AERODROME SAFETY PUBLICATION

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ICAO Doc 9157- Part 4 - Visual Aids
IEC 61821:2011 - Electrical installations for lighting and beaconing of aerodromes

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Note – Aerodrome Safety Publications are published by the SCAA to supplement the to the provisions of the Seychelles Technical Standards – Aerodromes. The publications are intended to provide recommendations and guidance to illustrate a means, but not necessarily the only means, of complying with SARPs. Aerodrome Safety Publications may explain certain regulatory requirements by providing interpretive and explanatory materials.

1. Purpose

1.1 The purpose of this Aerodrome Safety Publication (ASP) is to provide guidance, best practices, and recommended procedures for planning and conducting routine inspections with the development of a comprehensive preventive maintenance programme of airfield lighting systems and related electrical facilities which are critical for the safe operation of aircraft, particularly during low-visibility conditions, night operations, and/or adverse weather.

1.2 There may be other maintenance methods not covered in this ASP; if such methods are effective, the aerodrome operator may choose to adopt them.

2. Applicability

2.1. This ASP applies to all aerodrome operators subjected to Regulation 61 of the Civil Aviation (Safety) Regulations, 2017 and the Seychelles Technical Standards - Aerodromes.

2.2. Operators of aerodromes that are outside the scope of Regulation 61 of the Civil Aviation (Safety) Regulations, 2017 are highly encouraged to implement the provisions of this ASP.

3. Cancellation

3.1. Nil

4. Introduction

4.1 Operating an aerodrome at night or in low-visibility conditions relies on the consistent performance of runway and taxiway lighting systems. To maintain this reliability, a well-structured maintenance and inspection programme is essential. Regular checks and timely upkeep not only help prevent faults that could mislead or confuse pilots but also ensure the lighting systems provide uninterrupted visual guidance, thereby enhancing overall safety of aircraft operation.

4.2 Additionally, a clear and thorough maintenance programme also supports compliance with regulatory requirements and helps keep the aerodrome safe and fully operational.

4.3 Ultimately, the continued effectiveness of any installed lighting system depends on its serviceability, an objective that can only be achieved through diligent and proactive maintenance by the aerodrome operator.

4.4 Different types of Visual Aids for navigation used at aerodromes are as follows:

a. Runway edge lights, centre line lights, touch-down zone lights, threshold lights, stop bar lights, runway end lights etc.
b. Taxiway edge lights, centre line lights, taxi stop bar lights etc.
c. High intensity approach lights, low intensity approach lights, strobe lights, Precision Approach Path Indicator (PAPI) etc.
d. Aerodrome beacon, wind direction indicators, obstruction lights etc.

e. Markings and signs etc.

5. Abbreviations and Definitions

5.1 Abbreviations

AFL	Airfield Lighting
AGL	Aeronautical Ground Lighting
ASP	Aerodrome Safety Publication
ATC	Air Traffic Control
CCR	Constant Current Regulator
ICAO	International Civil Aviation Organization
FOD	Foreign Object Debris
LED	Light Emitting Diode
STS-ADR	Seychelles Technical Standards - Aerodromes
PAPI	Precision Approach Path Indicators
ALCMS	Airport Lighting Control and Monitoring System
AVDGS	Advanced Visual Docking Guidance Systems

5.2 Definitions

Advanced Visual Docking Guidance Systems
Advanced Visual Docking Guidance Systems is a system that provides electronically displayed information, such as the azimuth position of the aircraft and stopping distance. In some cases, the AVDGS determines the aircraft type automatically and sets the relevant guidance parameters accordingly.

Aerodrome
Aerodrome means a defined area on land or water (including any buildings, installations and equipment) intended or designed to be used either wholly or partly for the arrival, departure and surface movement of aircraft.

Aerodrome Operator
Any person or legal entity authorized by the Authority to manage and operate an aerodrome by means of issuance of an aerodrome certificate.

Aeronautical Ground Lighting
Any light specially provided as an aid to air navigation, other than a light displayed on an aircraft.

Lock-out/Cut-out procedures
Safety procedure to isolate energy sources and prevent equipment from being accidentally energized during maintenance

Maintenance programme

A maintenance programme is a planned set of inspections, tests, and servicing actions designed to ensure that aerodrome lighting systems remain safe, reliable, and compliant with operational standards.

Runway Edge Lighting
Runway Edge Lighting is located along the edges of the area declared for use as the runway delineated by white edge markings and may be provided either by elevated or by flush fitting lamp fixtures.

Runway Threshold Lighting
Runway threshold lighting is green and indicates the start of the available landing distance.

Runway Centerline Lighting
The centre-line lighting is colour coded in order to warn a pilot of the approaching end of the runway white centre-line lighting extends from the threshold to 900 m from the runway end, the following 600m is lit with alternate white and red lights, and the final 300 m lit by red centre-line lighting.

Runway Threshold Identification Lights
Runway Threshold Identifying Lights (RTIL) consist of two synchronized flashing lights located near the runway threshold to provide rapid and positive identification of the approach threshold of a runway

Stopway Lighting
Where stopway is provided at the end of a runway, the declared stopway is delineated by red edge and end lighting showing ONLY in the direction of landing.

Taxiway Lighting
At those aerodromes equipped for low visibility operations, taxiways are equipped with green centreline lighting. Where green centreline lighting is provided, blue taxiway edge lighting may also be installed as additional guidance on sections of taxiway.

Taxiway
A defined path on a land aerodrome established for the taxiing of aircraft and intended to provide a link between one part of the aerodrome and another including aircraft stand, taxi-lane, apron, taxiway, and rapid exit taxiway.

6. The Four Cs of Airfield Lighting Systems

Airport lighting systems are defined by four key elements—known as the “Four Cs”: Configuration, Colour, Candelas, and Coverage.

a. *Configuration* provides visual guidance through the layout and pattern of lights.
b. *Colour* indicates the aircraft’s position within the system (e.g., green for taxiways, red for stop bars).
c. *Candelas* refer to light intensity, which affects visibility in different conditions.
d. *Coverage* ensures lights are visible from the required angles and distances.

These elements work together to support safe operations, and their application varies with airport size and expected visibility conditions.

7. DEVELOPING A MAINTENANCE PROGRAMME

7.1 By establishing a proactive inspection and maintenance programme, aerodrome operators can effectively manage the risk of system failures and unserviceability. Such a programme enables early detection and timely correction of deficiencies, reducing the likelihood of unexpected breakdowns that could compromise airfield safety or disrupt operations.

7.2 When developing a maintenance programme for airfield lighting systems, operators should take into account general maintenance best practices, the specific recommendations provided by equipment manufacturers, and any relevant safety and health requirements. These elements ensure the programme is comprehensive, effective, and aligned with both operational needs and regulatory expectations.

7.3 A robust maintenance programme for airfield lighting systems should consist of the following key components:

a. Routine Maintenance
Regular and scheduled tasks designed to ensure the ongoing functionality of the lighting systems. This may include cleaning, testing, and minor adjustments to ensure lights are operating as expected.

b. Corrective Maintenance
Addressing issues or faults that have already affected the performance of the lighting system. This involves troubleshooting and repairing or replacing faulty components to restore proper system function.

c. Preventive Maintenance
Tasks aimed at preventing potential system failures before they occur. This can include inspections, system testing, and replacement of components showing early signs of wear or degradation.

d. Predictive Maintenance
Using data and performance indicators to predict when maintenance or repairs are likely to be needed, allowing for timely interventions before a failure occurs. This can include the use of advanced diagnostic tools and monitoring systems.

7.4 In addition to these main components, the maintenance programme should also include procedures to address the following critical factors:

7.4.1 **Personnel Qualification and Training**
Ensuring that all staff involved in maintenance activities are properly trained and qualified to perform tasks safely and efficiently, with electrical technicians entrusted with the maintenance of lighting aids required to have the following qualifications and qualities:

a. Be experienced with high voltage series circuits and lighting;

b. Be fully competent 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.

7.4.2 **Authorization procedures**
Determination of which activities require authorization, who is able to give the authorization, how the authorization, including written permission, is to be obtained, and all other safety procedures associated with the activity.

7.4.3 **Lock-out/Cut-out procedures**
The lighting circuit should be deactivated, locked-out and tagged-out before any maintenance is conducted on any lights.

7.4.4 **Availability of Spare Parts:**
Ensuring that essential spare parts are available and can be quickly sourced to minimize downtime in case of system failure, with an adequate stock of spare parts maintained based 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.

7.4.5 **Readily Available As-Built Drawings**
Maintaining updated and easily accessible as-built drawings of the lighting systems for reference during inspections and repairs, with a set of as-built drawings kept readily available in the Maintenance unit and stored in the following manner.

a. Drawings should 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 should 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.

7.4.6 **Electrical System Component Inspection Schedule**
A systematic inspection schedule should be established for all electrical components of the aerodrome lighting system. This ensures early identification of wear, damage, or malfunction that may compromise system performance and safety. This schedule is usually available in the manufacturer's manual for each light fixture or equipment.

7.4.7 **Electrical System Component Maintenance Schedule**
Establishing a clear, structured maintenance schedule for **each** component of

the lighting system to ensure timely and regular servicing. This schedule is usually available in the manufacturer's manual for each light fixture or equipment.

7.4.8 **Electrical System Component Maintenance Procedures**
Defining and documenting standardized procedures for the maintenance of each component to ensure consistency and compliance with safety standards, including procedures for aerodrome lighting inspection, CCR inspections, substation inspections, and other relevant tasks.

7.4.9 **Performance Level Objectives for Visual Aids**
Setting clear objectives for the performance standards of visual aids to ensure they meet required safety and operational criteria, this performance level should be maintained through planned, unplanned and preventive maintenance.

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

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

No	Light Category	Minimum acceptable light output (% of specified value)	Minimum acceptable % of serviceable light		Consecutive lights, more than numbers given below, should not remain unserviceable
1.	Runway edge lights	50%	a. For Cat -I operations, at or above prescribed visibility		2
			b. When Runway Visual Range is less than 550m	95%	
2.	Runway centre line lights	50%	a. For Cat-I operation, at or above prescribed visibility	85%	2
			b. When Runway Visual Range is less than 550m	95%	
3.	Runway end lights	50%	a. For Cat-I operation, at or above prescribed visibility	85%	2
			b. When Runway Visual Range is less than 550m	95%	
4.	Taxiway Stop-bar lights	50%	Not more than two lights should be Unserviceable		2
5.	Runway Threshold lights	50%	85%		-
6.	Touch Down Zone lights	50%	90%		-
7.	Approach lights	50%	Beyond 450 m	85%	-

8. Preventive Maintenance of Visual Aids for Navigation

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

i. Light bulbs should be considered unserviceable and be replaced when their brightness falls below 50% of normal value.

ii. The specifications from the manufacturers manual regarding the normal life span of all the items of visual aids should be available.

iii. In case when manufacturer's specification is not available, light bulbs should be replaced after 90% of the average life time of the bulbs has elapsed.

iv. The condition of all cables associated with visual aids should be verified. Cables showing signs of aging or damage that could compromise system performance must be promptly replaced.

v. Light fittings, fasteners and their supporting structures which may be damaged by rust should be painted annually.

vi. Functions of all other items should be closely monitored and should be replaced whenever there is any threat to the system to be hampered due to aging of those items.

9. Basic Components of Preventive Maintenance

9.1 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;**
The unserviceable lights can be identified more easily during night inspections.

b. **Monitoring;**
Possible failures can be noticed by the personnel or ATC at the Control desk/panel if an appropriate monitoring system is there.

c. Servicing and overhaul;
Periodic servicing and scheduled overhauls help extend the lifespan of components and ensure they operate within the manufacturer's specifications. This includes cleaning, recalibration, and replacement of consumables.

d. **Repair;**
Timely repair of defective or damaged lighting components is critical to maintaining system integrity. Repairs should be carried out by qualified personnel following documented procedures and using approved parts and tools.

9.2 Structure of a Maintenance Programme

Refer to Appendix 1

The structure of the Maintenance programme should consist of the following:

a. Cover Title
b. Document Control & Administration
c. Table of Contents
d. Definitions and Abbreviations
e. Introduction
f. Objectives
g. Scope
h. Roles and Responsibilities
i. Inspection & Maintenance Team
j. Inspection Schedule
k. Maintenance Schedule
l. Performance Level Objectives for Visual Aids
m. Fault Reporting and Rectification
n. Spare Parts and Inventory
o. Documentation and Records
p. Training
q. Appendices

10. Inspection And Maintenance Team

10.1 The team for the inspection and maintenance of visual aids should consist of at least one qualified electrical technician.

11. PREVENTIVE MAINTENANCE FOR AIRFIELD LIGHTING SYSTEMS

11.1 Aeronautical Ground Lighting

Maintenance for all types of approach, runway and taxiway lights these include (elevated or insets fittings) should include checking and, if necessary, taking the indicated corrective action, as follows:

a. Daily

i. System for burnt-out lamps; replacing burnt-out lamps.

ii. System for gross misalignment (if applicable); Adjusting.

iii. Control equipment for proper operation on each brightness step (if applicable); Correcting or repairing malfunctions.

iv. Glass for breakage; replacing broken parts.

b. Annually

i. Fasteners of each light unit; Tightening.

ii. Lights for corrosion; Painting or Replacing rusted parts.

iii. Reflector of each light unit (if applicable); Cleaning or Replacing.

iv. Glass of each light; Cleaning or Replacing.

v. Lamps of the whole system; Replacing of the unserviceable lamps or entire system.

vi. Elevation setting (if applicable); Adjusting.

vii. Horizontal alignment; Adjusting.

viii. Plug connections for cleanness and faultless contact; cleaning or replacing of dirty parts.

ix. Light fittings and their supporting structure (if existing) for adequacy of fastening and for corrosion and rust; tightening fasteners; Painting or Spraying general condition of the whole system and recording result.

c. Unscheduled

i. Elevation setting and the horizontal alignment (if applicable) of the light unit after severe storm; Adjusting

ii. Light units for obstruction by grass. etc; removing any obstacles found.

11.2 Threshold Lights and Runway End light

*Maintenance should include checking and, **if necessary**, taking the indicated corrective action as follows:*

a. Twice Weekly

i. fasteners of the lights; tightening

ii. glass of each light for wear and tear; replacing.

11.3 Precision Approach Path Indicator (PAPI)

Maintenance should include checking and, if necessary, taking the indicated corrective action as follows:

a. Daily

i. All lamps are illuminated and display uniform brightness.

ii. Glass components are intact; any broken parts are replaced.

iii. No visible signs of physical damage.

iv. Red-to-white colour transitions are consistent across all elements and;

v. Lenses are clean and free from contamination.

b. Monthly

i. Signs of damage from service vehicles, rodent activity, water ingress, or insect infestation

ii. Verification and adjustment of the elevation (vertical angle) setting of the light units.

c. Quarterly

i. Reflectors, filters and lenses for cleanness; Cleaning

d. Annually

i. Perform flight check and recording results; Adjusting and Replacing lamps

ii. Supporting structure and the foundation of each unit; Repairing

11.4 Signs

Signs provide essential directional information for pilots during taxiing and holding operations. Maintenance must ensure the integrity, visibility, and legibility of the information displayed at all times. While sign design and construction may vary, the following general checks and maintenance actions are recommended for each sign:

a. Daily

i. Verify illumination; replace any burnt-out lamps.

ii. Check inscriptions for legibility and ensure they are free from dirt or obstructions.

iii. Repair signs as needed and remove any physical obstructions.

b. Annually

i. Inspect the mounting of both the sign and its lighting system (if present); repair as necessary.

ii. Assess the sign structure and foundation; clean, repair, or replace components as needed.

11.5 Other Airport Lights

Other airport lights, such as airport beacons, obstacle lights, and wind direction indicators, aerodrome fence lighting generally require less maintenance than

approach, runway, or taxiway lighting systems. Their maintenance should involve daily checks and, where necessary, corrective actions, including:

a. Daily

i. Lamps; Replacing (if necessary);Correcting or Repairing

ii. Fabric of the wind cone; Repairing or Replacing

b. Semi Annually (only for airport beacon)

i. Power supply (brushes and slip-rings); Leaning or replacing

ii. Electrical connections; Tightening

iii. Rotating parts; Fastening.

c. Annually

i. Optical system of the airport beacon glasses and the gaskets of obstacle lights; Cleaning or Replacing

ii. Function of the flashing relays and of the day light switches of the obstacle lights; cleaning, Repairing or Replacing

iii. Power supply and the lighting of the wind direction indicator; Repairing or Replacing

iv. Electrical connections; Tightening; Spraying with contact cleaner

v. Fasteners of obstacle lights

vi. Structure and the fasteners of the wind direction indicator; Tightening or Repairing the structure lights for corrosion; painting

vii. Colour of the fabric cone of the wind direction indicator; replacing.

viii. Location of obstacle lights for easy access for maintenance; Arranging of change of location if required and possible.

d. Unscheduled

i. Wind direction indicator after severe storms; repairing.

11.6 Docking Guidance System

Maintenance requirements to be checked and maintenance action to be taken, if necessary, include:

a. Daily

i. System for over-all operation; repairing

ii. Lamps; replacing burnt-out lamps

b. Semi-annually

i. Alignment of the system; adjusting.

c. Annually

i. Electrical connections (if provided) for corrosion, wear and tear; cleaning, tightening and replacing

ii. Function of relays (if provided); cleaning or replacing

iii. Structure of the system and the function of all mechanical parts; repairing

iv. System for cleanness and moisture; cleaning and drying.

12 PREVENTIVE MAINTENANCE OF AERODROME ELECTRICAL SYSTEMS

12.1 Routine maintenance schedules for individual components of the airport electrical system should be guided primarily by manufacturer recommendations and adjusted based on the aerodrome operator's experience with system performance and failure trends. To support effective scheduling and reliability tracking:

i. Detailed maintenance records must be kept for all work performed.

ii. Since servicing frequency varies with equipment type, universal maintenance intervals cannot be prescribed.

iii. The schedules provided herein are intended to serve as general guidance for developing a tailored preventive maintenance programme.

12.2 Power Cables and Distributors (In-Field)

Preventive maintenance of power cables and distributors installed outside buildings is limited due to their underground placement. Where accessible (e.g., in channels or manholes), inspections should be conducted, including the following actions:

a. Semi annually

i. Distributors in manholes: Check for cleanliness and moisture; clean and dry as required.

ii. Plug-in and clamp connections: Ensure good electrical contact; tighten connections and apply contact spray.

iii. Manhole conditions: Inspect interior; pump out water, dry, or clean as needed.

iv. Insulation resistance: Measure and record earth resistance of each circuit; take corrective actions if readings indicate degradation.

12.3 Constant Current Regulators (CCRs)

Maintenance of transformers and regulators should include periodic checks and, if necessary, the following corrective actions:

a. Monthly

i. power supply transformers and regulators for cleanness and oil losses; cleaning and replacing oil

ii. switches at all light intensity positions for malfunctions; restoring

iii. switch over to standby units for serviceability; restoring.

b. Annually

i. transformers for noise; investigating reason for any unusual sound and repairing
ii. over-all condition; repairing
iii. insulators; repairing or replacing
iv. collector bar system; cleaning
v. voltage and amperage at all intensity levels, measuring and recording; adjustment of voltage to nominal level.

12.4 **Transformer stations** *(electrical power supply/distribution)*
Maintenance of transformers should include periodic checks and, if necessary, the following corrective actions:

a. Weekly

i. Visual inspection of overall condition: Identify and restore any noticeable defects.

ii. Fuse boxes: Check for completeness; replace any missing fuses.

b. Semi Annually

i. Insulators and electrical connections: Clean and restore as needed.
ii. Station cleanliness: Remove dirt and moisture; dry interior areas thoroughly.
iii. Locks to stations: Check for serviceability; repair or replace as necessary, and ensure proper locking.

c. Annually

i. Protection relays: Inspect and adjust as necessary.

ii. High-voltage cable insulation: Record the condition of each cable and apply preventive measures if deterioration is observed.

iii. Earthing system: Clean and test resistance values; rectify if values exceed limits.

iv. Electrical supply system: Inspect for abnormal noise or physical damage; repair as required.

v. Metal surfaces: Check for rust, corrosion, or damaged protective coating; clean and repaint.

vi. Warning signs and safety devices: Confirm presence, legibility, and correct positioning; clean or replace as needed.

vii. Safety grids:

- Inspect for completeness, rust, or coating damage; clean, repaint, or replace as necessary.
- Check stability and earthing; tighten and restore proper grounding where needed.

12.5 **Relay and Switch Cabinets** *(including switchgear in substations)*
Maintenance of relays and switching cabinets should include periodic checks and, if necessary, the following corrective actions:

a. Semi-Annually:

i. Turn and plug-in connections: Check for cleanliness and ensure good electrical contact.

ii. Relays: Verify positive contact closure; clean or replace if necessary.

iii. Electrical contacts: Inspect for corrosion and wear; clean or replace as needed.

iv. Cabinet condition: Ensure proper weather sealing, cleanliness, and absence of mechanical damage; clean and repair as required.

v. Monitoring relays (for series circuits): Check for proper feedback; repair if faulty.

vi. Voltage switch-over (if available): Confirm serviceability of dual circuits; repair as necessary.

b. Annually:

i. Exterior cabinet condition: Inspect for dirt, moisture, and accessibility; clean and dry.

ii. Fuses and fuse sockets (if provided): Clean sockets, spray contact cleaner, and replace fuses as needed.

iii. Voltage output (for all series circuits): Measure, record, and take corrective action if values are out of tolerance.

12.6 **Control cables, monitoring units and control desk**
Maintenance of control cables, monitoring units and control desk should include periodic checks and, if necessary, the following corrective actions:

a. Daily

Check optical and acoustic signals for feedback; restore if faulty.

b. Weekly

i. Verify nominal control voltage; charge battery as needed.

ii. Record voltage and ammeter readings; adjust if out of range.

iii. Check battery acid level; top up with distilled water if required.

c. Monthly

i. Test monitoring unit functions.

ii. Inspect components for cleanliness and condition; clean, repair, or replace as necessary.

d. Quarterly

i. Inspect system components for loose connections; tighten, repair, or replace as required.

ii. Check overall functionality of the control desk; investigate and resolve malfunctions.

iii. Verify mimic panel indications match field conditions; correct or adjust as needed.

iv. Inspect mechanical structure of the desk for stability; repair if needed.

e. Semi-Annually

i. Replace lamps in monitoring units

f. Annual

i. Clean and repair cables and distributors.

ii. Clean relays.

iii. Replace control and monitoring units if required.

iv. Tighten and spray electrical connections.

g. Unscheduled (Post-Lightning Strike)

i. Test cable insulation (wire-to-wire and wire-to-ground); improve insulation as needed.

12.7 **Secondary Power Supplies (Generators)**

Maintenance of secondary power supplies must include a weekly or monthly test run and the following checks, with corrective actions taken as necessary:

a. Weekly

i. Test generators for functionality

ii. Fuel level in the tank after the test run; refill if needed

iii. Overall performance to identify any abnormal behaviour requiring correction or repair.

iv. Meter readings recorded and compared against previous data to identify performance trends or early signs of failure.

v. Voltmeter readings to confirm voltage remains within acceptable tolerances

b. Monthly

i. Check on Automatic Transfer equipment for signs of overheating or malfunction

ii. Generator unit for unusual vibrations or excessive heat

iii. Diesel engine for irregular operation or oil leakage

c. Quarterly or Semi Annually

i. Test monitoring unit functions.

ii. Inspect components for cleanliness and condition; clean, repair, or replace as necessary.

iii. Switch-over time from primary to secondary power supply to ensure it meets operational requirements

12.8 Apron Floodlighting

a. Daily

i. Check for lamp outages; replace if necessary.

ii. Verify remote switching operation; repair if faulty.

b. Annually

i. Clean turn and plug-in connections; ensure good contact.

ii. Clean or replace relays and contacts.

iii. Inspect and repair relay cabinet (weather seals, moisture, damage).

iv. Clean and spray fuse sockets; replace fuses.

v. Ensure relay cabinet exterior is clean and accessible.

13 AERODROME INSPECTION PROGRAMME/PROCEDURES

In-pavement lights are installed within aircraft movement areas and are routinely subjected to the weight of aircraft, making them higher-maintenance components. Their below-ground installation also increases susceptibility to water infiltration, requiring frequent inspection and maintenance to ensure continued performance and reliability. The inspection programme consists of the following:

13.1 Daily Inspection

13.1.1 A runway lighting inspection should be conducted daily. The operator should check for:

i. Burned-out lamps;

ii. Dimly burning lamps;

iii. Brilliancy or brightness step settings: and

iv. Record any defects observed and their location.

13.1.2 **Corrective action**

The field electrician should inspect and service any lights reported as defective in daily inspections. The preferred service method is to replace the in-pavement light unit with a spare and take the defective unit back to the shop for repair.

The following are some malfunctions of lighting systems:

a. No light

i. Replace the fixture with a refurbished unit.

ii. Return the faulty unit to the maintenance shop for re-lamping and repair.

b. Electrical failure

i. If a replacement lamp also fails, a series circuit problem likely exists.

ii. A string of failed lights also indicates a circuit issue that must be investigated.

c. Dim light

i. Dirt or contamination on the optical surface may reduce brightness.

ii. A dim light may also indicate a weak lamp or misalignment.

iii. Consider replacing the fixture if cleaning does not resolve the issue.

d. Light aiming

i. Shallow-base in-pavement lights can be misaligned by aircraft movements;

ii. Dim lights may simply be misaligned and require repositioning.

e. Water in the Fixture

i. Check for standing water or condensation behind the lens.

ii. If water is present, remove the unit and service it to prevent electrical damage

13.2 Regular Inspection.

13.2.1 Regular inspections may be conducted **monthly, quarterly, semi-annually,** or **annually** should be scheduled to ensure the serviceability and proper functioning of aerodrome electrical infrastructure. The frequency and scope of these inspections should be determined based on the following factors:

a. Traffic density;

b. Local pollution level;

b. Reliability of the installed equipment; and

c. Continuous assessment of the results of the in-field measurements

14 Cleaning

14.1 Due to their position at ground level, in-pavement lights need frequent cleaning to support their specified performance. The frequency with which the lights are cleaned depends on:

a. Location;

b. Weather conditions; and

c. Traffic density.

14.2 Rubber deposits have been shown to have an extremely detrimental effect on light output. Clean the lights when the light output of the fixture is less than 50 % of the standard [or of the design value when this value is in excess of the standard] A fixture degraded below this is ineffective for high background brightness, low visibility conditions.

14.3 Dry cleaning of lighting glassware should be avoided, as it may damage the surface. Instead, regular wet cleaning at scheduled intervals is recommended to preserve light performance and prevent the need for intensive treatments. Minor contaminants, such as dust, may be removed on-site—preferably using maintenance vehicles equipped with air compressors. Thorough cleaning, such as removing mud, moisture, or rust from the interior of fixtures, should be carried out in a workshop using appropriate tools and procedures.

15 Removal of water

15.1 Inset lights are prone to water accumulation, which can lead to corrosion, electrical damage, lamp degradation, and optical obstruction. To mitigate these risks:

i. Ensure proper drainage of the pavement opening before installing inset lights.

ii. Acknowledge that complete prevention of moisture ingress is unlikely, so regular inspections are essential.

iii. If water is detected inside a fixture, remove and replace it if possible. If not, dry the unit on-site, ensuring that:

- The sealings are inspected and replaced if deteriorated.
- The lamp is briefly switched on after drying to evaporate residual moisture through heat.

15.2 Water on or in front of the glass lens can distort the light beam and affect alignment. If this occurs, the drainage system must be improved to prevent recurrence.

16 Intensity Check and Photometric Testing

16.1 Test equipment is now available to allow for the rapid and accurate testing of the light output of both in-pavement and elevated runway lighting fixtures. Regular photometric measurements are the only practical way of determining if the lights are emitting the specified amount of light and for determining misalignment errors.

16.2 By using regular photometric measurements, maintenance of runway lighting fixtures may be targeted only where needed thereby saving resources and time while allowing the aerodrome to be assured of meeting light output specifications, especially in low-visibility conditions. This aids in providing a consistent lighting pattern to give the pilot with the best possible, non-ambiguous visual cues when landing.

16.3 Necessary frequency of photometric measurements will vary from facility to facility and from runway to runway depending on amount of traffic and age of fixtures. After experience has been gained with the measurement equipment, inspection schedules may be decided on or modified.

17 Photometric testing should be done:

i. Before cleaning or re-lamping, to prove what maintenance is necessary; and

ii. After cleaning, or other maintenance actions, to track the effectiveness of the maintenance and decide the extent of degradation of the optical assembly.

18 Semi-Annual Checks – Shallow Base Installations

18.1 Shallow base installations should be routinely checked for water accumulation, especially during prolonged periods of rain or high humidity. Any water present should be promptly removed, and the base should be properly sealed to prevent further ingress.

18.2 Persistent water intrusion is common due to the extensive network of conduits that may leak over time, gradually filling the base with moisture. Maintaining a dry base is crucial to prevent corrosion, electrical faults, and premature failure of fixtures and components.

19 Summary

19.1 Aerodrome operators should establish a preventive maintenance programme, including a structured inspection plan, to ensure the continued functionality, viability, and operational safety of the aerodrome infrastructure. The guidance provided in this document should be followed to support the safe and efficient operation of aerodrome lighting systems and associated facilities.

Note - For further reference on comprehensive airport maintenance practices, consult ICAO Doc 9137 – Airport Services Manual, Part 9: Airport Maintenance Practices.

20 Queries

20.1 Any queries relating to this ASP should be addressed to Head of Aerodrome Safety & Standards Inspectorate on seyaga@scaa.sc

Aerodrome Safety & Standards Inspectorate
Seychelles Civil Aviation Authority

Appendix 1. Aerodrome Maintenance Programme sample format

Document Title

SAMPLE FORMAT

[Company LOGO]
[Aerodrome Name/Organization Name]
[Department Name]
Maintenance Programme
Aerodrome Electrical Infrastructure

Watermark - Logo

May include graphics

Copy Number	[Number]
Version Number	[Enter Version Number]
Document Reference	[Enter Reference Number]
Effective Date	[Enter Date]

Reference Number

1

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12. Spare Parts and Inventory 7
13. Documentation and Records 7
14. Training 7
Appendices 7

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1. Document Control & Administration

1.1 Document Control

1.1.1 This SOP is owned by [Department Name]

1.1.2 This document shall be reviewed [Enter Period]

1.1.3 All recent revisions must be indicated in the 'amendment records' section by amendment numbers in an ascending order and dated.

1.2 Document Authority

	Name:	Post Title	Date	Signature
Prepared By:	[Enter Author Name]	[Enter Post Title]	[Enter Prepared Date]	Signature
Reviewed By:	[Enter Reviewer Name]	[Enter Post Title]	[Enter Review Date]	Signature
Compliance Review By	Enter Reviewer Name]	[Enter Post Title]	[Enter Review Date]	Signature
Approved By:	[Enter Approver Name]	[Enter Post Title]	[Enter Approval Date]	Signature

1.3 Amendment Record

Amendment Number	Section Amended	Details of Changes	Date of Amendment
[xx]	[Section Title]	[Brief Description]	[Date]
[xx]	[Section Title]	[Brief Description]	[Date]

1.4 Distribution List

Copy N^0	Group
1	[Enter Post Title/Section name]
2	[Enter Post Title/Section name]

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2. Definitions and Abbreviations

Include any key terms or abbreviations used in the document, along with their definitions. This ensures clarity for personnel who are responsible for following the procedures.

3. Introduction

This section introduces the document, explaining the purpose of the manual, its importance to the organization, and any regulations or standards that guided its creation

4. Objectives

State the specific objectives or outcomes of the document. The objective should clarify why the maintenance programme is needed, what it aims to achieve, and how it supports operational effectiveness.

5. Scope

This defines the boundaries of its application. It outlines the specific lighting and/or related electrical systems.

E.g. Covers all lighting systems, including:
Runway and taxiway edge and centerline lights
Stop bars and guard lights
Approach and PAPI lighting systems
Apron floodlighting
Control and monitoring systems
Power supply systems and cables

6. Roles and Responsibilities

This section defines the specific roles and duties of personnel involved in executing procedures. It clarifies who is responsible for various tasks, such as conducting inspections, reporting incidents, or ensuring compliance. Clearly defined responsibilities promote accountability and ensure that all tasks are covered. It typically includes:

1. ***Role Titles:*** *List the various roles (e.g., Manager, Technician, Quality Control, etc.) involved in the procedure.*

2. ***Duties and Responsibilities:*** *Describe the specific tasks each role must perform. For example, a supervisor may be responsible for overseeing the execution of tasks, while a technician may perform the operational work.*

3. ***Accountability:*** *Indicate who is ultimately accountable for ensuring the procedure is followed correctly.*

E.g. •

Senior Manager : Ownership and responsibility of implementation of this procedure etc…

Electrical Technician – Airfield Lighting System - Responsible for execution of this job and ensure timely completion etc…

Electrical/AGL Supervisor: Daily coordination and defect rectification etc.

7. Inspection & Maintenance Team

The inspection and maintenance team is responsible for carrying out scheduled and unscheduled maintenance activities on all airfield lighting systems. The team typically consists of the following members:

Team Leader / Supervisor – Oversees all maintenance operations, ensures compliance with procedures, assigns tasks, and verifies completed work.

Licensed Electrical Technicians – Carry out inspections, installations, testing, repairs, and replacements of lighting and electrical components.

8. Inspection Schedule

This section outlines the types of inspection activities required to ensure the continued serviceability and safety of aerodrome lighting systems, along with how often they should be performed. Tasks are categorized into daily, weekly, monthly, quarterly, semi-annual, annual, and unscheduled (corrective) intervals. Frequencies are determined based on operational demands, equipment reliability, environmental conditions, and regulatory requirements. (See appendix 2)

9. Maintenance Schedule

This section outlines the types of maintenance activities required to ensure the continued serviceability and safety of aerodrome lighting systems, along with how often they should be performed. Tasks are categorized into daily, weekly, monthly, quarterly, semi-annual, annual, and unscheduled (corrective) intervals. Frequencies are determined based on operational demands, equipment reliability, environmental conditions, and regulatory requirements. (See appendix 3)

10. Performance Level Objectives for Visual Aids

Setting clear objectives for the performance standards of visual aids to ensure they meet required safety and operational criteria, this performance level should be maintained through planned, unplanned and preventive maintenance

11. Fault Reporting and Rectification

All faults to be recorded in the AGL maintenance log. Faults affecting safety-critical areas (e.g., runway centerline, stop bars) must be rectified within 24 hours. If not rectified, appropriate NOTAM action must be taken.

12. Spare Parts and Inventory

Maintain minimum stock levels for lamps, transformers, connectors, fuses, and control modules. All critical components to be sourced from approved suppliers. (See appendix 4)

13. Documentation and Records

Maintain a logbook of inspections, test results, repairs, and component replacements. Keep records for a minimum of 3 years for audit and regulatory review.

14. Training

Technicians must be trained in AGL systems, safety procedures, and manufacturer-specific equipment. Annual refresher training and competency assessments are required.

Appendices

Appendix: Provide forms, checklists, process maps, visuals/graphics or supplementary information relevant to the procedures.

Appendices may be numbered (e.g., Appendix 1, Appendix 2) or labeled with alphabets (e.g., Appendix A, Appendix B), depending on the organization's preferred formatting style

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Appendix 1 / Appendix A

[Insert forms, checklists, process maps, visuals/graphics or supplementary information relevant to the procedures]

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Document Title

Appendix 2
Inspection Programme Schedule

Aerodrome Name (Department Name)							
Lighting and Electrical systems - Inspection Schedule							
Components or Assets	**Daily**	**Weekly**	**Monthly**	**Quarterly**	**Semi-Annually**	**Annually**	**Unscheduled**
Title							
Component Name	[Enter Data]	[Enter Data]	[Enter Data]	[Enter Data]	[Enter Data]	[Enter Data]	[Enter Data]
Component Name	[Enter Data]	[Enter Data]	[Enter Data]	[Enter Data]	[Enter Data]	[Enter Data]	[Enter Data]
Runway Lights							
Runway Edge Lights	Check for burnt out lamps	[Enter Data]	[Enter Data]	[Enter Data]	[Enter Data]	Fasteners of each light unit	Elevation setting and the horizontal alignment (if applicable) of the light unit after severe storm
	Control equipment for proper operation on each brightness step	[Enter Data]	[Enter Data]	[Enter Data]	[Enter Data]	Lights for corrosion	[Enter Data]
	System for gross misalignment	[Enter Data]	[Enter Data]	[Enter Data]	[Enter Data]	Reflector of each light unit	[Enter Data]
	Glass for breakage	[Enter Data]	[Enter Data]	[Enter Data]	[Enter Data]	[Enter Data]	
[Enter Data]	[Enter Data]	[Enter Data]	[Enter Data]	[Enter Data]	[Enter Data]	[Enter Data]	[Enter Data]
[Enter Data]	[Enter Data]	[Enter Data]	[Enter Data]	[Enter Data]	[Enter Data]	[Enter Data]	[Enter Data]
[Enter Data]	[Enter Data]	[Enter Data]	[Enter Data]	[Enter Data]	[Enter Data]	[Enter Data]	[Enter Data]
[Enter Data]	[Enter Data]	[Enter Data]	[Enter Data]	[Enter Data]	[Enter Data]	[Enter Data]	[Enter Data]
Taxiway Lights							
	[Enter Data]	[Enter Data]	[Enter Data]	[Enter Data]	[Enter Data]	[Enter Data]	[Enter Data]
VASIs							
PAPI							
	[Enter Data]	[Enter Data]	[Enter Data]	[Enter Data]	[Enter Data]	[Enter Data]	[Enter Data]
Electrical Systems							

Reference Number 8

Document Title

Appendix 3
Aerodrome Maintenance Schedule

Aerodrome Name (Department Name)							
Lighting and Electrical systems - Maintenance Schedule							
Components or Assets	**Daily**	**Weekly**	**Monthly**	**Quarterly**	**Semi-Annually**	**Annually**	**Unscheduled**
Title							
Component Name	[Enter Data]	[Enter Data]	[Enter Data]	[Enter Data]	[Enter Data]	[Enter Data]	[Enter Data]
Component Name	[Enter Data]	[Enter Data]	[Enter Data]	[Enter Data]	[Enter Data]	[Enter Data]	[Enter Data]
Runway Lights							
Runway Edge Lights	replacing burnt-out lamps.	[Enter Data]	[Enter Data]	[Enter Data]	[Enter Data]	Fasteners of each light unit	Elevation setting and the horizontal alignment (if applicable) of the light unit after severe storm
	Correcting or repairing malfunctions.	[Enter Data]	[Enter Data]	[Enter Data]	[Enter Data]	Lights for corrosion	[Enter Data]
	Adjusting.	[Enter Data]	[Enter Data]	[Enter Data]	[Enter Data]	Reflector of each light unit	[Enter Data]
	Replace broken parts	[Enter Data]	[Enter Data]	[Enter Data]	[Enter Data]	[Enter Data]	
[Enter Data]	[Enter Data]	[Enter Data]	[Enter Data]	[Enter Data]	[Enter Data]	[Enter Data]	[Enter Data]
[Enter Data]	[Enter Data]	[Enter Data]	[Enter Data]	[Enter Data]	[Enter Data]	[Enter Data]	[Enter Data]
[Enter Data]	[Enter Data]	[Enter Data]	[Enter Data]	[Enter Data]	[Enter Data]	[Enter Data]	[Enter Data]
[Enter Data]	[Enter Data]	[Enter Data]	[Enter Data]	[Enter Data]	[Enter Data]	[Enter Data]	[Enter Data]
Taxiway Lights							
	[Enter Data]	[Enter Data]	[Enter Data]	[Enter Data]	[Enter Data]	[Enter Data]	[Enter Data]
VASIs							
PAPI							
	[Enter Data]	[Enter Data]	[Enter Data]	[Enter Data]	[Enter Data]	[Enter Data]	[Enter Data]
Electrical Systems							
[Enter Data]	[Enter Data]	[Enter Data]	[Enter Data]	[Enter Data]	[Enter Data]	[Enter Data]	[Enter Data]
[Enter Data]	[Enter Data]	[Enter Data]	[Enter Data]	[Enter Data]	[Enter Data]	[Enter Data]	[Enter Data]
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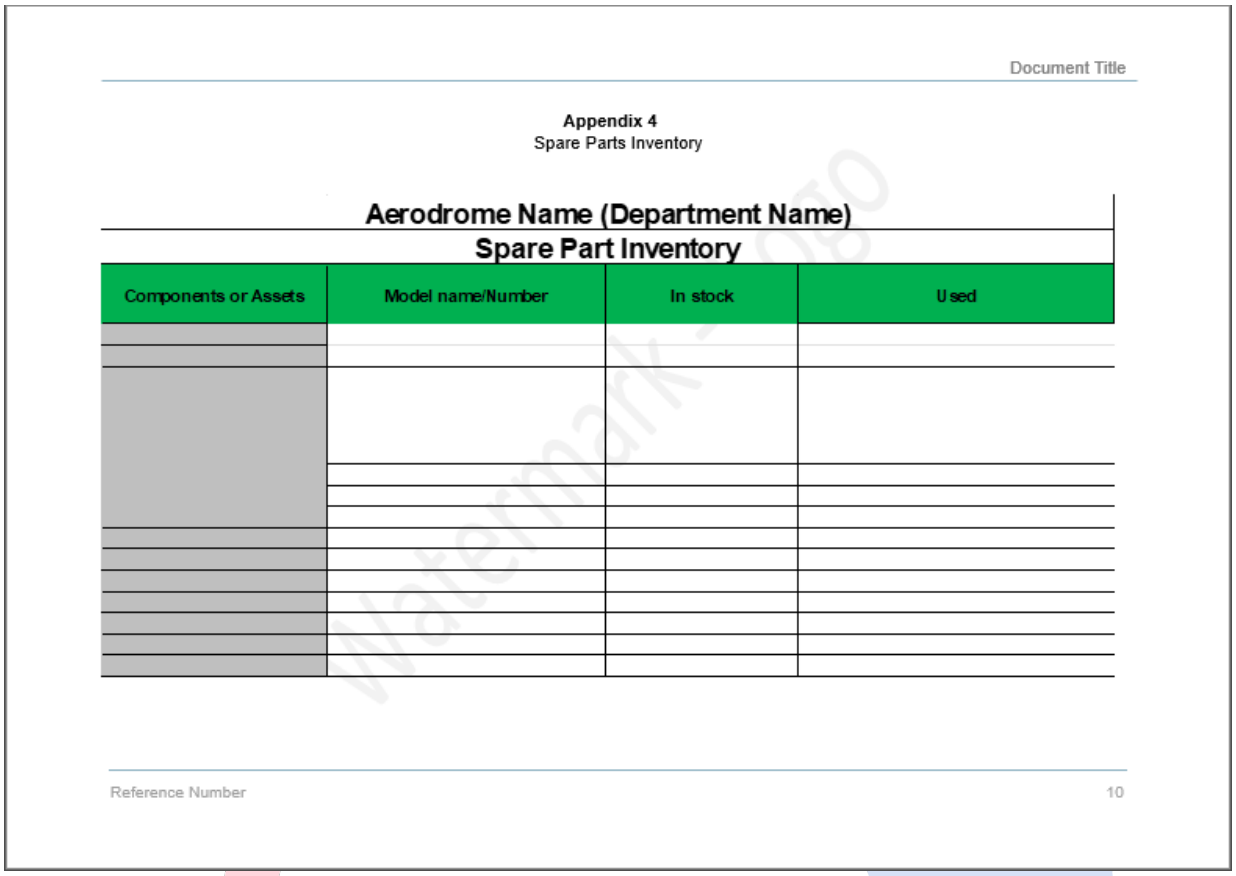
Reference Number 9



Document Title

Appendix 4
Spare Parts Inventory

Aerodrome Name (Department Name) Spare Part Inventory			
Components or Assets	**Model name/Number**	**In stock**	**Used**

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Reference Number 10