	<p style="text-align: center;">TANZANIA CIVIL AVIATION AUTHORITY</p> <p style="text-align: center;">AERODROMES AND GROUND AIDS</p>	<p style="text-align: right;">Revision: 1</p>
<p>Document No. TCAA/QSP/SR/AC/AGA-032</p>	<p style="text-align: center;">PREPARATIONS OF AERODROMES MAINTENANCE MANUAL</p>	<p style="text-align: right;">Page 1 of 79</p>

1. PURPOSE

The purpose of this Advisory Circular is to provide guidance to the aerodrome operators on the information about standards, practices and procedures that the Authority has found to be an Acceptable Means of Compliance (AMC) with the associated Directives.

An AMC is not intended to be the only means of compliance with a Directive, and consideration will be given to other methods of compliance that may be presented to the Authority.

This Advisory Circular (AC) provides information and guidance to aerodrome operators on the conduct of aerodrome maintenance to meet requirements.

2. BACKGROUND


2.1 A maintenance program, including preventive maintenance, shall be established at an aerodrome to maintain facilities in a condition, which does not impair the safety, regularity or efficiency of air navigation.

Note: Preventive maintenance is programmed maintenance work done in order to prevent a failure or degradation of facilities.

Note: "Facilities" are intended to include such items as pavements, visual aids, fencing, drainage and electrical systems and buildings.

2.2 The design and application of the maintenance program shall observe Human Factors principles.

<p>This is a controlled document</p>	<p style="text-align: right;">Issued 14 August 2025</p>
--------------------------------------	---

	<p style="text-align: center;">TANZANIA CIVIL AVIATION AUTHORITY</p> <p style="text-align: center;">AERODROMES AND GROUND AIDS</p>	<p style="text-align: right;">Revision: 1</p>
<p>Document No. TCAA/QSP/SR/AC/AGA-032</p>	<p style="text-align: center;">PREPARATIONS OF AERODROMES MAINTENANCE MANUAL</p>	<p style="text-align: right;">Page 2 of 79</p>

Note: Guidance material on Human Factors principles can be found in the ICAO Human Factors Training Manual (Doc 9683) and in the Airport Services Manual (Doc 9137), Part 8.

3. REFERENCES

- 3.1 Civil Aviation (Aerodrome Design and Operations) Regulations, 2024.
- 3.2 ICAO Doc. 9137 – Airport Service Manual Part 8 and Part 9.
- 3.3 ICAO Doc. 9157.

4. GENERAL


4.1 General

4.1.1 Intention of the Manual:

Efficiency and safety of operation at an airport can only be expected from facilities that are in good operational condition. Proper maintenance is the only key to keep the installations and facilities of an airport in good condition. Maintenance also minimizes wear and tear, thus controlling and extending considerably the life span of technical components. In this respect maintenance becomes an economic requirement to keep investment and capital costs for the aeronautical infrastructure within acceptable limits.

4.1.2 The Maintenance manual is intended to give guidance to aerodrome operators on planning and conducting maintenance work on the airport. The guidance has been developed on the basis of related ICAO Documents which, in turn, were developed from various airport operators' practices and reflects long-term experience in the field of airport operation. Since wear and sensitivity of any technical component depend on material, utilization, age, climate and other environmental conditions, none of the recommendations on the type and intervals of maintenance action described in this manual should be considered a specification.

<p>This is a controlled document</p>	<p style="text-align: right;">Issued 14 August 2025</p>
--------------------------------------	---

	<p style="text-align: center;">TANZANIA CIVIL AVIATION AUTHORITY</p> <p style="text-align: center;">AERODROMES AND GROUND AIDS</p>	<p style="text-align: right;">Revision: 1</p>
<p>Document No. TCAA/QSP/SR/AC/AGA-032</p>	<p style="text-align: center;">PREPARATIONS OF AERODROMES MAINTENANCE MANUAL</p>	<p style="text-align: right;">Page 3 of 79</p>

Maintenance work shall be planned on the basis of local needs, experience and recommendations of manufacturers of components and be carried out as per the approval of the appropriate authority.

4.2 Organization of the Manual:

4.2.1 The Maintenance manual shall be organized in such a way as to cover primarily the airport maintenance tasks required for maintaining safe aircraft operation during the landing, taxi and take-off phases. In addition, some of the maintenance tasks supporting the airport efficiency have been included.


1.2.2 The requirements for safety reasons dominate the first part of the manual's contents, wherein the maintenance of visual aids, of electrical infrastructure, of pavements, of unpaved areas and of the drainage system is dealt with. Availability of suitable equipment is the tool for complying with the maintenance requirements of fixed facilities. Aircraft removal equipment represents a very special type of airport equipment. The material in this manual is complementary to the *Airport Services Manual*, Part 5, which deals with removal procedures.

4.3 Organization of the Maintenance:

4.3.1 Inspection is very vital part of maintenance. It comprises all measures to check and evaluate the operating condition including spontaneous and scheduled checks. Scheduled checks are carried out in accordance with a plan specifying the preparation of the check, the sort of check, the report on the result and the evaluation of the results. From the evaluations the operator decides whether or not extra servicing or even repair has to be undertaken.

4.3.2 A fundamental task of the maintenance organization is to translate the maintenance requirements into man/hours and monetary value. This evaluation is the basis of staffing budget planning. It is, furthermore, a tool for decision-making when contracting third parties for maintenance tasks instead of employing extra personnel.

<p>This is a controlled document</p>	<p style="text-align: right;">Issued 14 August 2025</p>
--------------------------------------	---

	<p style="text-align: center;">TANZANIA CIVIL AVIATION AUTHORITY</p> <p style="text-align: center;">AERODROMES AND GROUND AIDS</p>	<p style="text-align: right;">Revision: 1</p>
<p>Document No. TCAA/QSP/SR/AC/AGA-032</p>	<p style="text-align: center;">PREPARATIONS OF AERODROMES MAINTENANCE MANUAL</p>	<p style="text-align: right;">Page 4 of 79</p>

4.3.3 Computer assistance can be helpful and economical if the volume of maintenance is high. The computer is particularly capable of controlling preventive maintenance tasks typical of electrical systems and machines. Furthermore, evaluation of the aging of inventory and of maintenance budget control can be facilitated by suitable computer programmes. The computer is less effective for maintenance control of buildings and pavements, where repair work upon notice will always prevail.

4.3.4 Management should check the work carried out against scheduled maintenance tasks and thereby achieve the full control of the progress of maintenance and budget. Compliance reports are the feedback and have to be recorded, as well as observations on any reported deficiencies.


4.3.5 Updated maintenance programmes will allow:

- a. appropriate;
- b. compliance with the recorded maintenance needs; and
- c. flexibility as to the timing of action when unexpected circumstances have affected the planned schedule.

4.3.6 All maintenance programmes should be "screened" once a year, preferably at the time of budget planning. It is useful not only to rely on recorded data but to inspect the condition of all major objects at that time. In contrast to machines, whose operating hours give a good measure of wear, the deterioration of buildings is more dependent on weathering, utilization under heavy load, concealed construction deficiencies or other unpredictable sources of damage.

4.4 Requirement of workshops at the airport:

<p>This is a controlled document</p>	<p style="text-align: right;">Issued 14 August 2025</p>
--------------------------------------	---

	<p style="text-align: center;">TANZANIA CIVIL AVIATION AUTHORITY</p> <p style="text-align: center;">AERODROMES AND GROUND AIDS</p>	<p style="text-align: right;">Revision: 1</p>
<p>Document No. TCAA/QSP/SR/AC/AGA-032</p>	<p style="text-align: center;">PREPARATIONS OF AERODROMES MAINTENANCE MANUAL</p>	<p style="text-align: right;">Page 5 of 79</p>

To ensure the whole airport's smooth operation the provision of workshops at the airport is necessary from both an operational and economic standpoint. The size of the workshop and types of equipments to be available will of course depend on;

- a. the volume of maintenance to be done at the airport;
- b. the availability of skilled maintenance personnel; and
- c. availability of close-to-airport workshops or craftsmen that may be used for maintenance work on contract basis;
- d. compliance with airport emergency plan; and
- e. economic aims.

A sound balance between the capacity of the airport's basic maintenance workforce and their system to comply with peak and emergency workloads is important for an economic airport operation.

4.5 Categories of maintenance:

There are two categories of maintenance, namely-

- a) Corrective / Regular Maintenance,
- b) Preventive Maintenance.


4.5.1 Regular / Corrective maintenance:

Corrective maintenance can be defined as the maintenance which is required to bring an item back to working order when it has failed or worn out. Corrective maintenance shall be carried out on items where-

- a) the consequences of failure or wearing out are not very significant, and
- b) the cost of corrective maintenance is not greater than preventive maintenance.

Corrective Maintenance activity will consist of repair, restoration or replacement of equipment/ item. This activity will be the result of a regular

<p>This is a controlled document</p>	<p style="text-align: right;">Issued 14 August 2025</p>
--------------------------------------	---

	<p style="text-align: center;">TANZANIA CIVIL AVIATION AUTHORITY</p> <p style="text-align: center;">AERODROMES AND GROUND AIDS</p>	<p style="text-align: right;">Revision: 1</p>
<p>Document No. TCAA/QSP/SR/AC/AGA-032</p>	<p style="text-align: center;">PREPARATIONS OF AERODROMES MAINTENANCE MANUAL</p>	<p style="text-align: right;">Page 6 of 79</p>

inspection, which identifies the failure in time for corrective maintenance to be planned, scheduled and effected.

Corrective Maintenance activity will consist of repair, restoration or replacement of equipment/ item. This activity will be the result of a regular inspection, which identifies the failure in time for corrective maintenance to be planned, scheduled and effected.

4.5.2 Preventive maintenance:

Preventative maintenance is the maintenance which is carried out to prevent an item failing or wearing out. Preventive maintenance shall be implemented by providing systematic inspection, detection and prevention of incipient failure. Preventive maintenance shall be carried out on items where-


- a) the consequences of failure or wearing out are significant, and
- b) the cost of corrective maintenance is greater than preventive maintenance. The items falling under preventive maintenance would be e.g. lift, fire alarms, monitoring lamps for important equipment, electricity supply etc

5. MAINTENANCE OF VISUAL AIDS

5.1 Introduction:

The basic purpose of visual aid systems is to aid in the safe operation of aircraft. Therefore, the highest standards of maintenance are required. Once a system has been installed, its usefulness is dependent on its service-ability which in turn depends upon the effectiveness of the maintenance work carried out. Annex 14, Volume I, Chapter 10 defines a light to have failed when its light output falls below 50 per cent of that specified for a new light. The loss of in light output can be due to

<p>This is a controlled document</p>	<p style="text-align: right;">Issued 14 August 2025</p>
--------------------------------------	---

	<p style="text-align: center;">TANZANIA CIVIL AVIATION AUTHORITY</p> <p style="text-align: center;">AERODROMES AND GROUND AIDS</p>	<p style="text-align: right;">Revision: 1</p>
<p>Document No. TCAA/QSP/SR/AC/AGA-032</p>	<p style="text-align: center;">PREPARATIONS OF AERODROMES MAINTENANCE MANUAL</p>	<p style="text-align: right;">Page 7 of 79</p>

the following two causes:-

- a. Contaminants outside and inside the light unit, and
- b. Degradation of the lamp and optical system due to aging.

The light can and should be restored to its original condition by cleaning or replacing the lamp and any parts which have apparently become degraded. For this purpose it is essential to establish a comprehensive routine maintenance system for servicing lights and other equipment so that the installation complies with the specified requirements. Reference is made to Annex 14, Chapter 10.

5.2 Different types of Visual Aids:


Different types of visual aids used at airports are as follows:

- a. Runway edge lights, center line lights, touch-down zone lights, threshold lights, stop bar lights, runway end lights etc.
- b. Taxiway edge lights, center line lights, taxi stop bar lights etc.
- c. High intensity approach lights, low intensity approach lights, strobe lights, VASI / PAPI etc.
- d. Aerodrome beacon, wind direction indicators, obstruction lights etc.
- e. Markings and signs etc.

5.3 Performance level objectives for Visual Aids:


The Performance level objectives for visual aids shall be as given below. This performance level shall be maintained through scheduled, unscheduled and preventive maintenance.

<p>This is a controlled document</p>	<p style="text-align: right;">Issued 14 August 2025</p>
--------------------------------------	---

	TANZANIA CIVIL AVIATION AUTHORITY	Revision: 1
	AERODROMES AND GROUND AIDS	
Document No. TCAA/QSP/SR/AC/AGA-032	PREPARATIONS OF AERODROMES MAINTENANCE MANUAL	Page 8 of 79

SN	Light category	Minimum acceptable light output (% of specified value)	Minimum acceptable % of serviceable light		Consecutive lights, more than numbers given below, shall not remain unserviceable
1	Rwy edge lights	50 %	a) For Cat-1 operation, at or above prescribed visibility	85 %	2
			b) When RVR is less than 550 M	85 %	
			b) When RVR is less than 550 M	85 %	
2	Rwy end / THR lights	50 %	a) For Cat-1 operation, at or above prescribed visibility	75 %	2
			b) When RVR is less than 550 M	75 %	
3	Twy/Stop-bar lights	50 %	Not more than 2 lights shall be U/S.		2
4	Approach lights	50 %	a) Beyond 450 M	85 %	-

This is a controlled document	Issued 14 August 2025
-------------------------------	--------------------------

	<p style="text-align: center;">TANZANIA CIVIL AVIATION AUTHORITY</p> <p style="text-align: center;">AERODROMES AND GROUND AIDS</p>	<p style="text-align: right;">Revision: 1</p>
<p>Document No. TCAA/QSP/SR/AC/AGA-032</p>	<p style="text-align: center;">PREPARATIONS OF AERODROMES MAINTENANCE MANUAL</p>	<p style="text-align: right;">Page 9 of 79</p>

		b) Within 450 M	85 %	
--	--	-----------------	------	--

Note: With respect to barrettes, crossbars and runway edge lights, lights are considered to be adjacent if located consecutively and:

- ¾ laterally: in the same barrette or crossbar; or
- ¾ longitudinally: in the same row of edge lights or barrettes.

5.4 Personnel:

Electricians to be entrusted with the task of maintenance of lighting aids shall have the following qualifications / qualities:

- a. Be experienced with high voltage series circuits and lighting;
- b. Be fully acquainted with the work to be done;
- c. Be present or available on call during the operating hours of the airport to correct any deficiencies that might develop;
- d. Be provided with appropriate training to maintain their competence and to keep them abreast of new developments.

5.5 Spare parts:


An adequate stock of spare parts should be available. The required level of stock will depend on the following criteria:-

- a. Rate of consumption of the items;
- b. Time required to get the resupply of the items;
- c. Shelf life of the items.

5.6 As-built drawing:

A set of as-built drawings shall be kept readily available in the Maintenance unit. The

<p>This is a controlled document</p>	<p style="text-align: right;">Issued 14 August 2025</p>
--------------------------------------	---

	<p style="text-align: center;">TANZANIA CIVIL AVIATION AUTHORITY</p> <p style="text-align: center;">AERODROMES AND GROUND AIDS</p>	<p style="text-align: right;">Revision: 1</p>
<p>Document No. TCAA/QSP/SR/AC/AGA-032</p>	<p style="text-align: center;">PREPARATIONS OF AERODROMES MAINTENANCE MANUAL</p>	<p style="text-align: right;">Page 10 of 79</p>

as-built drawings shall be kept in the following manner:-


- a. Drawings shall be kept in the Maintenance unit and in the concerned Engineer's office;
- b. Drawings must be kept up to date and any changes at site shall be reflected immediately on these drawings.
- c. The completeness and the accuracy of all circuit diagrams, drawings and descriptions shall be checked at least annually.

5.7 Preventive maintenance of Visual aids:

A system of preventive maintenance of visual aids shall be employed to ensure lighting and marking system reliability. Procedures of preventive maintenance shall be as follows:-

- a. Light bulbs shall be considered unserviceable and be replaced when their brightness falls below 50% of normal value.
- b. The specifications from the Manufacturers regarding the normal life time of all the items of visual aids, shall be made available with the maintenance personnel, and light bulbs shall be replaced after 90% of the manufacturer's prescribed life time has elapsed.
- c. In case when manufacturer's specification is not available, light bulbs shall be replaced after 90% of the average life time of the bulbs has elapsed.
- d. Light fittings, fasteners and their supporting structures which may be damaged by rust shall be painted annually. Preferable period for such work shall be between January and April each year.
- e. Cable lives of all concerned sections of visual aids shall be verified and cables shall be replaced whenever there is any threat to the system to be hampered for damage of cables due to aging.
- f. Functions of all other items shall be closely monitored and shall be replaced whenever there is any threat to the system to be hampered due to

<p>This is a controlled document</p>	<p style="text-align: right;">Issued 14 August 2025</p>
--------------------------------------	---

	<p style="text-align: center;">TANZANIA CIVIL AVIATION AUTHORITY</p> <p style="text-align: center;">AERODROMES AND GROUND AIDS</p>	<p style="text-align: right;">Revision: 1</p>
<p>Document No. TCAA/QSP/SR/AC/AGA-032</p>	<p style="text-align: center;">PREPARATIONS OF AERODROMES MAINTENANCE MANUAL</p>	<p style="text-align: right;">Page 11 of 79</p>

aging of those items.

5.8 Basic components of maintenance:

Maintenance includes measures to keep or restore the operational function as well as measures to check and to evaluate the present function of an element. The basic components of maintenance are:

- a. Inspection/ Monitoring;
(The unserviceable lights can be identified more easily during night inspections, and of course, possible failures can be noticed by the operator at the Control desk if appropriate electric monitoring system is there.)
- b. Servicing and overhaul; and
- c. Repair.


5.8.1 Regular maintenance and Inspection:

Inspection is a vital part of maintenance. An inspection programme shall be prepared and be strictly followed. As the frequency of inspection will vary according to the hours of operation of the airport, inspection programme shall be prepared keeping pace with the hours of operation of the airport and flight schedule. Maintenance personnel of supervisor category shall regularly inspect the visual aids to assess the requirement of maintenance, and maintenance work shall be done immediately. For expediting the job, maintenance personnel shall be included in the inspection team to do the maintenance job instantaneously.

5.8.2 Recording of Inspection and Maintenance reports:

- a. Daily report of the maintenance work done during the last 24 hours shall be raised by the maintenance personnel and shall be sent to the concerned Engineer's office. The Engineer shall verify the genuinity of the

<p>This is a controlled document</p>	<p style="text-align: right;">Issued 14 August 2025</p>
--------------------------------------	---

	<p style="text-align: center;">TANZANIA CIVIL AVIATION AUTHORITY</p> <p style="text-align: center;">AERODROMES AND GROUND AIDS</p>	<p style="text-align: right;">Revision: 1</p>
<p>Document No. TCAA/QSP/SR/AC/AGA-032</p>	<p style="text-align: center;">PREPARATIONS OF AERODROMES MAINTENANCE MANUAL</p>	<p style="text-align: right;">Page 12 of 79</p>

report and preserve in his office as record.

b. Copy of the report shall be sent by the Engineer to the Airport Manager. Airport Manager shall verify the maintenance report against the Daily IOU report and take necessary action. Significant discrepancies shall be consulted with the concerned engineers. Reports shall be preserved as record.

5.8.3 Daily Reports:

a. Daily report of the serviceability status shall be raised by the maintenance personnel and shall be sent to the concerned Engineer's office. The Engineer shall verify the report against the daily maintenance reports and preserve in his office as record.


b. Copy of the report shall be sent by the Engineer to the Airport Manager. Airport Manager shall verify the maintenance report against the Daily maintenance report and take necessary action. Significant discrepancies shall be consulted with the concerned engineers. Reports shall be preserved as record.

c. Airport Manager shall send the report to CAM - TCAA HQ [Attention: ATS unit / (Air Traffic Controller) through the best available means.

5.8.4 Inspection and Maintenance Team:

A team for the inspection and maintenance of visual aids shall be formed with at least three members out of the following five persons, where No. a, or No. b, and

<p>This is a controlled document</p>	<p style="text-align: right;">Issued 14 August 2025</p>
--------------------------------------	---

	<p style="text-align: center;">TANZANIA CIVIL AVIATION AUTHORITY</p> <p style="text-align: center;">AERODROMES AND GROUND AIDS</p>	<p style="text-align: right;">Revision: 1</p>
<p>Document No. TCAA/QSP/SR/AC/AGA-032</p>	<p style="text-align: center;">PREPARATIONS OF AERODROMES MAINTENANCE MANUAL</p>	<p style="text-align: right;">Page 13 of 79</p>

No. e, shall be included:

- a. Assistant Engineer, E/M
- b. Sub-assistant Engineer, E/M
- c. E/M Foreman,
- d. Electrician,
- e. One Security personnel.

5.95.9 General procedures of Maintenance:


At the time of maintenance of the lights the following general procedures shall be followed:-

- a. The instructions of the appropriate authority, based on the recommendations of the manufacturer shall be followed.
- b. Maintenance schedule shall be prepared and records of maintenance of each piece of equipment shall be maintained.
- c. This can be arranged in a dated reminder file to make sure that each equipment is serviced regularly.
- d. This record should have space to enter observations, action taken and signature of the Technicians.
- e. If situation demands, a change in the schedule may be effected with the approval of appropriate authority and in consultation with the equipment manufacturer, if applicable.

5.10 5.10 Frequency of checks:

- a. Frequency of inspection and servicing will vary according to the

<p>This is a controlled document</p>	<p style="text-align: right;">Issued 14 August 2025</p>
--------------------------------------	---

	<p style="text-align: center;">TANZANIA CIVIL AVIATION AUTHORITY</p> <p style="text-align: center;">AERODROMES AND GROUND AIDS</p>	<p style="text-align: right;">Revision: 1</p>
<p>Document No. TCAA/QSP/SR/AC/AGA-032</p>	<p style="text-align: center;">PREPARATIONS OF AERODROMES MAINTENANCE MANUAL</p>	<p style="text-align: right;">Page 14 of 79</p>

type of equipment, its location and usage.

- b. A maintenance programme shall be prepared for each airport based on its past experience and with the objective of achieving required service standard.
- c. The following schedules are presented as guidance material in establishing a preventive maintenance programme.
- d. More frequent checks may required for higher categories of lights.
- e. Each check shall be followed by appropriate corrective action.

5.10.1 Daily Checks:

(1) Runway, Taxiway, Approach, Threshold, PAPI and other Lights:

- a. Burnt-out lamps shall be replaced.
- b. Glass of each light to be cleaned and shall be replaced, as required.
- c. Loose fasteners of light units shall be tightened.
- d. Rusted and corroded light parts and reflectors shall be painted and replaced, if required.
- e. Horizontal alignment of the light units shall be adjusted, as applicable.


(2) Inset lights:

- a. Lenses o f inset lights shall be cleaned.
- b. Light output of runway center line lights shall be measured and recorded; lenses shall be cleaned and replaced, if required.
- c. Top parts of runway center line lights shall be checked and unserviceable parts shall be replaced, as required.

(3) Other Airport lights: Airport beacon, obstacle lights, signs markers etc:

- a. Burnt-out lamps shall be replaced.

<p>This is a controlled document</p>	<p style="text-align: right;">Issued 14 August 2025</p>
--------------------------------------	---

	<p style="text-align: center;">TANZANIA CIVIL AVIATION AUTHORITY</p> <p style="text-align: center;">AERODROMES AND GROUND AIDS</p>	<p style="text-align: right;">Revision: 1</p>
<p>Document No. TCAA/QSP/SR/AC/AGA-032</p>	<p style="text-align: center;">PREPARATIONS OF AERODROMES MAINTENANCE MANUAL</p>	<p style="text-align: right;">Page 15 of 79</p>

- b. Control equipment shall be corrected or repaired, as required for proper operation.
- c. Fabric of wind cone shall be replaced, as required.
- d. Inscriptions legibility shall be ensured by repairing the signs and removing the obstructions, as required.

5.10.2 Monthly checks:


(1) Runway, Taxiway, Approach, Threshold, PAPI and other Lights:

- a. Spreader glasses, filters and lamps shall be cleaned.
- b. Light output of all lights within the system shall be measured and results shall be recorded; lenses shall be cleaned.
- c. Elevation setting of the light units shall be adjusted, as required.
- d. Control equipment shall be checked for proper operation at each brightness step; malfunctions shall be corrected and repaired, as required.

5.10.3 Half-yearly / Yearly Checks:

(1) Runway, Taxiway, Approach, Threshold, PAPI and other Lights:

- a. Lamps of the whole system shall be checked; unserviceable lamps or, if required, lamps of the entire system shall be replaced.
- b. Rusted and corroded light parts and reflectors shall be painted and replaced, if required.
- c. Reflector of each light unit (if applicable), shall be cleaned, and replaced, if required.
- d. Loose fasteners of light units shall be tightened.
- e. Plug connections shall be checked and faultless connection shall be ensured by cleaning the dirty parts; if required, faulty plugs shall be replaced.

	<p style="text-align: center;">TANZANIA CIVIL AVIATION AUTHORITY</p> <p style="text-align: center;">AERODROMES AND GROUND AIDS</p>	<p style="text-align: right;">Revision: 1</p>
<p>Document No. TCAA/QSP/SR/AC/AGA-032</p>	<p style="text-align: center;">PREPARATIONS OF AERODROMES MAINTENANCE MANUAL</p>	<p style="text-align: right;">Page 16 of 79</p>

f. Elevation setting of the light units shall be checked and elevation shall be adjusted, as applicable.

g. Horizontal alignment of the light units shall be checked and alignment shall be adjusted, as applicable.

h. Supporting structure and the foundation of the units shall be repaired and painted, as required.

(2) Inset lights:

a. Lenses of inset lights shall be cleaned.

b. Lights shall be dried for moisture, if required.

c. Electrical connections of the lights shall be tightened and sprayed with contact agents for proper contact.

d. Alignment of the lights shall be adjusted, as required.

e. Prisms and filters of lights shall be cleaned or replaced, if required.

f. Sealing compound shall be changed shall be resealed.

(3) Other Airport lights: Airport beacon, obstacle lights, signs markers etc:

a. Power supply brushes and slip-rings of aerodrome beacon shall be cleaned; or replaced, if required.

b. Electrical connections of the lights shall be tightened.

c. Rotating parts shall be fastened.

d. Optical system of the beacon shall be checked and required remedial action shall be taken.


e. Glasses and gaskets of obstacle lights shall be cleaned; or replaced, if required.

f. Function of the Flashing lights and twilight switches shall be cleaned, repaired or replaced, if required.

g. Power supply and lighting of the wind direction indicator shall be repaired or replaced, if required.

h. Fastener of the wind direction indicator shall be tightened

<p>This is a controlled document</p>	<p style="text-align: right;">Issued 14 August 2025</p>
--------------------------------------	---

	<p style="text-align: center;">TANZANIA CIVIL AVIATION AUTHORITY</p> <p style="text-align: center;">AERODROMES AND GROUND AIDS</p>	<p style="text-align: right;">Revision: 1</p>
<p>Document No. TCAA/QSP/SR/AC/AGA-032</p>	<p style="text-align: center;">PREPARATIONS OF AERODROMES MAINTENANCE MANUAL</p>	<p style="text-align: right;">Page 17 of 79</p>

and structure shall be repaired, if required.

i. Supporting structure and the foundation of different units shall be repaired, as required.

j. Loose fasteners of obstruction lights shall be tightened.

k. Easy access to locations of obstruction lights, for maintenance, shall be arranged; if required and possible, location shall be changed.

l. Structure and mounting of both signs and their lighting shall be cleaned, repaired and replaced, as required; shall be repainted wherever applicable.

m. All markings on paved areas shall be inspected at least semi-annually; markings which are faded or discolored by soil shall be repainted.

(4) Docking guidance system:

a. Alignment of the system shall be adjusted.

b. Electric connections shall be checked for wear and tear; connections shall be cleaned, tightened and replaced, as required.

c. Control relays shall be cleaned and replaced, as required.


d. Structure of the system and function of all mechanical parts, shall be repaired and restored, as required

e. Total system shall be cleaned and dried, as required for proper functioning.

5.10.4 Non-schedule checks:

In addition to carrying out all the above mentioned scheduled maintenances, situations like some natural calamity, accidents, sabotage etc. may give rise to such

<p>This is a controlled document</p>	<p style="text-align: right;">Issued 14 August 2025</p>
--------------------------------------	---

	<p style="text-align: center;">TANZANIA CIVIL AVIATION AUTHORITY</p> <p style="text-align: center;">AERODROMES AND GROUND AIDS</p>	<p style="text-align: right;">Revision: 1</p>
<p>Document No. TCAA/QSP/SR/AC/AGA-032</p>	<p style="text-align: center;">PREPARATIONS OF AERODROMES MAINTENANCE MANUAL</p>	<p style="text-align: right;">Page 18 of 79</p>

situation when some outof-schedule maintenance work will become essential.

5.11 5.11 Light Maintenance Procedures:

5.11.1 General hints for Maintenance of lights

Maintenance work can be done in two ways-

- a. Indoor, and
- b. Outdoor.

As far as practicable, maintenance work shall be carried out indoor. Outdoor maintenance has the following inconveniences:-

- a. Heat, cold, precipitation etc.
- b. Aircraft noise.
- c. Traffic restrictions, interruptions etc.

5.11.2 Steps of Maintenance procedures

There are two steps in the commonly used maintenance procedure-

- a. Removal of defective lights and replacement by new or repaired once;
- b. Servicing and overhauling of deficiencies in the workshop where required tools and equipment are available.


The prerequisites to run the above system of maintenance are as follows:-

- a. Provision of sufficient number of spares;
- b. Requirements of spare parts will be determined by the past experience of rate of damage / consumption of the individual items;
- c. Lights which are easy to install and repair should be used;

5.12 Cleaning procedures of lights

The type and degree of contamination of the various lights on an airport will be

<p>This is a controlled document</p>	<p style="text-align: right;">Issued 14 August 2025</p>
--------------------------------------	---

	<p style="text-align: center;">TANZANIA CIVIL AVIATION AUTHORITY</p> <p style="text-align: center;">AERODROMES AND GROUND AIDS</p>	<p style="text-align: right;">Revision: 1</p>
<p>Document No. TCAA/QSP/SR/AC/AGA-032</p>	<p style="text-align: center;">PREPARATIONS OF AERODROMES MAINTENANCE MANUAL</p>	<p style="text-align: right;">Page 19 of 79</p>

different. While elevated approach and edge lights are normally contaminated by dust carried by wind and rain, more severe contamination can be observed on inset lights, particularly on runways. Rubber deposits from tires on touchdown and exhaust from engine reverse thrust procedures create firmly sticking deposits on the exterior glassware of lights. The very different degree of contamination must be reflected in the maintenance schedule of different categories of lights or sections in the runway/taxiway system.

5.12.1 When cleaning the glassware of lights, the manufacturer's recommendations should be observed. Normally, cleaning is accomplished by washing the glassware with a cleansing mixture of water and a special solvent that will neither affect the sealing material nor produce a residual film on the glass. The solvent must be given sufficient time to dissolve the deposits. If necessary, rubber spots may be scraped off by using plastic tools or powder before using the solvent. Other mechanical aids for cleaning may be sponges, cloths, hand brushes or electric rotating brushes. The cleaning technique and the materials used should not scratch or groove the glass surface nor damage the sealing material.


5.12.2 Dry cleaning of glassware should be avoided. However, if cleaning becomes necessary for some reason, no sand or other abrasive material should be used. In such cases cleaning can be done by using clean ground-up walnut or pecan shells and dry compressed air. Special treatment can normally be avoided by following a maintenance schedule with wet cleaning at suitable intervals.

5.12.3 Thorough cleaning of the interior of the lights to remove mud, moisture or rust should be carried out in workshops. Only minor contaminants, such as dust, should be removed on site.

5.13 Water inside lamps

Inset lights may sometime collect water. Water inside the lights causes the following problems:-

<p>This is a controlled document</p>	<p style="text-align: right;">Issued 14 August 2025</p>
--------------------------------------	---

	<p style="text-align: center;">TANZANIA CIVIL AVIATION AUTHORITY</p> <p style="text-align: center;">AERODROMES AND GROUND AIDS</p>	<p>Revision: 1</p>
<p>Document No. TCAA/QSP/SR/AC/AGA-032</p>	<p style="text-align: center;">PREPARATIONS OF AERODROMES MAINTENANCE MANUAL</p>	<p>Page 20 of 79</p>

- a. Increase corrosion;
- b. Damage to electrical parts;
- c. Deposits on lenses and lamps;
- d. Reduces the life of the lamp.

5.13.1 Remedial actions against water inside the lamps:

Preventive and remedial actions against water inside lamp shall be as follows:

- a. Before inserting a light into the pavement, good drainage of the opening must be ensured.
- b. Regular inspection shall be made to check lights for presence of water, penetration of moisture and accumulation of water can not be prevented completely.

Lights found to be wet inside should be removed and replaced, if such a procedure is possible with the type of light. Other wise, drying must be carried out on the spot.


- a. After drying, the sealings should be checked carefully and replaced when required.
- b. Before closing a dried light, the lamp should be switched on for some time to permit any residual moisture to evaporate due to the temperature increase inside.

Attention should be paid to the presence of water on and in front of the glass of inset tights. Water may bend the light beam, thus misaligning the light direction. If such a situation is observed, the drainage has to be improved.

5.14 Lamp Replacement

The life span of lamps varies from 100 to some 1 000 hours of operation. The life time depends on the percentage of operation at high brightness levels and on the

<p>This is a controlled document</p>	<p>Issued 14 August 2025</p>
--------------------------------------	----------------------------------

	<p style="text-align: center;">TANZANIA CIVIL AVIATION AUTHORITY</p> <p style="text-align: center;">AERODROMES AND GROUND AIDS</p>	<p style="text-align: right;">Revision: 1</p>
<p>Document No. TCAA/QSP/SR/AC/AGA-032</p>	<p style="text-align: center;">PREPARATIONS OF AERODROMES MAINTENANCE MANUAL</p>	<p style="text-align: right;">Page 21 of 79</p>

number of switchings, dynamic stresses imposed by aircraft wheel loads (inset lights) and temperature-induced stresses inside the casing affect the lamp life. Lamps which have failed shall be replaced as soon as possible so that the lighting system of the airport meets the required maintenance level objectives stated in para 5.3 of this Manual. (Ref: Annex 14, Chapter 10).

5.14.1 Lamp replacement Procedures:

The following procedures shall be followed to replace the unserviceable lamps:


- a. Only lamps which have failed or lamps showing major output reduction are replaced upon checking; this method requires checks to be carried out at short intervals;
- b. Bulk changing of lamps in certain sections of the entire lighting system in accordance with a fixed time schedule.
- c. The intervals between replacements have to be derived from local experience with the average life of lamps in use.
- d. Lamps should be changed when they have been operated for 80 per cent of their average life.
- e. For this maintenance method a reliable record of operating hours for the individual sections of the airport's lighting system is a required.
- f. This method requires less frequent checks.

Lamp replacement in the workshop is preferable, particularly with inset lights. The unserviceable light shall be removed from its position and replaced by a serviceable light. Lamp replacement of elevated lights may be carried out on site provided that the casing can be opened easily and quickly, and the socket of the lamp needs no realignment afterwards,

5.15 Light Measurements and Output Standards:

5.15.1 The light output will diminish with the lapse of time due to lamp aging.

<p>This is a controlled document</p>	<p style="text-align: right;">Issued 14 August 2025</p>
--------------------------------------	---

	<p style="text-align: center;">TANZANIA CIVIL AVIATION AUTHORITY</p> <p style="text-align: center;">AERODROMES AND GROUND AIDS</p>	<p style="text-align: right;">Revision: 1</p>
<p>Document No. TCAA/QSP/SR/AC/AGA-032</p>	<p style="text-align: center;">PREPARATIONS OF AERODROMES MAINTENANCE MANUAL</p>	<p style="text-align: right;">Page 22 of 79</p>

Contamination of reflector and lens will result in a further degradation of light output. **A light shall be considered to have failed when its output is less than 50% of the required intensity.** For practical reasons a light will be replaced when its output falls below 70 per cent of that specified for a new light.

5.15.2 Light measurements shall be carried out regularly to detect early light output reduction. Appropriate equipment for both field and bench measurement of light output will be made available. The equipment produced by light manufacturers does not, however, indicate the absolute intensity values but provide ratios between measured and original light intensities of each individual type.

5.15.3 Field measurements are particularly necessary for inset lights. Wheel loads on inset lights may frequently cause damage. Before measuring, the lights shall be cleaned and switched to the highest available intensity setting.


5.15.4 Light measurements shall be made by using the measuring equipment supplied by the light manufacturers or procured time to time, as required. The intensity is checked by comparison with the results of a calibration test with a new light.

5.15.5 Often a much faster visual observation carried out by experienced personnel will achieve comparable results for discovering and reporting single lights with unacceptable light output. For visual checks the level of brightness must be switched to "low" (3 to 10 per cent of maximum).

5.15.6 For adjustment of the correct angle of the beam, lights are normally furnished with alignment markings. Beam misalignment caused by displacement of the optical system inside, which cannot be corrected by adjusting the casing, shall be adjusted in the workshop.

5.15.7 For measuring light output in the workshop microammeter readings shall be compared with the calibration value. Directional adjustments shall be made using

<p>This is a controlled document</p>	<p style="text-align: right;">Issued 14 August 2025</p>
--------------------------------------	---

	<p style="text-align: center;">TANZANIA CIVIL AVIATION AUTHORITY</p> <p style="text-align: center;">AERODROMES AND GROUND AIDS</p>	<p style="text-align: right;">Revision: 1</p>
<p>Document No. TCAA/QSP/SR/AC/AGA-032</p>	<p style="text-align: center;">PREPARATIONS OF AERODROMES MAINTENANCE MANUAL</p>	<p style="text-align: right;">Page 23 of 79</p>

the alignment screws.

5.16 Maintenance of Signs and Markings:

Signs and Markings give pilots directional information for taxiing and holding. Maintenance should ensure integrity and perfect legibility of the information provided by them. The design and construction of signs varies considerably and maintenance system may also vary; but the general checks and maintenance, as given in articles 5.3 shall be followed and, if required, additional system may be adopted with the approval of appropriate authority.

6. MAINTENANCE OF AIRPORT ELECTRICAL SYSTEMS


6.1 Introduction

The serviceability and reliability of air navigation equipment and installations are requirements for safe operation of aircraft in airport area. Apart from visual aids, the air navigation equipment and installations include electronic landing aids, navigation equipment, radar and meteorological equipment. The required serviceability of installations and equipment will only be achieved as long as a constant power supply is maintained. To this end, a regular maintenance for airport equipment and installations distributing primary power and equipment supplying the secondary power when there is a circuit break down. This circular will provide a general guideline to the Aerodrome operators in making a maintenance programme for individual elements of the Power Supply System.

6.2 Purpose

The purpose this manual is to establish a mechanism to assist the aerodrome operators to prepare their maintenance programme for Airport Electrical System and

<p>This is a controlled document</p>	<p style="text-align: right;">Issued 14 August 2025</p>
--------------------------------------	---

	<p style="text-align: center;">TANZANIA CIVIL AVIATION AUTHORITY</p> <p style="text-align: center;">AERODROMES AND GROUND AIDS</p>	<p style="text-align: right;">Revision: 1</p>
<p>Document No. TCAA/QSP/SR/AC/AGA-032</p>	<p style="text-align: center;">PREPARATIONS OF AERODROMES MAINTENANCE MANUAL</p>	<p style="text-align: right;">Page 24 of 79</p>

that they effectively implement the aerodrome maintenance programme including preventive maintenance programme to ensure highest level of performance of all kinds of electrical installations and appliances.

6.3 Different elements of Electrical Installations and Equipment:

The individual elements of Electrical Installations and Equipment are as follows:-

- a. Power cables,
- b. Control cables,
- c. Airport sub-stations (Transformer, generator, PFI panel, Relay and magnetic circuits, Control circuits, switchgear panels, AVR)
- d. Flood lights, street lights, terminal light fittings, fans etc.
- e. Boarding bridges,
- f. Lifts, escalators,
- g. Check-in counters and conveyer belts,
- h. Air condition system.


6.4 Maintenance Personnel:

Electricians to be entrusted with the task of maintenance of Airport Electrical System shall have the following qualifications / qualities. They shall-

- a. be skilled electricians,
- b. be well informed and acquainted with the safety measures while working in high voltage areas,
- c. be fully acquainted with the work to be done, and
- d. be present or on call during the operating hours of the airport to correct any deficiencies that might develop. Wherever possible, the same personnel can be utilized for maintenance of both Electrical systems and Visual aids.

Note: *To protect personnel the required safety devices should always be kept in good condition.*

<p>This is a controlled document</p>	<p style="text-align: right;">Issued 14 August 2025</p>
--------------------------------------	---

	<p style="text-align: center;">TANZANIA CIVIL AVIATION AUTHORITY</p> <p style="text-align: center;">AERODROMES AND GROUND AIDS</p>	<p style="text-align: right;">Revision: 1</p>
<p>Document No. TCAA/QSP/SR/AC/AGA-032</p>	<p style="text-align: center;">PREPARATIONS OF AERODROMES MAINTENANCE MANUAL</p>	<p style="text-align: right;">Page 25 of 79</p>

6.5 As-built wiring / circuit diagram and Manufacturer's Manual:

A set of wiring / circuit diagram is required to be available in the maintenance unit. The wiring / circuit diagram shall be kept in the following manner:-

- a. A set of wiring / circuit diagram of important and complex electrifications shall be kept readily available.
- b. These wiring / circuit diagram must be kept up to date and any changes at site shall be reflected immediately on these drawings.
- c. The completeness and the accuracy of all circuit diagrams, drawings and descriptions shall be checked at least annually.
- d. Manufacturer's Operation and Maintenance Manual shall be preserved in the office of the concerned maintenance engineering division.

6.6 Spare Parts

An adequate stock of spare parts should be available. The required level of stock of spare parts will depend on the following criteria:-


- a) Rate of consumption of the item;
- b) Time required to re-supply the item, and
- c) Shelf life of the item.

6.7 General procedures for Maintenance:

At the time of servicing the electrical installations, the following general procedures shall be followed:-

- a. The instructions of the appropriate authority, based on the recommendations of the manufacturer shall be followed.
- b. Maintenance schedule shall be prepared and records of maintenance

<p>This is a controlled document</p>	<p style="text-align: right;">Issued 14 August 2025</p>
--------------------------------------	---

	<p style="text-align: center;">TANZANIA CIVIL AVIATION AUTHORITY</p> <p style="text-align: center;">AERODROMES AND GROUND AIDS</p>	<p style="text-align: right;">Revision: 1</p>
<p>Document No. TCAA/QSP/SR/AC/AGA-032</p>	<p style="text-align: center;">PREPARATIONS OF AERODROMES MAINTENANCE MANUAL</p>	<p style="text-align: right;">Page 26 of 79</p>

of each piece of equipment shall be maintained.

- c. These can be arranged in a dated reminder file to make sure that all equipment is serviced regularly.
- d. This record should have space to enter observations, measurements and initials of the servicing individual.
- e. If situation demands, a change in the schedule may be effected with the approval of appropriate authority and in consultation with the equipment manufacturer, if applicable.

6.7.1 Regular / Corrective maintenance

Corrective maintenance can be defined as the maintenance which is required to bring an item back to working order when it has failed or worn out. Corrective maintenance shall be carried out on items where-


- a) the consequences of failure or wearing out are not very significant, and
- b) the cost of corrective maintenance is not greater than preventive maintenance. Corrective Maintenance activity will consist of repair, restoration or replacement of equipment/ item. This activity will be the result of a regular inspection, which identifies the failure in time for corrective maintenance to be planned, scheduled and effected.

6.7.2 Preventive maintenance

Preventative maintenance is the maintenance which is carried out to prevent an item failing or wearing out. Preventive maintenance shall be implemented by providing systematic inspection, detection and prevention of incipient failure. Preventive maintenance shall be carried out on items where-

- a) the consequences of failure or wearing out are significant, and
- b) the cost of corrective maintenance is greater than preventive maintenance. The items falling under preventive maintenance would be e.g. lift, fire alarms, monitoring lamps for important equipment,

<p>This is a controlled document</p>	<p style="text-align: right;">Issued 14 August 2025</p>
--------------------------------------	---

	<p style="text-align: center;">TANZANIA CIVIL AVIATION AUTHORITY</p> <p style="text-align: center;">AERODROMES AND GROUND AIDS</p>	<p style="text-align: right;">Revision: 1</p>
<p>Document No. TCAA/QSP/SR/AC/AGA-032</p>	<p style="text-align: center;">PREPARATIONS OF AERODROMES MAINTENANCE MANUAL</p>	<p style="text-align: right;">Page 27 of 79</p>

electricity supply etc.

6.8 Basic components of maintenance:

Maintenance includes measures to keep or restore the operational function as well as measures to check and to evaluate the present function of an element. The basic components of maintenance are:


- a. Inspection/ Monitoring;
(The unserviceable lights can be identified more easily during night inspections, and of course, possible failures can be noticed by the operator at the Control desk, if appropriate electric monitoring system is there).
- b. Servicing and overhaul; and
- c. Repair.

6.8.1 Regular maintenance and Inspection:

Inspection is a vital part of maintenance. An inspection programme shall be prepared and be strictly followed. As the frequency of inspection will vary according to the hours of operation of the airport, inspection programme shall be prepared keeping pace with the hours of operation of the airport and flight schedule. Inspection programme for residential or commercial areas shall be prepared on different perspectives. Maintenance personnel of supervisor category shall regularly inspect the electrical installations and equipments to assess the requirement of maintenance, and maintenance work shall be done immediately. For expediting the job, maintenance personnel shall be included in the inspection team to do the maintenance job instantaneously.

6.8.2 Recording of Inspection and Maintenance reports

<p>This is a controlled document</p>	<p style="text-align: right;">Issued 14 August 2025</p>
--------------------------------------	---

	<p style="text-align: center;">TANZANIA CIVIL AVIATION AUTHORITY</p> <p style="text-align: center;">AERODROMES AND GROUND AIDS</p>	<p style="text-align: right;">Revision: 1</p>
<p>Document No. TCAA/QSP/SR/AC/AGA-032</p>	<p style="text-align: center;">PREPARATIONS OF AERODROMES MAINTENANCE MANUAL</p>	<p style="text-align: right;">Page 28 of 79</p>

a. Daily report of the maintenance work during the last 24 hours shall be raised by the maintenance personnel and shall be sent to the concerned Engineer's office. The Engineer shall verify the genuinity of the report and preserve in his office as record.

b. Copy of the report shall be sent by the Engineer to the Airport Manager. Airport Manager shall verify the maintenance report and take necessary action. Significant discrepancies shall be consulted with the concerned engineers. Reports shall be preserved as record.

6.8.3 Inspection and Maintenance Team

Regular inspections of the Electrical items shall be done with a team consisting of at least 3 (three) members out of the following persons, where No. a, or No. b shall be included:

- a. Assistant Engineer, E/M
- b. Sub-assistant Engineer, E/M
- c. E/M Foreman,
- d. Electrician,

6.8.4 Grouping of the electric items for Maintenance:


For the purpose of efficient maintenance and easy supervision all the electrical items may be divided into some groups and maintenance task of particular group of items may be assigned to separate group of personnel. Such grouping may done in two ways:-

- a. group of equipment/ installations which are identical in nature, or
- b. group of equipment/ installations which are located in one or adjacent areas.

Both the ways of grouping has their merits and demerits, and of course, the concerned aerodrome operator shall decide the way which will be most suitable for his aerodrome.

6.9 Maintenance schedule and frequency of maintenance:

<p>This is a controlled document</p>	<p style="text-align: right;">Issued 14 August 2025</p>
--------------------------------------	---

	<p style="text-align: center;">TANZANIA CIVIL AVIATION AUTHORITY</p> <p style="text-align: center;">AERODROMES AND GROUND AIDS</p>	<p style="text-align: right;">Revision: 1</p>
<p>Document No. TCAA/QSP/SR/AC/AGA-032</p>	<p style="text-align: center;">PREPARATIONS OF AERODROMES MAINTENANCE MANUAL</p>	<p style="text-align: right;">Page 29 of 79</p>

It is very difficult to describe a generally applicable maintenance schedule for the very different types of electrical installations. The frequency of inspection, cleaning and servicing will vary according to the type of installations and equipment, their location and usage. A maintenance programme shall be prepared for each airport based on its past experience and with the objective of achieving required service standard.

The following schedules are presented as guidance material in establishing a corrective and, at the same time, a preventive maintenance programme.

- a. More frequent checks may be required for higher categories of lights / equipment.
- b. Each check shall be followed by appropriate corrective action.
- c. All malfunctions and corrective actions are to be recorded after taking the action.

6.9.1 Daily Checks

(1) Lighting and Electric equipment, Lighting system of the terminal building and forecourt, Apron Flood lighting, Lighting system for Roads and Parking lots:


- a. Burnt-out lamps shall be replaced.
- b. Unserviceable switches, including remote control switches, shall be repaired or replaced as required.

(2) Control cables, monitoring units, control desk:

- a. Optical and acoustical signals shall be checked for feedback and restored.
- b. Unserviceable and burnt-out lamps of monitoring units shall be replaced.

(3) Fixed 400 Hz ground power supplies:

This is a controlled document	<p style="text-align: right;">Issued 14 August 2025</p>
-------------------------------	---

	<p style="text-align: center;">TANZANIA CIVIL AVIATION AUTHORITY</p> <p style="text-align: center;">AERODROMES AND GROUND AIDS</p>	<p style="text-align: right;">Revision: 1</p>
<p>Document No. TCAA/QSP/SR/AC/AGA-032</p>	<p style="text-align: center;">PREPARATIONS OF AERODROMES MAINTENANCE MANUAL</p>	<p style="text-align: right;">Page 30 of 79</p>

- a. Plugs, cables and cable holdings shall be checked and repaired, as required.
- b. Unserviceable control lamps shall be replaced.

(4) Lifts / Escalators:

- a. Lifts shall be cleaned.
- b. Functioning of the lifts shall be checked; any unusual sound or jerk shall be attended and for fault shall be removed.

(5) Air conditioners:

The operational condition of the system has to be monitored constantly from the control centre so that any failures can be detected early and corrective action taken in time

- a. Moisture control shall be checked.
- b. Energy consumption of electric motors freezers shall be checked.
- c. Cooling water flow meters timer control shall be checked.

6.9.2 Weekly Checks


(1) Lighting and Electric equipment, Lighting system of the terminal building and forecourt, Lighting system for Roads and Parking lots:

- a. Proper functioning shall be checked and ensured.
- b. Fluorescent tubes and ignition starters shall be replaced, as required.

(2) Airport sub-stations:

- a. Over-all condition of the Sub-stations shall be checked visually and restored.
- b. All switchgear panels shall be checked for completeness of contents

<p>This is a controlled document</p>	<p style="text-align: right;">Issued 14 August 2025</p>
--------------------------------------	---

	<p style="text-align: center;">TANZANIA CIVIL AVIATION AUTHORITY</p> <p style="text-align: center;">AERODROMES AND GROUND AIDS</p>	<p style="text-align: right;">Revision: 1</p>
<p>Document No. TCAA/QSP/SR/AC/AGA-032</p>	<p style="text-align: center;">PREPARATIONS OF AERODROMES MAINTENANCE MANUAL</p>	<p style="text-align: right;">Page 31 of 79</p>

and missing elements shall be added.

(3) Control cables, monitoring units, control desk:

- a. Nominal control voltage shall be maintained by charging the batteries,
- b. Voltage and ammeter readings shall be adjusted.
- c. Acid level in batteries shall be maintained by adding distilled water.

(4) Fixed 400 Hz ground power supplies:

- a. Proper functioning shall be checked and ensured.
- b. Loose connections shall be repaired.
- c. Necessary repairs shall be done to prevent oil spillage.


(5) Baggage check-in counters, weighing scales and Conveyor Belts:

- a. Visual checks shall be carried out for check-in counters, weighing scales and for cuts and cracks of the belts. Short cracks at the edges can be eliminated by cutting off the damaged edge material.
- b. Smooth movement and low noise shall be ensured by proper servicing. Noisy and squeaking parts shall be repaired or replaced.
- c. Loose spring rollers shall be adjusted.
- d. Stress on belt movements shall be adjusted to normal.
- e. Control box and monitoring units of the check-in counters and weighing scales shall be checked and repair or replacement shall be done, as required.

(6) Passenger Boarding Bridge:

- a. Tires shall be checked for surface damage and wear.
- b. Wheel brakes shall be checked.
- c. Electric driving motors shall be checked and drive chains shall be cleaned, as required.
- d. Lifting jacks shall be checked for normal operations; lubrication shall be done as required.
- e. Hydraulic system shall be checked and normal operation shall be ensured.

<p>This is a controlled document</p>	<p style="text-align: right;">Issued 14 August 2025</p>
--------------------------------------	---

	<p style="text-align: center;">TANZANIA CIVIL AVIATION AUTHORITY</p> <p style="text-align: center;">AERODROMES AND GROUND AIDS</p>	<p style="text-align: right;">Revision: 1</p>
<p>Document No. TCAA/QSP/SR/AC/AGA-032</p>	<p style="text-align: center;">PREPARATIONS OF AERODROMES MAINTENANCE MANUAL</p>	<p style="text-align: right;">Page 32 of 79</p>

f. Bridge movements, i.e. extension, retraction, lowering, raising and steering shall be checked and normal operation shall be ensured.

(7) Air Condition system:

- a. Activated carbon filters and air filters shall be changed, as required.
- b. Energy consumption of freezers (refrigerators), air supplies, fans, electric motors, flaps, valves, regulators and pumps shall be checked.
- c. Insulation shall be checked for damage.
- d. Cone belts shall be checked.

6.9.3 Monthly Checks

(1) Lighting and Electric equipment:

- a. Accumulators (battery capacities) shall be checked.
- b. Repair work, as found necessary through inspections, shall be done according to maintenance plan.
- c. Light bulbs shall be replaced according to maintenance plan.


(2) Transformers and regulators, including stand by units:

- a. Shall be cleaned and oil shall be replaced.
- b. Regulator switches at all light intensity positions shall be checked and restored.
- c. Switch over to standby units shall be checked for serviceability, and restored.

(3) Control cables, monitoring units, control desk:

- a. Functions of the monitoring units shall be checked.
- b. Parts shall be cleaned, repaired and replaced as required.

<p>This is a controlled document</p>	<p style="text-align: right;">Issued 14 August 2025</p>
--------------------------------------	---

	<p style="text-align: center;">TANZANIA CIVIL AVIATION AUTHORITY</p> <p style="text-align: center;">AERODROMES AND GROUND AIDS</p>	<p style="text-align: right;">Revision: 1</p>
<p>Document No. TCAA/QSP/SR/AC/AGA-032</p>	<p style="text-align: center;">PREPARATIONS OF AERODROMES MAINTENANCE MANUAL</p>	<p style="text-align: right;">Page 33 of 79</p>

(4) Fixed 400 Hz ground power supplies:

- a. Serviceability of control lamps shall be ensured by replacement of lamps, as required.
- b. Cleanness of cables shall be ensured.
- c. Ventilator flaps and orifices shall be cleaned.
- d. Stress on the cone belts driving the ventilator system shall be adjusted to normal.

(5) Baggage Conveyor Belts:

- a. Joints and dirt trapping boxes shall be cleaned.
- b. Papers and other wastes shall be removed from underneath the belts.


(6) Air Conditioners:

- a. Servicing of all air ducts, fans, electric motors, flaps, valves, regulators and pumps shall be done.
- b. All dirt traps in the pipe network shall be cleaned.
- c. Energy consumption record shall be checked; corrective action shall be taken as required.
- d. Air ducts shall be checked and cleaned.

(7) Secondary Power Supplies (*Generators*):

- a. Switch-over time from primary to secondary power supply shall be checked for conformation to the requirement.
- b. Voltmeter readings shall be checked to ensure that the voltage remains within acceptable tolerances.
- c. Transfer equipment shall be checked for excessive heating and malfunctions.
- d. Diesel engine shall be checked for any irregularities and oil leakage.
- e. After the test run, fuel level in the tank shall be checked and

<p>This is a controlled document</p>	<p style="text-align: right;">Issued 14 August 2025</p>
--------------------------------------	---

	<p style="text-align: center;">TANZANIA CIVIL AVIATION AUTHORITY</p> <p style="text-align: center;">AERODROMES AND GROUND AIDS</p>	<p>Revision: 1</p>
<p>Document No. TCAA/QSP/SR/AC/AGA-032</p>	<p style="text-align: center;">PREPARATIONS OF AERODROMES MAINTENANCE MANUAL</p>	<p>Page 34 of 79</p>

refilled with fuel, if required.

- f. Corrective repairing action shall be taken for any abnormal or undesirable performance.
- g. All the meter readings of the test run shall be recorded and compared with former records to detect potential deficiencies; if required, corrective action shall be taken.

6.9.4 Quarterly Checks

(1) Control cables, monitoring units, control desk:

- a. System components shall be tightened, repaired or replaced, for good connections.
- b. Over-all operation of control desk shall be investigated and parts shall be repaired or replaced against malfunctions.
- c. Indications of the mimic panel shall be corrected or adjusted for field conditions.
- d. Mechanical structure of the desk shall be repaired for stability.

(2) Fixed 400 Hz ground power supplies


- a. Potential deformations of the current-input cables shall be removed.
- b. Mechanical damage of the connector boxes shall be repaired.
- c. Proper mounting of plug sockets shall be ensured.
- d. Bearings shall be lubricated properly.

(3) Lighting and Electric equipment

- a. Lighting control units shall be checked.
- b. Dimmers shall be adjusted.

6.9.5 Half-yearly Checks:

<p>This is a controlled document</p>	<p>Issued 14 August 2025</p>
--------------------------------------	----------------------------------

	<p style="text-align: center;">TANZANIA CIVIL AVIATION AUTHORITY</p> <p style="text-align: center;">AERODROMES AND GROUND AIDS</p>	<p>Revision: 1</p>
<p>Document No. TCAA/QSP/SR/AC/AGA-032</p>	<p style="text-align: center;">PREPARATIONS OF AERODROMES MAINTENANCE MANUAL</p>	<p>Page 35 of 79</p>

(1) Underground Power cables and Control cables:

- a. Output level shall be measured, and shall be repaired, as required.
- b. Distributors located in manholes shall be cleaned and dried.
- c. Plug-in and clamp connections in the distributors shall be tightened and sprayed for good contact.
- d. Manholes, for condition of the interior, shall be pumped-out, dried up and cleaned.
- e. Insulation resistance shall be measured by measuring the earthing resistance of each circuit, and the readings shall be recorded and necessary corrective actions shall be taken.

(2) Fixed 400 Hz ground power supplies:


- a. Cables shall be repaired or replaced to ensure serviceability (wire and insulation).
- b. Temperature rise in the main conductor cable under nominal electric power shall be removed by removal of observed deficiencies.
- c. Connectors, plugs and cable holdings shall be adjusted and tightened.
- d. Switches shall be cleaned of dust and dirt for proper operation.
- e. Mounting screws or bolts of the fixings holding the regulator and switch cabinet housing shall be tightened.

(3) Transformer stations for electric power supply:

- a. Insulators and electrical connections shall be cleaned and restored.
- b. Stations shall be cleaned and dried against dirt and moisture.
- c. Locks to stations shall be repaired for serviceability and locking.

(4) Relay and switch cabinets (including switch cabinets in substations):

<p>This is a controlled document</p>	<p>Issued 14 August 2025</p>
--------------------------------------	----------------------------------

	<p style="text-align: center;">TANZANIA CIVIL AVIATION AUTHORITY</p> <p style="text-align: center;">AERODROMES AND GROUND AIDS</p>	<p>Revision: 1</p>
<p>Document No. TCAA/QSP/SR/AC/AGA-032</p>	<p style="text-align: center;">PREPARATIONS OF AERODROMES MAINTENANCE MANUAL</p>	<p>Page 36 of 79</p>


- a. Turn and plug-in connections shall be cleaned to maintain good electrical contact.
- b. Relays shall be cleaned to maintain positive closing of contact.
- c. Corroded and wearied electrical contacts shall be cleaned, and replaced as required.
- d. Cabinet shall be cleaned and dried, weather seals be kept serviceable, and mechanical damages shall be repaired.
- e. Relays of series circuits shall be monitored for proper feedback, and repaired as required.
- f. Voltage switch-over of two circuits shall be repaired for serviceability, if required.

(5) Secondary power supplies (generators):

- a. Switch over time from primary to secondary power supply shall be checked and conformation to the requirement shall be ensured.
- b. Voltmeter readings shall be checked and voltage within the acceptable tolerance shall be ensured.
- c. Excessive heating and malfunction of Transfer equipment shall be repaired, as required.
- d. Any irregularity or oil leakage of diesel engine shall be removed.
- e. Fuel level shall be checked after the test run and refueling shall be done, as required.
- f. Corrective action shall be taken for any other abnormal or undesirable performance.
- g. Meter readings of the test runs shall be recorded compared with former records and corrective actions shall be taken for any potential differences.

(6) Passenger Boarding Bridges

<p>This is a controlled document</p>	<p>Issued 14 August 2025</p>
--------------------------------------	----------------------------------

	<p style="text-align: center;">TANZANIA CIVIL AVIATION AUTHORITY</p> <p style="text-align: center;">AERODROMES AND GROUND AIDS</p>	<p style="text-align: right;">Revision: 1</p>
<p>Document No. TCAA/QSP/SR/AC/AGA-032</p>	<p style="text-align: center;">PREPARATIONS OF AERODROMES MAINTENANCE MANUAL</p>	<p style="text-align: right;">Page 37 of 79</p>

- a. Bearings and their lubrication shall be checked and restored.
- b. Rollers shall be checked for wear and corrosion, and shall be greased, repaired and replaced as required.
- c. Drive chains shall be checked for stress and shall be adjusted, as required.
- d. Floor covers shall be checked for damage and be fixed as required.
- e. The outer skin of the tunnel shall be cleaned.
- f. Paints shall be renewed.

(7) Air Conditioners:

- a. Refrigerators and switching units shall be serviced.
- b. Heat exchangers and fans shall be cleaned.
- c. Output data shall be verified and performance of all components shall be adjusted to desired standards.
- d. Hot air curtains and air filters shall be serviced.

(8) Passenger Communication and Information Facilities:


All components of Flight information boards and television monitors, electric clock system and amplifiers for the loudspeaker system shall be serviced.

(9) Lighting and Electric equipment:

- a. Supply lines, cables, switches and distributors shall be checked.
- b. Plugs, contacts and terminals of the electric wiring shall be cleaned.

6.9.6 Annual Checks:

<p>This is a controlled document</p>	<p style="text-align: right;">Issued 14 August 2025</p>
--------------------------------------	---

	<p style="text-align: center;">TANZANIA CIVIL AVIATION AUTHORITY</p> <p style="text-align: center;">AERODROMES AND GROUND AIDS</p>	<p style="text-align: right;">Revision: 1</p>
<p>Document No. TCAA/QSP/SR/AC/AGA-032</p>	<p style="text-align: center;">PREPARATIONS OF AERODROMES MAINTENANCE MANUAL</p>	<p style="text-align: right;">Page 38 of 79</p>

(1) Lighting and Electric equipment:

- a. Lamps shall be cleaned.
- b. Insulation capacity shall be checked by overload voltage.


(2) Transformer stations for electric power supply:

- a. Relays shall be adjusted.
- b. Insulation of high voltage cables shall be recorded and necessary preventive action shall be taken.
- c. Earthing and its resistance shall be checked and cleaning / necessary corrective action shall be taken.
- d. Noisy and damaged electric supply system shall be repaired.
- e. Rusted, corroded and defective coatings shall be cleaned and painted.
- f. Warning signs and safety devices shall be cleaned and replaced in correct positions.
- g. Safety grids shall be cleaned; coating deficiencies shall be removed and painted against rust.
- h. Safety grids shall be tightened for stability and proper earthing shall be restored.

(3) Transformers and Regulators, including stand by units:

- a. If noisy, reason shall be found out and repairing action shall be taken.
- b. Over-all condition shall be checked and repairing action shall be taken, as required.
- c. Insulators shall be repaired and replaced as required.
- d. Collector bar system shall be cleaned.
- e. Voltage and amperage shall be measured and recorded at all intensity levels, and shall be adjusted to nominal level.

<p>This is a controlled document</p>	<p style="text-align: right;">Issued 14 August 2025</p>
--------------------------------------	---

	<p style="text-align: center;">TANZANIA CIVIL AVIATION AUTHORITY</p> <p style="text-align: center;">AERODROMES AND GROUND AIDS</p>	<p style="text-align: right;">Revision: 1</p>
<p>Document No. TCAA/QSP/SR/AC/AGA-032</p>	<p style="text-align: center;">PREPARATIONS OF AERODROMES MAINTENANCE MANUAL</p>	<p style="text-align: right;">Page 39 of 79</p>

(4) Relay and switch cabinets (including switch cabinets in substations)

- a. Cabinets outer conditions shall be well maintained for easy access by cleaning and drying.
- b. Fuses and fuse sockets shall be cleaned, sprayed or replaced, if required.
- c. Voltage out-put of all series circuits shall be recorded and necessary corrective actions shall be taken.

(5) Control cables, monitoring units, control desk

- a. Cables and distributors shall be cleaned and repaired.
- b. Relays shall be cleaned.
- c. Control and monitoring units shall be replaced, as required.
- d. Connections shall be tightened and sprayed for good contact.

(6) Baggage Conveyor Belts

- a. Drives shall be checked and overhauled, as required.
- b. Driving motors shall be cleaned.
- c. Gear box oil shall be changed and refilled.
- d. Driving chains shall be cleaned and lubricated.

(7) Lifts / Escalators

Ropes, drives and other moving parts shall be completely overhauled.


(8) Escalators

Total system shall be completely overhauled.

(9) Air conditioners

- a. chemical and mechanical cleaning of condensers and

<p>This is a controlled document</p>	<p style="text-align: right;">Issued 14 August 2025</p>
--------------------------------------	---

	<p style="text-align: center;">TANZANIA CIVIL AVIATION AUTHORITY</p> <p style="text-align: center;">AERODROMES AND GROUND AIDS</p>	<p style="text-align: right;">Revision: 1</p>
<p>Document No. TCAA/QSP/SR/AC/AGA-032</p>	<p style="text-align: center;">PREPARATIONS OF AERODROMES MAINTENANCE MANUAL</p>	<p style="text-align: right;">Page 40 of 79</p>

evaporators.

b. servicing of fire protection gates.

(10) Passenger Communication and Information Facilities:

a. information boards, e.g. all drives and flaps of electro-mechanical systems.

b. Screens or lights used for giving information visually to passengers.

(11) Apron Flood lighting:

a. Turn and plug-in connections shall be cleaned for good electric contact.

b. Relays shall be maintained serviceable by cleaning, repair or replacement.

c. Corroded and wearied contacts shall be cleaned, repaired or replaced.

d. Cabinet shall be cleaned and dried, weather seals be kept serviceable, and mechanical damages shall be repaired.

e. Fuses and fuse sockets shall be cleaned, sprayed or replaced, if required.


f. Cabinets outer conditions shall be well maintained for easy access by cleaning and drying.

6.9.7 Non-schedule Checks:

In addition to carrying out all the above-mentioned scheduled maintenances, situations like some natural calamity, accidents, sabotage etc. may give rise to the necessity of some out-of schedule maintenance. Some instances of such non-schedule maintenance are as follows:

(1) Underground Power cables and Control cables:

<p>This is a controlled document</p>	<p style="text-align: right;">Issued 14 August 2025</p>
--------------------------------------	---

	<p style="text-align: center;">TANZANIA CIVIL AVIATION AUTHORITY</p> <p style="text-align: center;">AERODROMES AND GROUND AIDS</p>	<p style="text-align: right;">Revision: 1</p>
<p>Document No. TCAA/QSP/SR/AC/AGA-032</p>	<p style="text-align: center;">PREPARATIONS OF AERODROMES MAINTENANCE MANUAL</p>	<p style="text-align: right;">Page 41 of 79</p>

Underground Power cables and Control cables, whenever malfunction is observed, shall be repaired.

(2) Control cables, monitoring units, control desk:

After each lightning strike, the insulation between wire & wire, and between wire & ground shall be checked and necessary improvement shall be effected.

(3) Control cables, monitoring units, control desk:

After each lightning strike, the insulation between wire & wire, and

(4) Air conditioners:

Activated carbon has to be replaced at intervals of between two and three years according to experience with the air conditioning system in use.

7. MAINTENANCE OF AIRPORT PAVEMENTS


7.1 Introduction to Aerodrome Pavements

Aerodrome pavements are designed, constructed, and maintained to support the critical loads imposed by aircraft and to produce a smooth, skid-resistant, and safe-riding surface. The pavement must be of such quality and thickness to ensure it will not fail under the loads imposed and be durable enough to withstand the abrasive action of traffic, adverse weather conditions, and other deteriorating influences.

7.1.1 Classification of Aerodrome Pavements

Generally, pavements fall into two classes: **rigid** and **flexible** pavements.

<p>This is a controlled document</p>	<p style="text-align: right;">Issued 14 August 2025</p>
--------------------------------------	---

	<p style="text-align: center;">TANZANIA CIVIL AVIATION AUTHORITY</p> <p style="text-align: center;">AERODROMES AND GROUND AIDS</p>	<p style="text-align: right;">Revision: 1</p>
<p>Document No. TCAA/QSP/SR/AC/AGA-032</p>	<p style="text-align: center;">PREPARATIONS OF AERODROMES MAINTENANCE MANUAL</p>	<p style="text-align: right;">Page 42 of 79</p>

7.1.2 Rigid Pavement Composition and Structure

Rigid pavements normally use Portland cement concrete (PCC) as the prime structural element. The PCC pavement slab is designed with plain, lightly and continuously reinforced, pre-stressed, or fibrous concrete. The PCC pavement slab usually lies on a compacted granular or treated sub-base, which is supported by a compacted sub-grade. The sub-base provides uniform stable support and may provide subsurface drainage.

7.1.3 Flexible Pavement Composition and Structure

Flexible pavements comprise several layers of carefully selected materials designed to gradually distribute loads from the bituminous pavement (or hot mix asphalt – HMA) surface to the layers underneath. The design ensures the load transmitted to each successive layer does not exceed the layer's load-bearing capacity.

7.1.4 Aerodrome Pavement Overlays


Aerodrome pavement overlays may correct deteriorating pavement surfaces, improve ride quality or surface drainage, maintain structural integrity, or increase pavement strength. Overlays are used when a pavement is damaged, requires strengthening to serve heavier aircraft, shows severe ponding, or has served its design life. Aerodrome pavement overlays generally consist of either PCC or bituminous mixtures.

7.2 PAVEMENT DISTRESSES

7.2.1 Types of Distresses for Rigid Pavements

The types of pavement distresses for rigid pavements fall into the following broad categories:

<p>This is a controlled document</p>	<p style="text-align: right;">Issued 14 August 2025</p>
--------------------------------------	---

	<p style="text-align: center;">TANZANIA CIVIL AVIATION AUTHORITY</p> <p style="text-align: center;">AERODROMES AND GROUND AIDS</p>	<p>Revision: 1</p>
<p>Document No. TCAA/QSP/SR/AC/AGA-032</p>	<p style="text-align: center;">PREPARATIONS OF AERODROMES MAINTENANCE MANUAL</p>	<p>Page 43 of 79</p>

- a. Cracking
- b. Disintegration
- c. Distortion
- d. Loss of skid resistance
- e. Joint Seal Damage

7.2.1.1 Cracking

Cracks in rigid pavements often result from stresses caused by expansion and contraction or warping of the pavement. Overloading, loss of subgrade support and insufficient and/or improperly cut joints acting singly or in combination are also possible causes. Several different types of cracking can occur such as:

- a) Longitudinal, Transverse, and Diagonal Cracks
- b) Corner Breaks
- c) Durability "D" Cracking
- d) Shrinkage Cracking
- e) Joint Seal Damage.


7.2.1.2 Disintegration

Disintegration is the breaking up of a pavement into small, loose particles. Improper curing, finishing, mixing of the concrete and unsuitable aggregates can cause this distress. Disintegration falls into several categories:

- a) Scaling
- b) Spalling
- c) Blowups
- d) Pop-outs
- e) Patching.

7.2.1.3 Distortion.

<p>This is a controlled document</p>	<p>Issued 14 August 2025</p>
--------------------------------------	----------------------------------

	<p style="text-align: center;">TANZANIA CIVIL AVIATION AUTHORITY</p> <p style="text-align: center;">AERODROMES AND GROUND AIDS</p>	<p style="text-align: right;">Revision: 1</p>
<p>Document No. TCAA/QSP/SR/AC/AGA-032</p>	<p style="text-align: center;">PREPARATIONS OF AERODROMES MAINTENANCE MANUAL</p>	<p style="text-align: right;">Page 44 of 79</p>

Distortion refers to a change in the pavement surface's original position, and it results from foundation settlement, expansive soils or loss of fines through improperly designed sub-drains or drainage systems. Two types of distortion generally occur:

- a) Pumping
- b) Settlement or Faulting.

7.2.1.4 Loss of Skid Resistance.

Skid resistance refers to the ability of a pavement to provide a surface with the desired friction characteristics under all weather conditions. Loss of skid resistance is caused by the wearing down of the textured surface through normal wear and tear or the buildup of contaminants.

7.2.1.5 Joint seal damage


Joint sealant damage is manifested by intrusion of water and debris and causes pumping. Debris may accumulate in open joints which prevents normal joint movement. This condition greatly accelerates joint deterioration and may culminate into full depth patching and joint replacement.

7.3 7.3 Types of Distresses for Flexible Pavements

The types of pavement distresses for flexible pavements fall into the following broad categories:

- a. Cracking
- b. Disintegration
- c. Distortion
- d. Loss of skid resistance

<p>This is a controlled document</p>	<p style="text-align: right;">Issued 14 August 2025</p>
--------------------------------------	---

	<p style="text-align: center;">TANZANIA CIVIL AVIATION AUTHORITY</p> <p style="text-align: center;">AERODROMES AND GROUND AIDS</p>	<p style="text-align: right;">Revision: 1</p>
<p>Document No. TCAA/QSP/SR/AC/AGA-032</p>	<p style="text-align: center;">PREPARATIONS OF AERODROMES MAINTENANCE MANUAL</p>	<p style="text-align: right;">Page 45 of 79</p>

7.3.1 Cracking

Cracks in flexible pavements are caused by deflection of the surface over an unstable foundation, shrinkage of the surface, thermal expansion and contraction of the surface, poorly constructed lane joints, or reflection cracking. Five types of cracks commonly occur in these types of pavements:

- a) Longitudinal and Transverse Cracks.
- b) Block Cracking
- c) Reflection Cracking
- d) Alligator or Fatigue Cracking
- e) Slippage Cracks.

7.3.2 Disintegration


Disintegration in a flexible pavement is caused by insufficient compaction of the surface, insufficient asphalt binder in the mix, loss of adhesion between the asphalt coating and aggregate particles, or severe overheating of the mix. The following are common types of disintegration:

- a) Raveling and Weathering
- b) Potholes
- c) Asphalt Stripping
- d) Jet Blast Erosion
- e) Patching and Utility Cut Patch.

7.3.3 Distortion

Distortion is caused by foundation settlement, insufficient compaction of the pavement courses, lack of stability in the bituminous mix, poor bond between the

<p>This is a controlled document</p>	<p style="text-align: right;">Issued 14 August 2025</p>
--------------------------------------	---

	<p style="text-align: center;">TANZANIA CIVIL AVIATION AUTHORITY</p> <p style="text-align: center;">AERODROMES AND GROUND AIDS</p>	<p style="text-align: right;">Revision: 1</p>
<p>Document No. TCAA/QSP/SR/AC/AGA-032</p>	<p style="text-align: center;">PREPARATIONS OF AERODROMES MAINTENANCE MANUAL</p>	<p style="text-align: right;">Page 46 of 79</p>

surface and the underlying layer of the pavement structure, and swelling subgrade soils. Four types of distortion commonly occur:

- a) Rutting
- b) Corrugation
- c) Shoving
- d) Depression
- e) Swelling.

7.3.4 Loss of Skid Resistance

In flexible pavements, a loss of skid resistance may result from one or a combination of the following:

- a) Polished Aggregate
- b) Contaminants
- c) Bleeding
- d) Fuel/Oil Spillage.


7.4 7.4 Drainage of Aerodrome Pavements

Lack of drainage can contribute to pavement distress. Good drainage system is essential to preventive maintenance. The drainage system collects and removes surface water runoff, removes excess underground water, lowers the water table, and protects all slopes from erosion. A poor drainage system can cause saturation of the sub-grade and sub-base, damage to slopes by erosion, and loss of the load-bearing capacity of the paved surfaces.

7.5 INSPECTION OF PAVEMENTS

7.5.1 Introduction

<p>This is a controlled document</p>	<p style="text-align: right;">Issued 14 August 2025</p>
--------------------------------------	---

	<p style="text-align: center;">TANZANIA CIVIL AVIATION AUTHORITY</p> <p style="text-align: center;">AERODROMES AND GROUND AIDS</p>	<p style="text-align: right;">Revision: 1</p>
<p>Document No. TCAA/QSP/SR/AC/AGA-032</p>	<p style="text-align: center;">PREPARATIONS OF AERODROMES MAINTENANCE MANUAL</p>	<p style="text-align: right;">Page 47 of 79</p>

Adequate and timely maintenance is essential for controlling pavement deterioration. Maintenance inspection can reveal at an early stage where a problem exists and thus provide enough warning and time to permit corrective action.

7.5.2 Inspection Procedures

Effective maintenance should be an on-going process which requires a series of scheduled and periodic inspection programmes and surveys. These must be controlled to ensure that each element or feature is inspected, potential problem areas identified, and appropriate corrective action undertaken.

7.5.3 Inspection Schedules

The aerodrome operator is responsible for establishing a schedule for pavement inspections and surveys. Inspection schedules and surveys should ensure that all critical areas are checked. Inspection and surveys should be conducted in accordance with guidelines contained in the Manual on Maintenance of Aerodrome Pavements.

7.5.4 Inspection Records


The aerodrome operator should prepare and maintain records of all inspections and maintenance performed. These records should document the severity level of existing distress types, their locations, their probable causes and remedial actions.

7.5.5 Friction Surveys of Paved Surfaces

Aerodrome operators should maintain runway pavements to ensure provision of good friction characteristics under all weather conditions. Parameters that affect the skid resistance of wet runway surfaces include the following:

- a. Texture depth
- b. Rubber deposits

<p>This is a controlled document</p>	<p style="text-align: right;">Issued 14 August 2025</p>
--------------------------------------	---

	<p style="text-align: center;">TANZANIA CIVIL AVIATION AUTHORITY</p> <p style="text-align: center;">AERODROMES AND GROUND AIDS</p>	<p style="text-align: right;">Revision: 1</p>
<p>Document No. TCAA/QSP/SR/AC/AGA-032</p>	<p style="text-align: center;">PREPARATIONS OF AERODROMES MAINTENANCE MANUAL</p>	<p style="text-align: right;">Page 48 of 79</p>

- c. Paint marking
- d. Pavement abnormalities, such as rutting, raveling, and depression

Observations made during pavement inspection and surveys are adequate predictors of skid resistance.

7.5.6 Non-Destructive Testing

In addition to conducting visual inspections and surveys, aerodrome operators should consider collecting data from non-destructive testing. Non-destructive testing involves evaluating pavement load-carrying capacity using instrument-based approach such as ground penetrating radar or falling weight deflectometer.

7.5.7 Drainage Surveys


The maintenance program shall take into account the importance of adequate drainage of surface and ground water. The personnel carrying out the inspection should look for signs of distress such as:

- a. Ponding of water
- b. Soil buildup at pavement edge preventing runoff
- c. Eroded ditches and spill basins
- d. Broken or displaced inlet grates or manhole covers
- e. Clogged or silted inlet grates and manhole covers
- f. Blocked subsurface drainage outlets
- g. Broken or deformed pipes
- h. Backfill settlement over pipes

7.5.8 Pavement Management Systems

An aerodrome operator shall have in place an Aerodrome Pavement Management System (APMS) as part of its pavement maintenance programme. An APMS is a systematic and consistent procedure for scheduling maintenance and rehabilitation with a view to optimizing benefits and use of available resources. An APMS is used for evaluating and monitoring the present condition of a pavement and forecasting its

<p>This is a controlled document</p>	<p style="text-align: right;">Issued 14 August 2025</p>
--------------------------------------	---

	<p style="text-align: center;">TANZANIA CIVIL AVIATION AUTHORITY</p> <p style="text-align: center;">AERODROMES AND GROUND AIDS</p>	<p style="text-align: right;">Revision: 1</p>
<p>Document No. TCAA/QSP/SR/AC/AGA-032</p>	<p style="text-align: center;">PREPARATIONS OF AERODROMES MAINTENANCE MANUAL</p>	<p style="text-align: right;">Page 49 of 79</p>

future condition. By projecting the rate of deterioration, an APMS can facilitate a life-cycle cost analysis for various alternatives.

7.6 MATERIALS AND EQUIPMENT FOR MAINTENANCE WORKS

7.6.1 Common Materials for Maintenance and Repair.

The Aerodrome operator shall use the materials listed below for maintenance and repair of pavements:

- a. Hot- Mix Asphalt
- b. Tack Coat.
- c. Prime Coat
- d. Fog seal
- e. Aggregate seal
- f. Slurry seal
- g. Coal-tar seal
- h. Crack and joint sealants for flexible pavement
- i. Crack and joint sealing material for rigid pavement
- j. Crack filler material for flexible or rigid pavement
- k. Concrete
- l. Epoxy grout and concretes


7.6.2 Equipment Used for Pavement Maintenance

Aerodrome operator shall use the following equipment for the intended purpose:

7.6.2.1 Pavement Removal.

Pavement removal equipment includes but not limited to the following:

<p>This is a controlled document</p>	<p style="text-align: right;">Issued 14 August 2025</p>
--------------------------------------	---

	<p style="text-align: center;">TANZANIA CIVIL AVIATION AUTHORITY</p> <p style="text-align: center;">AERODROMES AND GROUND AIDS</p>	<p style="text-align: right;">Revision: 1</p>
<p>Document No. TCAA/QSP/SR/AC/AGA-032</p>	<p style="text-align: center;">PREPARATIONS OF AERODROMES MAINTENANCE MANUAL</p>	<p style="text-align: right;">Page 50 of 79</p>

- i) Power Saws
- ii) Cutting Disks
- iii) Jackhammers: Pavement Grinders
- iv) Cold Milling Machines
- v) Front-end Loaders and Skid-steer Loaders
- vi) Dump Trucks.

7.6.2.2 Maintenance Equipment.

The equipment is normally used for heating of Hot Mix Asphalt (HMA) mixes and aggregate works during laying work and includes the following:

- i) Asphalt Kettle
- ii) Aggregate Spreaders
- iii) Hand Tools (rakes, lutes etc).


7.6.2.3 Compaction Equipment.

- i) **Vibratory Plate Compactors.** Vibratory plate compactors are hand-operated units used to compact granular base or HMA plant-mix materials.
- ii) **Vibratory and Non-Vibratory Steel-Wheel Rollers.** Steel-wheel rollers are used to compact material, including HMA in patchwork areas. Smaller rollers can be hand operated, while large rollers are self-powered.
- iii) **Rubber-Tired Rollers.** Rubber-tired rollers are self-powered and used to compact HMA pavement.

7.6.2.4 Crack and Joint Sealing Equipment

- i) Joint Plow

This is a controlled document	<p style="text-align: right;">Issued 14 August 2025</p>
-------------------------------	---

	<p style="text-align: center;">TANZANIA CIVIL AVIATION AUTHORITY</p> <p style="text-align: center;">AERODROMES AND GROUND AIDS</p>	<p style="text-align: right;">Revision: 1</p>
<p>Document No. TCAA/QSP/SR/AC/AGA-032</p>	<p style="text-align: center;">PREPARATIONS OF AERODROMES MAINTENANCE MANUAL</p>	<p style="text-align: right;">Page 51 of 79</p>

- ii) Joint Router
- iii) Random Crack Saw
- iv) Power Brush
- v) Air Compressor and Sand Blasting
- vi) Pavement Sweeper
- vii) Heating Kettle
- viii) Pouring Pot
- ix) High-pressure Water Sprayer
- x) Hot Air Lance

7.6.2.5 Removal of Pavement Markings.

The following is a list of equipment recommended to be used for removal of faded or old pavement markings:

- i) High Pressure Water Jet
- ii) Abrasive Blasting
- iii) Solvent Cleaning


7.7 PAVEMENT REPAIR METHODOLOGIES

Repair method for a particular pavement type, whether rigid or flexible, is dependent on degree, mechanism of distresses and material characteristics. Different methods of repair are available to address the different distresses. However, in many cases pavements fails due to a combination of causative factors and therefore an aerodrome operator shall choose a repair method based on assessment of the prevailing condition. Methodologies for repair of pavements are described in the Manual on maintenance of aerodrome pavements.

7.7.1 Pavement overlay

The volume and frequency of operations at many airports makes it virtually mandatory to overlay (resurface) runways portion by portion so that they may be

<p>This is a controlled document</p>	<p style="text-align: right;">Issued 14 August 2025</p>
--------------------------------------	---

	<p style="text-align: center;">TANZANIA CIVIL AVIATION AUTHORITY</p> <p style="text-align: center;">AERODROMES AND GROUND AIDS</p>	<p style="text-align: right;">Revision: 1</p>
<p>Document No. TCAA/QSP/SR/AC/AGA-032</p>	<p style="text-align: center;">PREPARATIONS OF AERODROMES MAINTENANCE MANUAL</p>	<p style="text-align: right;">Page 52 of 79</p>


returned to operational status during peak hours. The purpose of this chapter is to detail the procedures to be used by those associated with such overlaying, viz. the airport manager, project manager, designer and contractors to ensure that the work is carried out most efficiently and without loss of revenues, inconvenience to passengers or delays to the air traffic systems.

7.7.2 Project co-ordination

Off-peak construction is, by its very nature, a highly visible project requiring close co-ordination with all elements of the airport during planning and design and virtually daily during construction. Once a runway paving project has been identified by the airport, it is important that the nominees of the airport authority, users and the Civil Aviation Authority of the State meet to discuss the manner in which construction is to be implemented. The following key personnel should be in attendance at all planning meetings: from the airport authority - the project manager, the operations, planning, engineering and maintenance directors; from the airlines - local station managers and head office representatives where appropriate; from the civil aviation authority - representatives from Air Traffic Services and Aeronautical Information Services. The agenda should include:

- a) determination of working hours. Since time is of the essence in off-peak construction, the contractor should be given as much time as possible to overlay the pavement each work period. A minimum period of 8.5 hours is recommended.
- b) identification of operational factors during construction and establishment of acceptable criteria include:
 - 1) designation of work areas;
 - 2) aircraft operations;
 - 3) affected navigation aids (visual and non-visual aids);
 - 4) security requirements and truck haul routes;
 - 5) inspection and requirements to open the area for operational use;
 - 6) placement and removal of construction barricades;
 - 7) temporary aerodrome pavement marking and signing;
 - 8) anticipated days of the week that construction will take place; and

<p>This is a controlled document</p>	<p style="text-align: right;">Issued 14 August 2025</p>
--------------------------------------	---

	<p style="text-align: center;">TANZANIA CIVIL AVIATION AUTHORITY</p> <p style="text-align: center;">AERODROMES AND GROUND AIDS</p>	<p style="text-align: right;">Revision: 1</p>
<p>Document No. TCAA/QSP/SR/AC/AGA-032</p>	<p style="text-align: center;">PREPARATIONS OF AERODROMES MAINTENANCE MANUAL</p>	<p style="text-align: right;">Page 53 of 79</p>

- 9) issuance of NOTAM and advisories;
- c) lines of communication and co-ordination elements. It is essential that the project manager be the only person to conduct co-ordination of the pavement project. The methods and lines of communication should be discussed for determining the availability of the runway at the start of each work period and the condition of the runway prior to opening it for operations;
- d) special aspects of construction including temporary ramps and other details as described herein; and
- e) contingency plan in case of abnormal failure or an unexpected disaster.

7.7.3 Return of operations on a runway after overlay

7.7.3.1 Inspection of the work area


A joint inspection of the work area is conducted by the team including electrical, civil, operations, wildlife and safety to ensure that the following are not left on the runway before operationalization.

- i. No FOD
- ii. Electrical installations are not damaged
- iii. Compliance with pavement and physical characteristics requirement
- iv. Equipment left on manoeuvring area
- v. Visual aids are compliant

7.7.3.2 Acceptance /approval of the completed works

7.7.3.2.1 Temporary return

<p>This is a controlled document</p>	<p style="text-align: right;">Issued 14 August 2025</p>
--------------------------------------	---

	<p style="text-align: center;">TANZANIA CIVIL AVIATION AUTHORITY</p> <p style="text-align: center;">AERODROMES AND GROUND AIDS</p>	<p>Revision: 1</p>
<p>Document No. TCAA/QSP/SR/AC/AGA-032</p>	<p style="text-align: center;">PREPARATIONS OF AERODROMES MAINTENANCE MANUAL</p>	<p>Page 54 of 79</p>

A unique feature of such off-peak construction is that a temporary ramp (a transition surface between the overlay and the existing pavement) must be constructed at the end of each work session so that the runway can be used for aircraft operations once the work force clears the area. Inspections should be conducted of all areas to be reopened to aircraft traffic to ensure the proper operation of lights and signs, for correct markings and absence of FOD. The contractor should conduct an inspection of the work area with airport operational personnel.

7.7.3.2.2 Permanent return to operation

The Aerodrome inspector verifies that the work has been done in accordance with submitted work plan and the Airport standards.

If not compliant the works are not accepted and brings to the attention of the aerodrome operator.

7.7.4 Notam promulgation


The Aerodrome operator notifies the Regulator that the works are complete and request for a NOTAM to be issued accordingly.

8. DRAINAGE

8.1 GENERAL

Drainage of the airport is essential for the following major reasons:

This is a controlled document	<p style="text-align: center;">Issued 14 August 2025</p>
-------------------------------	--

	<p style="text-align: center;">TANZANIA CIVIL AVIATION AUTHORITY</p> <p style="text-align: center;">AERODROMES AND GROUND AIDS</p>	<p style="text-align: right;">Revision: 1</p>
<p>Document No. TCAA/QSP/SR/AC/AGA-032</p>	<p style="text-align: center;">PREPARATIONS OF AERODROMES MAINTENANCE MANUAL</p>	<p style="text-align: right;">Page 55 of 79</p>

- a. To maintain sufficient bearing strength of the soil for the operation of vehicles and/or aircraft at any time during the year;
- b. To minimize the attraction of birds and other animals representing a potential hazard to aircraft.

Surface drainage is required to –

- Clear all parts of the movement area of standing water; and
- Prevent the formation of ponds or puddles.
- Quick run-off of water is particularly important on runways to minimize the hazard of aquaplaning. (Ref: *Airport Services Manual*, Part 2)

8.2 Lay out

8.2.1 Two drainage systems


For practical reasons an airport should have two drainage systems-

- a. One system which drains "clean" areas such as runways, taxiways, aprons, service roads, public roads and parking lots; and
- b. Another system which drains areas more likely to be polluted by oil, grease or chemicals such as hangars, aircraft maintenance areas, workshops and tank farms.

8.2.2 Drainage for the clean areas

The drainage system intended to serve the "clean" area may be built in a way to sink the drain water (from precipitation) into the adjacent ground. Where the natural ground is not suitable to drain the surface water it must be collected in slot drains or other artificial sinks which are connected with a drain pipe, culvert or canal ducting the water to nearby creeks, rivers, lakes, etc. To protect these natural water courses from pollution, collector basins with oil separators should be installed.

<p>This is a controlled document</p>	<p style="text-align: right;">Issued 14 August 2025</p>
--------------------------------------	---

	<p style="text-align: center;">TANZANIA CIVIL AVIATION AUTHORITY</p> <p style="text-align: center;">AERODROMES AND GROUND AIDS</p>	<p style="text-align: right;">Revision: 1</p>
<p>Document No. TCAA/QSP/SR/AC/AGA-032</p>	<p style="text-align: center;">PREPARATIONS OF AERODROMES MAINTENANCE MANUAL</p>	<p style="text-align: right;">Page 56 of 79</p>

8.2.3 Drainage for the areas likely to be polluted:

The drainage system intended to serve hangars, workshops, tank farms and other pollutant generating areas should be connected to a regular sewage system which ducts the water to sewage treatment plants. For pre-treatment the collected drain water should pass through fuel separators before entering the sewage culvert.

8.2.4 Compliance with national or local regulations:

Generally, the airport operator will have to comply with rules on water treatment issued by the national or local authorities responsible for water conservation, water supply and environmental protection. The layout of airport drainage systems depends on local conditions and so does the maintenance programme.

8.2.5 Cleaning of slot drains:

To facilitate the cleaning of slot drains, openings should be provided at 60 m intervals along the whole line. They must give good access to the bottom of the slot drain and serve as sand traps at the same time. Cleaning of a slot drain can be carried out most effectively by flushing all sections with water at high pressure, forced into the duct. Where necessary, mud and sand deposits must be vacuumed off by special mobile cleaning equipment.

8.2.6 Time intervals for cleaning slot drains:

The time intervals for cleaning depend on local experience with drain lines. One cleaning action per year has proved to be the minimum. When sand has been used for winter services a second cleaning right at the end of the winter is recommended. Regular inspections should be carried out to detect the need for additional cleaning. After sandstorms or heavy rain showers which flood unpaved areas near the slot drain, immediate checking of the drain capacity is highly recommended.

8.2.7 Drain pipes or culverts between surfaces and collector basins:

<p>This is a controlled document</p>	<p style="text-align: right;">Issued 14 August 2025</p>
--------------------------------------	---

	<p style="text-align: center;">TANZANIA CIVIL AVIATION AUTHORITY</p> <p style="text-align: center;">AERODROMES AND GROUND AIDS</p>	<p style="text-align: right;">Revision: 1</p>
<p>Document No. TCAA/QSP/SR/AC/AGA-032</p>	<p style="text-align: center;">PREPARATIONS OF AERODROMES MAINTENANCE MANUAL</p>	<p style="text-align: right;">Page 57 of 79</p>

Drain pipes should have manholes at intervals to allow cleaning the pipe of deposits. Sections between consecutive manholes should not exceed 75 m and man-holes should have a cross section of at least 1m². The cleaning can be accomplished by means of flushing with water at high pressure.

8.2.8 Time intervals for cleaning drain pipes or culverts:

Time intervals for cleaning depend on **local experience**. Cleaning **once a year** seems to be the operational minimum to ensure good drainage capacity of pipes and culverts collecting surface water from precipitation. Where the cross section of the pipes are less than 30 cm, cleaning **twice a year may be necessary**.

8.2.9 Oil and fuel separators:


Oil separators are integral parts of water collectors. Those are components of the drainage system of hangars, workshops and other technical working areas which must be provided with separator installations. The number and size of collectors depend on the drained area and quantity of precipitation. The capacity of a separator shall be such that the flow speed will at any time be slow enough to prevent oil passing by the separator wall into the collector basin. Their capacity will be determined by the expected maximum drain water through-put.

8.2.10 Cleaning the oil and fuel separators:

The oil layer depth at the surface of the separator **must be checked weekly** and oil pumped off when necessary. The amount of trapped oil and/or fuel should be checked in accordance with a maintenance plan for the facility, describing the time intervals of pumping off oils. The intervals must be **derived from local experience**. They can vary widely. To avoid accidental overflow of the fuel collector, automatic monitoring can be provided. Oil and fuel separated from the drain water must be pumped or carried to a demulsification plant.

8.2.11 Cleaning the bottom and banks of the drain water collector basins:

<p>This is a controlled document</p>	<p style="text-align: right;">Issued 14 August 2025</p>
--------------------------------------	---

	<p style="text-align: center;">TANZANIA CIVIL AVIATION AUTHORITY</p> <p style="text-align: center;">AERODROMES AND GROUND AIDS</p>	<p style="text-align: right;">Revision: 1</p>
<p>Document No. TCAA/QSP/SR/AC/AGA-032</p>	<p style="text-align: center;">PREPARATIONS OF AERODROMES MAINTENANCE MANUAL</p>	<p style="text-align: right;">Page 58 of 79</p>

The bottom should be cleaned **at least once a year**. The bottom and the banks of the drain water collector basins should be kept clear of plants. Embankments should be mowed regularly.

8.2.12 Removal of oil and fuel from separators:

For removal of oil and fuel from separators the employment of specialists (under contract) can be practical since special tank vehicles are required and the deposits have to be removed in accordance with environmental rules on the treatment of waste oil.

8.3 Water Hydrants:

8.3.1 Airport's water supply system:


The capacity of the airport's water supply system should comply with the requirements of fire fighting. All valves and flaps in the pipeline network should undergo functional testing once a year. Additional monitoring by checking the water consumption weekly can be useful to detect undiscovered leakages at an early date,

8.3.2 Airport Fire hydrants:

All fire hydrants including those at buildings must be checked regularly. Any subsurface hydrants should be kept clean of soil or mud so that they can be found without delay in cases of emergency. Serviceability of pumps and hydrants shall be checked at least twice in a year.

9. MAINTANANCE OF UNPAVED AREAS

<p>This is a controlled document</p>	<p style="text-align: right;">Issued 14 August 2025</p>
--------------------------------------	---

	<p style="text-align: center;">TANZANIA CIVIL AVIATION AUTHORITY</p> <p style="text-align: center;">AERODROMES AND GROUND AIDS</p>	<p style="text-align: right;">Revision: 1</p>
<p>Document No. TCAA/QSP/SR/AC/AGA-032</p>	<p style="text-align: center;">PREPARATIONS OF AERODROMES MAINTENANCE MANUAL</p>	<p style="text-align: right;">Page 59 of 79</p>

9.1 GENERAL

The maintenance of unpaved areas on an airport is essential for the following major reasons:

- a. Safety of aircraft on operating areas (this concerns runways, taxiways, strips and runway end safety areas);
- b. Safety of airborne aircraft (this concerns areas on the airport and in its nearby vicinity within the defined flight pattern where trees and bushes may grow); and
- c. Reducing bird hazards to aircraft (this concerns grass land within the airport's boundaries).

9.2 Reasons for maintenance of Green Areas on an Airport:

The major reasons for maintenance of green areas of an airport are as follows:


- a. To control animal life within the airport boundary to reduce the risk of animal strike with aircraft;
- b. To control the bird population and bird activities in order to keep the bird strike hazard as low as possible.
- c. To fulfill the requirements of obstacle clearance limitations.

9.3 Who can do the job

The responsibility of maintenance of unpaved areas of the airport lies on the aerodrome operator. Of course, that does not necessarily mean that the work is to be carried out by the staff of the airport operator. The airport operator may contract with nearby farmers who can do the job on the following conditions:-

- a. The contractor shall do the work upon advice.
- b. The contractors shall provide their own equipment.
- c. The contractor can use the grass for cattle feed.

<p>This is a controlled document</p>	<p style="text-align: right;">Issued 14 August 2025</p>
--------------------------------------	---

	<p style="text-align: center;">TANZANIA CIVIL AVIATION AUTHORITY</p> <p style="text-align: center;">AERODROMES AND GROUND AIDS</p>	<p style="text-align: right;">Revision: 1</p>
<p>Document No. TCAA/QSP/SR/AC/AGA-032</p>	<p style="text-align: center;">PREPARATIONS OF AERODROMES MAINTENANCE MANUAL</p>	<p style="text-align: right;">Page 60 of 79</p>

d. Work performed by contractors must be monitored by authorized personnel to safeguard air traffic safety requirements.

9.4 Maintenance of Green Areas within strips:

9.4.1 Target of maintenance of Green Areas within strips:

The targets of maintenance of the green areas of the airport are as follows:


- a. Bearing capacity of the strips shall be maintained.
- b. Evenness of the strips shall be maintained.
- c. The height of grass of the strips shall be maintained such that it does not exceed 10 cm.

9.4.2 Procedures for maintenance of Green Areas within strips:

After construction work in strip areas, attention should be paid to retain the specified surface conditions. This can be done in the following manner:

- a. Where the bearing capacity has been reduced it must be improved by soil compaction.
- b. Humps and depressions shall be eliminated.
- c. To protect the surface against blast erosion a sound matting of grass should be provided.
- d. The grass should be mowed down to a height of about 10 cm.
- e. Regular mowing will be necessary to keep the grass low, the frequency depending on the climate.
- f. The cut material should be picked up since otherwise it might be sucked into jet engines, thus creating a potential hazard to aircraft operation.
- g. Mowing attracts birds as the freshly mowed areas are rich in bird food.
- h. To minimize the ever-present risk of bird strikes, mowing should take place preferably before periods of lowest air traffic.
- i. In other cases, bird protection measures shall be increased after mowing to keep the collision risk low.

<p>This is a controlled document</p>	<p style="text-align: right;">Issued 14 August 2025</p>
--------------------------------------	---

	<p style="text-align: center;">TANZANIA CIVIL AVIATION AUTHORITY</p> <p style="text-align: center;">AERODROMES AND GROUND AIDS</p>	<p style="text-align: right;">Revision: 1</p>
<p>Document No. TCAA/QSP/SR/AC/AGA-032</p>	<p style="text-align: center;">PREPARATIONS OF AERODROMES MAINTENANCE MANUAL</p>	<p style="text-align: right;">Page 61 of 79</p>

9.5 Maintenance of Green Areas outside strips:

9.5.1 Target of maintenance of Green Areas outside strips:


The targets of maintenance of the green areas of the airport outside strips are as follows:

- a. The height of grass outside the strips shall be maintained such that it does not exceed 20 cm.
- b. The obstacle clearance criteria of the area shall be maintained.

9.5.2 Procedure for maintenance of Green Areas outside strips:

- a. Maintenance of grass surfaces should be determined by the individual needs of the site, i.e. the local species of birds and their habits.
- b. Most species of birds prefer low grass areas for food searching; conditions for finding food are better and watching out for enemies is facilitated by good visibility in all directions.
- c. For keeping large numbers of birds from settling, the optimum grass height has been observed to be around 20 cm. Only the smallest birds of body mass less than 20 g will prefer such meadows for residence. They are, however, less dangerous for aircraft than heavier birds.
- d. Dry grass-land offers more food to birds than wet land. Therefore, unless bearing capacity of the runway and taxiway is not at risk, swampy patches can be tolerated as long as those do not attract aquatic birds.
- e. The grass should be mowed down to a height of about 20 cm and the cut grass should be picked up. Composting effects cut grass produce great numbers of microscopic organisms, insects, worms etc., and again, attract birds to the area.

<p>This is a controlled document</p>	<p style="text-align: right;">Issued 14 August 2025</p>
--------------------------------------	---

	<p style="text-align: center;">TANZANIA CIVIL AVIATION AUTHORITY</p> <p style="text-align: center;">AERODROMES AND GROUND AIDS</p>	<p style="text-align: right;">Revision: 1</p>
<p>Document No. TCAA/QSP/SR/AC/AGA-032</p>	<p style="text-align: center;">PREPARATIONS OF AERODROMES MAINTENANCE MANUAL</p>	<p style="text-align: right;">Page 62 of 79</p>

- f. Special methods shall be applied, along with the maintenance of grass, to diminish the number of mice. Where mice population exceeds a "normal" rate, birds of prey may be attracted which, due to their flight techniques and body mass, create the most severe bird strike hazard. Mice populations will then have to be controlled by using suitable chemicals.
- g. Trees and bushes shall be cut at such a height that they do not penetrate the obstacle limitation surface. To discourage birds from settling, all bushes carrying berries should be eliminated from the airport.
- h. The height of trees in the approach and departure areas outside the airport boundary must be controlled for air traffic safety reasons. To minimize the extent of cutting or shortening of trees, cutting can be done more frequently.

9.6 Equipment for Maintenance of Grass

As there are different types of mowers available the choice should be determined by local conditions, i.e. the size of the area to be maintained and the types of grass and plants on it.


The following types are being used on airports:

- a. Spindle mowers,
- b. Cutter bar mowers,
- c. Rotary mowers,
- d. Flail mowers.

9.6.1 Spindle mowers

Normally spindle mowers are trailing equipment. They are efficient on areas of low grass height, such as unpaved runways, taxiways etc. With the mowers arranged in groups (so called mounted gangs), strips up to 8 m wide can be mowed in one run.

<p>This is a controlled document</p>	<p style="text-align: right;">Issued 14 August 2025</p>
--------------------------------------	---

	<p style="text-align: center;">TANZANIA CIVIL AVIATION AUTHORITY</p> <p style="text-align: center;">AERODROMES AND GROUND AIDS</p>	<p>Revision: 1</p>
<p>Document No. TCAA/QSP/SR/AC/AGA-032</p>	<p style="text-align: center;">PREPARATIONS OF AERODROMES MAINTENANCE MANUAL</p>	<p>Page 63 of 79</p>

Under favourable conditions the capacity can be 7 hectares per hour. Separate loaders are required to pick up the cut grass.

9.6.2 Cutter bar mowers

Cutter bar mowers are appropriate for both high and low grass. The cutter bar is generally a separate piece of equipment attachable to various tractor types, often in combination with a trailed self-picking hay loader. The cutting width is less than 2m, thus resulting in a low mowing capacity of about 1/2 hectare per hour. A special type of bar mower, the so-called chaff-cutters, cut strips up to 4m wide and, in combination with hay loaders, achieve a mowing capacity of almost 2 hectares per hour.

9.6.3 Rotary mowers

Rotary mowers are specialized on extremely high grass. They are produced in trailer form and mow a strip up to 5m wide, thus achieving a mowing capacity of 4 hectares per hour.


9.6.4 Flail mowers

The flail mowers are most effective for meadows with harder types of grass and plants, including low bushes. They are attachable to various types of towing equipment, have a maximum mowing width of 5m and achieve a capacity of some 2 hectares per hour.

9.7 Cost and Benefit:

Capital and operating costs of the different types of mowing equipment vary widely, trailed equipment being cheaper. Operating costs for automotive equipment including automatic hay loading equipment will be three to four times higher. However costly the equipment and procedures are, the reduced bird strike hazard at the airport is a benefit.

<p>This is a controlled document</p>	<p>Issued 14 August 2025</p>
--------------------------------------	----------------------------------

	<p style="text-align: center;">TANZANIA CIVIL AVIATION AUTHORITY</p> <p style="text-align: center;">AERODROMES AND GROUND AIDS</p>	<p style="text-align: right;">Revision: 1</p>
<p>Document No. TCAA/QSP/SR/AC/AGA-032</p>	<p style="text-align: center;">PREPARATIONS OF AERODROMES MAINTENANCE MANUAL</p>	<p style="text-align: right;">Page 64 of 79</p>

9.8 Treatment of cut grass

Since grass should be removed immediately after mowing as a protection against birds and for other safety reasons, considerable quantities of cut grass will be collected on larger airports. As to the procedure for reprocessing or disposal of the cut grass, three options exist:

- a. Giving away the cut grass to nearby farmers or ranchers;
- b. Composting at a suitable site and recycling as fertilizer for the airport, or for sale to gardeners or farmers. Cut grass needs approximately three months for composting before it is usable;
- c. Disposing the grass in a dump. The dump should be far away from the airport since cut grass will, without proper treatment, decay producing a wet and very polluting waste.

10. REMOVAL OF DISABLED AIRCRAFT


10.1 Removal Plan

When a disabled aircraft is on a part of the airport where it interferes with the movement of other aircraft, it has to be removed as quickly as possible. Aircraft removal is a rather complex procedure touching quite a number of responsibilities of different parties.

The relevant parties are:

- a. Aircraft registered owner,
- b. Aircraft Accident Investigation Branch (AAIB).
- c. Airport operator (Airport Management),
- d. Owner of removal equipment and
- e. May be others.

<p>This is a controlled document</p>	<p style="text-align: right;">Issued 14 August 2025</p>
--------------------------------------	---

	<p style="text-align: center;">TANZANIA CIVIL AVIATION AUTHORITY</p> <p style="text-align: center;">AERODROMES AND GROUND AIDS</p>	<p style="text-align: right;">Revision: 1</p>
<p>Document No. TCAA/QSP/SR/AC/AGA-032</p>	<p style="text-align: center;">PREPARATIONS OF AERODROMES MAINTENANCE MANUAL</p>	<p style="text-align: right;">Page 65 of 79</p>

10.1.1 Removal Procedure

The procedure has to be performed in compliance with the removal plan worked out for the airport to satisfy local circumstances. Reference is made to:-

- a. Annex 14, 9.3;
- b. *Airport Services Manual*, Part 5, Guidance material on the establishment of the removal plan, procedures, techniques, methods and equipment;
- c. *Airport Services Manual*, Part 8 -- Airport Operational Services. Removal of Disabled Aircraft and operation of the disabled aircraft removal service.

10.2 Personnel Training:

Regardless of how removal responsibility and removal performance is agreed, staff should be trained thoroughly to handle the available equipment in the event of an aircraft removal.

10.2.1 Training programme:


The personnel assigned to the task of aircraft removal should at first be given a detailed and specified training, and there after recurring training programme should take place at least once a year.

The programme has to include-

- (i) instruction on theoretical measures,
- (ii) methods to be applied, and
- (iii) practical training in handling the equipment.

It should be continuously updated according to the most recent knowledge and experience available on aircraft removal techniques.

<p>This is a controlled document</p>	<p style="text-align: right;">Issued 14 August 2025</p>
--------------------------------------	---

	<p style="text-align: center;">TANZANIA CIVIL AVIATION AUTHORITY</p> <p style="text-align: center;">AERODROMES AND GROUND AIDS</p>	<p style="text-align: right;">Revision: 1</p>
<p>Document No. TCAA/QSP/SR/AC/AGA-032</p>	<p style="text-align: center;">PREPARATIONS OF AERODROMES MAINTENANCE MANUAL</p>	<p style="text-align: right;">Page 66 of 79</p>

10.3 Storage of Equipment

10.3.1 Where to store

The location where all removing equipment will be stored should have the following advantages:-

- a. All removal equipment shall be stored at one location, if possible.
- b. The store units shall be designed for easy transport and loading.
- c. Equipment shall be stored in such a manner as to minimize the risk of damage by equipment and vehicle movements.


10.3.2 How to store

Only careful storage and regular inspection can ensure that the equipment will be in good condition and that any aircraft removal operation will be successful and expeditious. Furthermore, proper storage and maintenance will extend the life of the equipment, which is important from an economical aspect.

The following cautionary system shall be followed while storing the equipment:-

- a. Equipment should be stored in a manner to ensure quick access at any time.
- b. As far as possible, equipment shall be stored in transportable units. This not facilitates access in cases of a removal action but also for equipment inspection and maintenance procedures.
- c. Equipment packed in boxes or on pallets shall be protected from the effect of weather such as wetness, moisture, heat, sunshine (ultraviolet radiation) which may rapidly destroy wooden, textile, plastic or rubber material.
- d. In order to protect equipment from detrimental climatic conditions, no material should be stored close to the equipment which would cause damage to it.
- e. In all possible cases, equipment shall be wrapped to protect from contamination.

<p>This is a controlled document</p>	<p style="text-align: right;">Issued 14 August 2025</p>
--------------------------------------	---

	<p style="text-align: center;">TANZANIA CIVIL AVIATION AUTHORITY</p> <p style="text-align: center;">AERODROMES AND GROUND AIDS</p>	<p style="text-align: right;">Revision: 1</p>
<p>Document No. TCAA/QSP/SR/AC/AGA-032</p>	<p style="text-align: center;">PREPARATIONS OF AERODROMES MAINTENANCE MANUAL</p>	<p style="text-align: right;">Page 67 of 79</p>

- f. Wooden material, e.g. plywood sheets and cribbing timber, has to be stored flat to avoid warping.
- g. All steel material needs an oil or paint finish to protect against rust.
- h. Protection must also be taken against vermin (mice, rats, termites, etc.).
- i. Each unit shall be clearly marked for quick identification of the contents.
- j. All pieces of the stored equipment shall be listed. The list should identify their location within the store and show the maintenance needs.

10.4 Transportation plan of equipment:

A transportation plan shall be prepared that shows which vehicles are to be used for the transportation of removal equipment and how the vehicles are to be available in the event of an aircraft removal action.

10.5 Inspection of equipment:

Regular inspection of all equipment is recommended to ensure that the equipment sets are complete and serviceable at all times. Inspection shall be carried at least once in a month, and necessary action shall be taken.

10.6 Maintenance of removal equipment:


Many of the pieces of equipment may need maintenance work at periodic intervals. All regular maintenance work shall be carried out in accordance with the manufacturer's advice. Discovery of damage or deficiency should lead to immediate repair. A general guideline on the Maintenance Schedule is given below:

10.6.1 Monthly Checks

(1) Air Compressor units

- a. Air compressors shall be subjected to a test run of at least five minutes once in a month. The following checks shall also be done.
- b. Tire pressure shall be checked.
- c. Oil content (compressor unit and engine) shall be checked.

<p>This is a controlled document</p>	<p style="text-align: right;">Issued 14 August 2025</p>
--------------------------------------	---

	<p style="text-align: center;">TANZANIA CIVIL AVIATION AUTHORITY</p> <p style="text-align: center;">AERODROMES AND GROUND AIDS</p>	<p style="text-align: right;">Revision: 1</p>
<p>Document No. TCAA/QSP/SR/AC/AGA-032</p>	<p style="text-align: center;">PREPARATIONS OF AERODROMES MAINTENANCE MANUAL</p>	<p style="text-align: right;">Page 68 of 79</p>

- d. Diesel content of tank shall be checked.
- e. battery capacity and acid content shall be checked.
- f. cooling water content shall be checked.
- g. any other technical details in accordance with the manufacturer's advice.

(2) Drainage pumps, flood lights and diesel generators:

- a. Remedial action shall be taken for mechanical damage, oil and fuel leakage.
- b. Battery capacity and acid content shall be checked.
- c. Fuel and oil content shall be checked,

10.6.2 Half-yearly Checks

(1) Protection pads (foam rubber pads) which are used to protect the lifting bags

- a. Protection pads shall be checked and maintained in good condition through repair or replacement, as required.

(2) Air hoses

- a. Air hose shall be checked for integrity and cleanness.


(3) Hydraulic jacks

- a. Hydraulic jacks shall be inspected in conjunction with a test run at which time the equipment shall be checked for corrosion, oil leakage or any damage in accordance with the manufacturer's advice.

(4) Winches, cables and ropes

- a. Winches, cables and ropes shall be checked for mechanical damage.

<p>This is a controlled document</p>	<p style="text-align: right;">Issued 14 August 2025</p>
--------------------------------------	---

	<p style="text-align: center;">TANZANIA CIVIL AVIATION AUTHORITY</p> <p style="text-align: center;">AERODROMES AND GROUND AIDS</p>	<p>Revision: 1</p>
<p>Document No. TCAA/QSP/SR/AC/AGA-032</p>	<p style="text-align: center;">PREPARATIONS OF AERODROMES MAINTENANCE MANUAL</p>	<p>Page 69 of 79</p>

- b. Special attention shall be given to bends and corrosion of steel cables and other load bearing lifting equipment.
- c. Stress tests shall be carried out in accordance with relevant safety and/or manufacturer's advice.

(5) Additional equipment consisting of:


- Plywood sheets,
- Steel and aluminum plates,
- Cribbing timber,
- Steel spikes for crib assembly,
- ground reinforcement mats (trackways or other),
- earth anchors, copperloy coated steel grounding rods, cables and clips,
- fencing material and warning signs,
- tools such as bolt cutters, sheet metal shears, picks, shovels, crow bars, hammers and saws

- a. Shall be checked for completeness and proper condition.
- b. damage like corrosion, cracks, distortion or wetness shall be repaired or replaced, as required.

(6) Pneumatic lifting bags

- a. Checks shall be done whether bag material has suffered from detrimental storage conditions such as high heat, direct sun radiation or wide temperature variations.
- b. The maintenance programme for lifting bags should include:
 - Cleaning of contamination, if required;

<p>This is a controlled document</p>	<p>Issued 14 August 2025</p>
--------------------------------------	----------------------------------

	<p style="text-align: center;">TANZANIA CIVIL AVIATION AUTHORITY</p> <p style="text-align: center;">AERODROMES AND GROUND AIDS</p>	<p style="text-align: right;">Revision: 1</p>
<p>Document No. TCAA/QSP/SR/AC/AGA-032</p>	<p style="text-align: center;">PREPARATIONS OF AERODROMES MAINTENANCE MANUAL</p>	<p style="text-align: right;">Page 70 of 79</p>

- Inflation up to the checking pressure as indicated by the bag manufacturer;
- Repair of all deficiencies or damage;
- Correct preparation for storage, i.e. dry surfaces, air valves protected by caps, surface powdered with French chalk; -Wrapping of folded bags to transportable packs.

10.6.3 Yearly Checks:

(1) Air Hoses:


- a. Air hoses should be stored on hose reels.
- b. The hoses must be unwound from their reels and stretched out on clean ground.
- c. A functional test can be accomplished by connecting them to the console module and applying air pressure. This procedure allows a check for any damage and the serviceability of all connections.
- d. Hoses shall be kept clean inside and outside to protect the rubber material.
- e. Ends of the hoses shall be closed by caps and reels shall be covered.
- f. Any deficiencies discovered shall be made good by repair or replacement.

(2) Console module:

Maintenance work shall include checking for-

- Integrity;
- Damage to any component;
- Serviceability of valves and stopcocks (function test under pressurized air according to manufacturer's advice); -Function of pressure gauges

<p>This is a controlled document</p>	<p style="text-align: right;">Issued 14 August 2025</p>
--------------------------------------	---

	<p style="text-align: center;">TANZANIA CIVIL AVIATION AUTHORITY</p> <p style="text-align: center;">AERODROMES AND GROUND AIDS</p>	<p>Revision: 1</p>
<p>Document No. TCAA/QSP/SR/AC/AGA-032</p>	<p style="text-align: center;">PREPARATIONS OF AERODROMES MAINTENANCE MANUAL</p>	<p>Page 71 of 79</p>

10.7 Test Run of the Equipment:

A Test Run should be held once in a year as a part of the Maintenance Programme. In addition, a rolling test should be carried out every six months to check wheel brakes and lamps of the Vehicle.

11. MAINTENANCE OF EQUIPMENT AND VEHICLE

11.1 General

11.1.1 RFF Operation vehicles


Vehicles which are essential for the safe and smooth operation of aircraft at an airport shall be kept serviceable at all times through preventive and corrective maintenance. By preventive maintenance, facilities on an airport can be kept in such a condition as to maintain safety, regularity and expeditious operation of air traffic. As per Annex 14, the following equipment and vehicles of an aerodrome are related with the safe operation of an airport:

- a. Rescue and fire fighting vehicles;
- b. Sweepers for removal of contaminants from aircraft operating areas;
- c. Mowers and other vehicles for control of grass height on unpaved areas.

11.1.2 Passenger, Freight and Ground handling vehicles:

There are many other vehicles also in operation for aircraft ground handling (fuel, water, electric energy, high- and low-pressure air), passenger handling, freight handling and transport. All these vehicles require preventive maintenance work in accordance with the manufacturer's advice. Operators of the vehicles have to make appropriate arrangements for keeping their equipment full time serviceable as part of the airport maintenance task.

<p>This is a controlled document</p>	<p>Issued 14 August 2025</p>
--------------------------------------	----------------------------------

	<p style="text-align: center;">TANZANIA CIVIL AVIATION AUTHORITY</p> <p style="text-align: center;">AERODROMES AND GROUND AIDS</p>	<p style="text-align: right;">Revision: 1</p>
<p>Document No. TCAA/QSP/SR/AC/AGA-032</p>	<p style="text-align: center;">PREPARATIONS OF AERODROMES MAINTENANCE MANUAL</p>	<p style="text-align: right;">Page 72 of 79</p>

11.2 Principles of organization of maintenance of vehicles:

Airport vehicle maintenance can be organized according to three different principles:

- a. Maintenance is carried out by the airport i.e. its own workshops;
- b. Maintenance is carried out by contractors in Workshops located on the airport;
or
- c. Maintenance is carried out by contractors in Workshops located outside the airport.

11.2.1 Reasons for providing workshops at the airport:

The main reasons for providing workshops at the airport are:


- a. The difficulty of moving specialized and very big vehicles, which are not licensed for use on public roads, outside the airport area; and
- b. The time and manpower needed to move vehicles from the airport to remote workshops and vice versa.

11.2.2 Reasons for providing airport-owned workshops:

Reasons for providing airport-owned workshops are:

- a. Personnel can be supervised by the airport management and their schedule or work adjusted to fit the airport's needs;
- b. Personnel can be trained to specialize in maintenance tasks for all airport equipment and will gain much experience;
- c. Personnel can be organized in such a way as to carry out stand-by tasks outside the normal duty hours;
- d. Personnel can carry out maintenance tasks on installed equipment; and
- e. Other duties like aircraft removal, assistance in emergencies, etc. can be assigned to workshop personnel upon short notice.

<p>This is a controlled document</p>	<p style="text-align: right;">Issued 14 August 2025</p>
--------------------------------------	---

	<p style="text-align: center;">TANZANIA CIVIL AVIATION AUTHORITY</p> <p style="text-align: center;">AERODROMES AND GROUND AIDS</p>	<p style="text-align: right;">Revision: 1</p>
<p>Document No. TCAA/QSP/SR/AC/AGA-032</p>	<p style="text-align: center;">PREPARATIONS OF AERODROMES MAINTENANCE MANUAL</p>	<p style="text-align: right;">Page 73 of 79</p>

11.2.3 Reasons for contracting with maintenance companies outside the airport:

Reasons for contracting with maintenance companies outside the airport are:

- a. Availability of expert knowledge, plants and tools for standard equipment overhaul and repair (e.g. motors, gear boxes, generators, drive axles of standard auto-motive design);
- b. Lack of own personnel or specialists for economic reasons (e.g. number of vehicles too low to warrant workshop installations and manning); and
- c. Need to overcome peak or bottleneck situations.

11.3 Schedule of Vehicle Maintenance:


The basis for vehicle maintenance is a schedule of the services required and the intervals between servicing. The schedule can be developed by the maintenance workshop or by the vehicle operating branch. For maintenance of standard vehicles the manufacturer's advice should be considered. In the absence of such recommendations the schedule shall be based on experience with maintenance needs.

11.3.1 Basis of preparing the Vehicle Maintenance Schedule:

The different types of vehicles of an airport do not run at the same rate or distance. Some of them are operated everyday and run quite good number of kilometers, some do not undergo long runs, though operated for long hours, while there are equipment which are often given static runs only. Thus their maintenance requirement and schedule will also vary. On the basis of that the vehicles and equipment can be grouped into the following categories for maintenance:

- a. Schedule on the basis of kms run.
- b. Schedule on the basis of hours operated.
- c. Time based schedule i.e. on the basis of Months or year.

<p>This is a controlled document</p>	<p style="text-align: right;">Issued 14 August 2025</p>
--------------------------------------	---

	<p style="text-align: center;">TANZANIA CIVIL AVIATION AUTHORITY</p> <p style="text-align: center;">AERODROMES AND GROUND AIDS</p>	<p style="text-align: right;">Revision: 1</p>
<p>Document No. TCAA/QSP/SR/AC/AGA-032</p>	<p style="text-align: center;">PREPARATIONS OF AERODROMES MAINTENANCE MANUAL</p>	<p style="text-align: right;">Page 74 of 79</p>

11.3.1.1 Schedule on the basis of kms run

Self driven vehicles like standard cars, station wagons, minibuses, buses, Ambulances etc. which more or less run considerable number of kms regularly should fall under the schedule on the basis of kms run. User or operator of the vehicle must maintain record of the kms run. This can be done by marking the next milometer reading when the maintenance shall be due.

11.3.1.2 Schedule on the basis of hours operated

Vehicles or equipment like RFF vehicles, standard trucks, aircraft towers, runway sweepers, mowers etc. which, although operated regularly for considerable hrs. do not run considerable number of kms should fall under the schedule on the basis of hours operated. User or operator of the vehicle must maintain record of the hours of operations. This can be done by marking the next milometer reading when the maintenance shall be due. An easy way of controlling the operating hours can be achieved by marking the limit of the vehicle on a label attached to the driver's panel or screen. Monitoring can also be carried out by fuelling personnel.


11.3.1.3 Fixed Interval or Time-based schedule i.e. schedule on the basis of Months or year

For other equipment, fixed time intervals are practical. Special procedures are applied for winter equipment, which should undergo inspection and overhaul twice a year, i.e. once before the winter season and then again shortly after it.

11.3.2 Categorization of Vehicle for Maintenance purpose


It is very difficult to bring the various types of vehicles and equipment operated at an airport in a single maintenance programme. However, the following table will give some general guidelines on the issue:

<p>This is a controlled document</p>	<p style="text-align: right;">Issued 14 August 2025</p>
--------------------------------------	---

	<p style="text-align: center;">TANZANIA CIVIL AVIATION AUTHORITY</p> <p style="text-align: center;">AERODROMES AND GROUND AIDS</p>	<p>Revision: 1</p>
<p>Document No. TCAA/QSP/SR/AC/AGA-032</p>	<p style="text-align: center;">PREPARATIONS OF AERODROMES MAINTENANCE MANUAL</p>	<p>Page 75 of 79</p>

Equipment maintenance intervals

SN	Equipment	Maintenance intervals		Remarks
		km driven	Hrs. Operated	
1	RFF vehicles, Ambulances	3,000 to 5,000 kms.	100 to 200 Hrs.	Whichever comes first.
2	Standard cars, station wagons, minibuses, buses	5,000 kms.	---	
3	Special passenger buses	---	100 to 200 Hrs.	At least twice a year.
4	Standard trucks, aircraft towers, runway sweepers, mowers.	---	100 to 200 Hrs.	At least twice a year.
5	Self-driven aircraft handling equipment (lifters, electric power trucks, water trucks, etc.)	---	100 to 200 Hrs.	
6	Other aircraft handling equipment (dollies, stairs, etc.)			Once or twice a year.

	<p style="text-align: center;">TANZANIA CIVIL AVIATION AUTHORITY</p> <p style="text-align: center;">AERODROMES AND GROUND AIDS</p>	<p style="text-align: right;">Revision: 2</p>
<p>Document No. TCAA/QSP/SR/AC/AGA-32</p>	<p style="text-align: center;">PREPARATIONS OF AERODROMES MAINTENANCE MANUAL</p>	<p style="text-align: right;">Page 76 of 79</p>

11.3.3 Advantages of Fixed Interval or Time-based schedules:

Fixed time intervals offer the advantage of well-balanced workshop utilization. Equipment with a low number of operating hours per year should fall in this category. But in such cases the equipment shall be inspected regularly. Otherwise, maintenance to protect from true wear cannot be met, since the individual use of equipment is not considered.

11.3.4 Defining the maintenance intervals:

The user (or proprietor) of the vehicles will define the maintenance intervals in accordance with experience, manufacturer's recommendation and work-shop capacity. No standards, but only guidelines, can be given.

11.3.5 Determining factors of maintenance schedules:

The maintenance programme for each type of vehicle or equipment will depend on the following factors:

- a. Function of the vehicle or equipment,
- b. Wear and tear characteristics, and
- c. Manufacturer's recommendation. Inspection must be carried out by specialists.


11.3.6 Servicing of radio-telecommunication equipment:

An important element of the maintenance of airport vehicles is the servicing of installed radio- telecommunication equipment, since, by the very nature of traffic control on an airport; the radiotelephone has to be serviceable at all times.

11.3.7 Inspections and maintenance:

Inspections and checks play a very important role in the process of maintenance of equipment and vehicles, and there by in keeping them serviceable up-to the mark. In the interest of safety, operating personnel must be advised to check the functioning of all essential components, **e.g. brakes, control, tires, lights** every day *before* using any vehicle or piece of equipment. Whenever deficiencies or failures are discovered, the

<p>This is a controlled document</p>	<p>Issued: 14 August 2025</p>
--------------------------------------	-----------------------------------

	<p style="text-align: center;">TANZANIA CIVIL AVIATION AUTHORITY</p> <p style="text-align: center;">AERODROMES AND GROUND AIDS</p>	<p style="text-align: right;">Revision: 2</p>
<p>Document No. TCAA/QSP/SR/AC/AGA-32</p>	<p style="text-align: center;">PREPARATIONS OF AERODROMES MAINTENANCE MANUAL</p>	<p style="text-align: right;">Page 77 of 79</p>

unserviceable equipment shall be taken out of service and repair shall be carried out as soon as practicable.

12. MAINTENANCE OF BUILDINGS

12.1 General

This section covers all routine repairs, refurbishing, structural strengthening, replacement, janitorial and operation of services.

The standards observed shall be as directed by the Aerodrome Operator and in accordance with sound engineering practices. Work techniques and procedures may be guided by any manuals derived from other recognized international authorities, Manufacturer's recommendations etc. as appropriate.

12.2 Building Structure


The structural components of all buildings, foundations, columns, beams, slabs, bracing and load bearing walls are to be continuously monitored for cracking, settlements and signs of obvious stress.

Any evidence of distress is to be thoroughly investigated and a report submitted to Airport Manager detailing the concerned probable cause with recommendations for any remedial work required. On receipt of such reports Airport manager will authorize repairs as deemed necessary.

Strengthening of any of any structural component such as adding additional columns or jacks, replacement of load carrying slabs and walls, bracing columns, load relief works, epoxy sealing of cracked members in non-critical areas and other routine repairs are considered maintenance works.

Similarly, normal settlement cracks in floors, walls, ceilings etc. of a non-critical nature and any replacement resulting there from such as door and window frames, broken glass panels etc. are to be considered as maintenance. Also, to be considered as maintenance activities are all remedial works for weather and water proofing of the buildings.

<p>This is a controlled document</p>	<p>Issued: 14 August 2025</p>
--------------------------------------	-----------------------------------

	<p style="text-align: center;">TANZANIA CIVIL AVIATION AUTHORITY</p> <p style="text-align: center;">AERODROMES AND GROUND AIDS</p>	<p style="text-align: right;">Revision: 2</p>
<p>Document No. TCAA/QSP/SR/AC/AGA-32</p>	<p style="text-align: center;">PREPARATIONS OF AERODROMES MAINTENANCE MANUAL</p>	<p style="text-align: right;">Page 78 of 79</p>

Weather proofing consists of ensuring the structural continuity of all walls i.e. ensuring, that window and door frames are tight, glass is properly sealed and all openings are properly fitted with weather stripping. Water proofing consists of maintaining the roof seals and ensuring proper fit of doors, windows and service openings.

12.3 Cracks

There are two types of cracking, load and non-load associated cracking. Load associated cracking can be further divided into critical and non-critical cracking. Non-load associated cracking, usually due to shrinking of materials or resulting from the use of improper materials and/or workmanship or due to age embrittlement/fatigue, is by definition non-critical.


Non-load associated cracking, distinguished by its location and random occurrence, usually takes the form of a pattern such as crazing. The cracks are only hairline and appear relatively suddenly, after which little or no further crack development takes place.

After the cracks are discovered, they should be monitored for approximately two months in order to establish, that the cracks are indeed non-load associated and, that they have stabilized. Remedial work will then consist of sizing, slurring or any other sealing process, that has an approval followed by the affected area being re-plastered or repainted as appropriate.

Load associated cracks usually start as individual hair cracks and develop with regard to length and width with time.

Since most load associated cracking develops and becomes relatively stable the first year (in normal buildings 95% of the settlement, which produces most of the cracking, is complete in the first year), it should be monitored, until further development has obviously ceased. Once it is decided, that remedial works are to begin, the crack shall be chased out to form a V approximately 2.5 cm deep with the sides left in a rough condition. The V is to be prepared for a filler by sizing or sealing with any approved proprietary material used in accordance with the Manufacturer's recommendations. The crack shall be filled with a suitable non-shrink, strongly adhesive (epoxy emulsion) special crack filler to whatever depth is appropriate for resurfacing. The final layer of the

<p>This is a controlled document</p>	<p>Issued: 14 August 2025</p>
--------------------------------------	-----------------------------------

	<p style="text-align: center;">TANZANIA CIVIL AVIATION AUTHORITY</p> <p style="text-align: center;">AERODROMES AND GROUND AIDS</p>	<p style="text-align: right;">Revision: 2</p>
<p>Document No. TCAA/QSP/SR/AC/AGA-32</p>	<p style="text-align: center;">PREPARATIONS OF AERODROMES MAINTENANCE MANUAL</p>	<p style="text-align: right;">Page 79 of 79</p>

filler may be tile to match the existing surrounding decorative walls etc. or non-shrink plaster having the same characteristic as the surround. Where repainting is appropriate, the entire area between natural boundaries or discontinuities, within which the crack occurred, is to be repainted.

12.4 Painting

Refurbishing of all decorative surfaces, the major portion of which consists of painting, shall be carried out as maintenance. Painting shall also include in certain cases plastering, stucco, special surface dressing, refacing or replacing marble and rechroming of sculpted surface. Also included shall be the preparatory work required such as acid bathing, cleaning, masking, plugging, scrapping, sizing, prime coating or replacement of rotted, exfoliated or disintegrating surfaces with an appropriate resurfacing.

Painting may be carried out by hand, by spray or by roller as appropriate using the specifically assigned color coding and standard painted finishes, all to the satisfaction of the Aerodrome Operator. All other refurbishing or refinishing shall be as appropriate to the surface involved and to the satisfaction of the Aerodrome Operator.

12.5 Maintenance

This covers trash collection, minor day to day repairs and the operation of support equipment such as air-conditioning, heating and ventilating equipment, replacement of consumables such as toilet paper, towels etc. Included is the replacement of parts that wear out such as tap washers, paving tiles, carpets, curtains, furniture reupholstering or replacement, weather stripping etc.

This also involves the replacement of limited life components such as light bulbs, water heaters, window air conditioners, filters, electric motors etc. as well as components subject to breakage or abuse such as furniture, glass, ash trays, sign repainting etc.



Tanzania Civil Aviation Authority

<p>This is a controlled document</p>	<p>Issued: 14 August 2025</p>
--------------------------------------	-----------------------------------