

	Transmission Telecommunications	Transmission Telecommunications
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**Scope of Works for ADLash Fibre
Optic Repairs**

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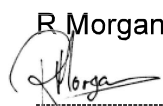
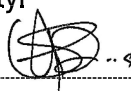
**Functional
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1. Introduction

This guideline describes the functional works for Eskom Telecommunications and its contractors, for scheduled maintenance, and break down repairs on the Fibre Optic Network (FON).

2. Supporting Clauses

2.1 Scope

This Guideline covers the works information for repairing and maintaining the ADLash Fibre Optic Network.

2.1.1 Purpose

The purpose of this guideline is to clarify the works information for scheduled maintenance and break down repairs of the ADLash Fibre Optic Network.

2.1.2 Applicability

This guideline is applicable to

- Corning ADLash cable maintenance and installations

This guideline shall apply throughout Eskom Holdings Limited, its divisions, subsidiaries, contractors and entities wherein Eskom has a controlling interest.

2.1.3 Effective date

May 2022

2.2 Normative/Informative References

Parties using this document shall apply the most recent edition of the documents listed in the following paragraphs.

2.2.1 Normative

- [1] ISO 9001 Quality Management Systems
- [2] ESKPVAEY6 – Operating Regulations for High Voltage Systems
- [3] Occupational Health and Safety Act 85 of 1993
- [4] ESKPBAAD6 Environmental Management
- [5] ISO45001 Health and safety management
- [6] ISO14001 Environmental Management

2.2.2 Informative

- [7] 240-106170090 Temporal Repair Procedures for Optical Cables on High Voltage Lines

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- [8] TGL41-340 Access to farms
- [9] TRMPVAEX6 Procedure to Gain Access Above the Anti-Climbing Guards on Transmission Towers
- [10]ETPR0786 Installing a mast bypass / down run with angled support tubes for ADLash cable on ground wire.
- [11]240-65293469 ADLash removal standard
- [12]240-70732888 Fibre Optic Cable Systems Acceptance testing
- [13]240-8979859 - FIBRE OPTIC CABLE FIRST LINE MAINTENANCE
- [14] 240-89279857 AERIAL and SUBSTATION FIBRE OPTIC LINK INSPECTION GUIDELINE AND TICK SHEETS
- [15]240-140807476 FON Contractor Management
- [16]240-57649019 OPGW CABLE AND ADLASH Cable Interface Installation Guideline Rev 3

2.3 Definitions

- 2.3.1 “Accreditation”: Procedure by which an authoritative body gives formal recognition that a body or person is competent to carry out specific tasks (ISO/International Electro-technical Committee Guide 2)
- 2.3.2 “Environment”: The surroundings within which humans exist and that are made up of
- (a) land, water and atmosphere of the earth;
 - (b) micro-organisms, plant and animal life;
 - any part or combination of (a) and (b) and the interrelationships among and between them; and the physical, chemical, aesthetic and cultural properties and conditions of the foregoing that influence human health and well-being
- 2.3.3 “Environmental Management Programme (EMP)”: A programme that seeks to achieve a required environmental end state and describes how activities, that could have a negative impact on the environment, will be managed and monitored and impacted areas rehabilitated
- 2.3.4 “Preventative/Planned Maintenance” The maintenance carried out at predetermined intervals or according to prescribed criteria and intended to reduce the probability of failure or the degradation of the functionality of the item or system.

2.4 Abbreviations

Abbreviation	Explanation
PECN	Private Electronic Communication Network
FON	Fibre Optic Network
FO	Fibre Optic
NOC	Network Operations Centre
NMC	Network Management Centre
FS	Field Services

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Abbreviation	Explanation
OI&E	Open Isolated and Earthed
ARC	Auto Re Closer
OEM	Original Equipment Manufacturer

2.5 Roles and Responsibilities

Eskom Telecommunications

Fibre Optic Network Management – Monitoring of Network Performance and Maintenance activities for Eskom Telecommunications network, Eskom Distribution and Eskom Transmission.

Field Services Managers - Provision and Management of maintenance services.

National Planning – Expansion and Engineering of FON network

BroadBand Infraco

Network Operations Centre – Control Room for the Network

Contractor

Fibre Optic Network repairs – Provide repairs and maintenance of the Fibre Optic Network on an as and when required basis as listed in Table 1 in section 3.14 of this document.

2.6 Process for Monitoring

Implementation of this document will be audited periodically.

2.7 Related/Supporting Documents

N/A

3. Document Content

The aim of this document is to provide guidance and information to Eskom Telecommunications personnel and its contractors to perform various types of repairs and maintenance on the Eskom fibre optic network namely:

Preventative/Planned maintenance - This will be scheduled in conjunction with the servitude owner namely Transmission or Distribution as well as where required, the Infraco NOC and PECN NMC.

Unplanned maintenance – This will be performed during “break down” conditions and is not scheduled. A temporary repair will be performed which will not transgress the safety clearances to the live line and will be in place until a scheduled repair can be performed. Notification of access and the scope of work will be communicated to the servitude owner via the Regional Control officer prior to the temporary repair.

All work on the High Voltage electrical network will be performed by people appointed and authorised in writing by servitude owner namely Transmission or Distribution.

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The maintenance and repairs of the Eskom approved ADLash fibre optic cable installation is for the Corning ADLash fibre cable and the Corning AD-Lashing band which is used to secure the ADLash fibre Optic Cable to the Earth conductor of the power network. The Corning ADLash cable and lashing band are required to be maintained and repaired as per the OEM specifications.

3.1 Notification of Access to Site

All maintenance shall be performed with prior arrangement with the servitude owner namely Transmission or Distribution and where required, in conjunction with the Infracore NOC and PECN NMC.

Eskom Telecommunication's staff shall notify the respective depots (Transmission or Distribution) of the upcoming planned maintenance or in the event of emergency work request Control to notify the landowner. The depot staff will in turn contact the land owners and notify the land owners of the number of people, the vehicle type, vehicle registration and the intention of the visit.

Eskom Telecommunications will prior to the works issue a Purchase Order number to the contractor for the required repairs and maintenance. The contractor accompanied by Eskom Telecommunications will access the required works site/s.

Refer to 240-80605256 Access to farms.

3.2 Safety

The safety of staff and contractors is paramount, to ensure the Safety of all staff and contractors the following shall be mandatory:

Adhere to the Eskom lifesaving rules.

Perform vehicle pre-trip inspection.

Perform toolbox talks.

Perform Risk assessments.

Adhere to approved Fall Protection plan

Wear Protective Personal Equipment. (Conductive boots required for climbing live structure above 132 kV)

Only staff authorised as drivers according to Eskom's requirement may drive a vehicle.

Keep to national speed limits.

Do not exceed the recommended speed for gravel roads of 80 Km/h and adjust the vehicles speed to suite the terrain.

Do not perform work when conditions are unsafe namely: Rain, Fog, mist, high wind.

Ensure that good communications are maintained at all times namely between work team/s and Control.

In rural areas be vigilant of wild animals and livestock crossing roadways.

ALWAYS ADHERE TO THE SERVITUDE OWNERS REQUIREMENTS, WITH REGARDS TO OUTAGES, RETURN TIME FOR LINE AND SAFETY REQUIREMENTS.

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3.3 Safe Work Clearances

ESKOM Operating Regulations for High Voltage Systems that set minimum clearance for personnel accessing and working in proximity of live conductors would be applicable. The table below is an extraction as specified in 5.3.6.3 and 5.3.6.4 of the ORHVS;

Minimum safe work clearances.

800 kV	—	6.0 meters
400 kV	—	4.0 meters
275 kV	—	3.0 meters
220 kV	—	2.5 meters
132 kV	—	2.0 meters
88 kV	—	1.5 meters
66 kV	—	1.3 meters
1 kV to 44 kV	—	1.0 meter

If the minimum safe clearance to the live line cannot be maintained, the line shall be Opened, Isolated and Earthed to enable safe working conditions.

Any work on an OPGW fibre optic installation shall always be performed by creating a safe work area (equipotential zone) by means of safety earths applied between all the optic cables and the tower steel work.

3.4 Identification of Visitors

Visitors shall carry Eskom Holdings identity cards, or other identification as is appropriate, displaying a photograph, unique number and/or national Identity Document number.

3.5 Identification of Vehicles

Eskom vehicles accompanying the contractor shall display the Eskom Holdings logo and identification markings as appropriate. Where vehicles are not permanently marked, use must be made of magnetic logos.

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3.6 Gates and Fences

Gates are intended to either permit or restrict the movement of animals on farms. Gates should be left in the state the landowner intended i.e. As found. In order to assist with any possible claims, any visitor will keep a log on Form ETFM0663 – Gate, Access Roads and River crossings register, of each gate that is used stating

- The position of the gate with reference to towers
- The state in which it was found (open or closed)
- The time
- Any other appropriate information (locks etc.)

The climbing or crawling over or through fences without the permission of the landowner is prohibited in terms of section 23 of the Act and visitors should take note of this section. No Eskom contractor may be issued with keys for any Eskom lock. The Eskom Standard locks shall be used in all cases and the Eskom key holder shall ensure that the lock securely locks the gate. Where dual use is made of the gate by Eskom Holdings and the landowner, the Eskom lock shall be locked into the farmers lock as to permit both parties to gain access without inconveniencing either party. No interference with landowner locks will be tolerated. The cutting of landowner's locks except in extreme emergencies will result in disciplinary action.

3.7 Damage caused during a visit

Any damage caused to any road, gate, fence, crop or grazing shall be reported to the line and Servitude Manager who will then refer it to the appropriate Eskom Holdings official for processing. Fires are prohibited and Eskom staff and its contractor shall take care with fires and the use of fires will only be permitted with the express approval of the landowner.

3.8 Removal of Fauna and Flora

No fauna or flora will be collected or removed from any farm by any visitor without written permission of the landowner, in which case cognisance will be taken of appropriate provincial legislation pertaining to fauna and flora.

3.9 Waste management and refuse

Any visitor will at all times refrain from littering and remove any refuse when leaving. No litter shall be left within the Container sites; all litter shall be removed and disposed of in appropriate waste bins at the service centres. If any Fibre Optical cables need to be disposed of, the Fibre Optic cable shall be disposed of in an appropriate waste disposal site. Fibre optic splinters shall be kept in a holding container for disposal in an appropriate manner.

3.10 Complaints Register

Each Transmission and Distribution line and servitude manager keeps a register of all complaints received from the landowners regarding servitudes. Complaints will be investigated and closed to the satisfaction of Eskom, its contractor, and the landowner.

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3.11 The use of roads

Visitors shall as far as possible use only the servitude roads or roads as determined by the environmental management plan and agreed to with the landowner. Where this is not possible the landowner's permission shall be obtained for the use of any other roads. In all cases care shall be taken not to cause any damage in the process and driving through the veldt must be avoided as far as possible.

3.12 Authorisation

Any contractor or Eskom staff who intends to access any power line structure above the anti-climbing device shall have the appropriate authorisation issued by the respective Transmission Grid or Distribution Operating Unit. Any Eskom person who requires keys for the Transmission and Distribution locks shall be authorised by the respective Grid and shall be the sole user of that key.

Subject to level of authorisation, prerequisites for Eskom staff and its contractor includes but is not limited to the following:

- Required modules for Eskom Operating Regulations for High Voltage Systems.
- Medical certificate of fitness (for climbers above ground level)
- First aid level 2
- Fall arrest system training (FAS)
- Competence to carry out specific safe work procedure will be verified by practical evaluation on site.

3.13 Non-Compliance with this procedure

The relationship between Eskom Holdings and landowners granting access to servitudes is of extreme importance to Eskom Holdings, both during maintenance of power lines as during negotiations for new servitudes. Access to private land must in all cases be conducted by showing the necessary respect for private property and the occupants of the land. The non-compliance with this document may lead to either disciplinary or legal action taken against the person or persons who contravene the stipulations of this document.

3.14 Works Information

A Workplace task order shall be generated for Eskom staff for the capturing of labour hours, work performed and expenses. An Eskom purchase order will be issued to the contractor for the required scope of works derived from table 1 below prior to the works being performed. Before ET service centre staff departs for the site to perform the pre-planned work, the technician will confirm with Infracore NOC if access is granted to the site.

Category	Description
Site Establishment	Transport LDV
	Transport Heavy Duty (4 Ton)
	Transport Extra Heavy Duty (8 Ton)
	Accommodation
	T&S
	Documentation (Safety file, test results, as build, records)

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Labour Normal Rate	Unskilled
	Artisan
	Supervisor
	Professional (Project Manager, designer, etc)
Labour Overtime 1.1/2	Unskilled
	Artisan
	Supervisor
Labour Overtime Sunday/Public Holiday	Unskilled
	Artisan
	Supervisor
Production Equipment	Manual trenching tools in pickable soil
	Ditch Witch
	Splice Machine
	Lashing Machine
	Crossings using double pulley system
	Winch & tensioner for ADSS incl. sundry equipment
	All terrain crane (exclude establishment)
	Road crossing
	Rail crossing
	HV crossing
	Scaffolding
Other	Patch Box
	Galvanised pipe
	Orange pipe
	Joint Enclosure
	7m Treated wooden pole
	8m Treated wooden pole
	50mm HDPE piping
ADLash accessories	ADLash lashing tape
	RSGU clamps 8mm, 13mm, 14mm, 16mm
	Di-electric rods
	Angle support
	MKD clamps
	End caps

Table 1 – Contractor Scope of Work Item list

On arriving at site ET service centre staff shall notify the Infracore NOC of their intention to enter the site to start testing which shall include notification of an accompanying contractor. To avoid any misconceptions, it is advised that ET staff check the alarm status of the site with the Infracore NOC before entering and then again on departure.

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3.14.1 ADLash Works

Scenario 1

With the line Open, Isolated and earthed, Eskom Telecommunications staff and its Contractors to remove sections of cable lashed onto the high voltage power lines when required, using Eskom accepted/approved safe work procedures and replace with new cable. In addition, Eskom Telecommunications staff will instruct in writing or include in the scope of works for the purchase order, the contractor to join the new sections to the existing sections.

Scenario 2

With the line Open, Isolated and earthed, Eskom Telecommunications staff and its Contractors will remove sections of lashing tape lashed onto the high voltage power lines when required, using Eskom accepted/approved safe work procedures and replace with new tape. Referenced to the ADLash removal standard (240-65293469),

Scenario 3

Eskom Telecommunication's staff and its Contractors to correct or replace dielectric installations, HDPE clamps, Joint Box Installations, and fibre joints with line alive and ARC switched off (defined as close proximity work). If the minimum safe clearance to the live line cannot be maintained, the line shall be Opened, Isolated and Earthed.

Scenario 4

The Eskom Telecommunications staff and its Contractors to carry out inspection of the Fibre Optic Installation when required. The following inspection will be carried out from ground level (refer to 240-8979859 - Fibre optic cable first line maintenance and 240-89279857 Aerial and substation fibre optic link inspection guideline and tick sheets and 240-61227494 All-dielectric self-supporting (ADSS) fibre optic link inspection guideline and tick sheets).

Bypass Towers

(Dielectrics) Out / off, broken fibre has uncoiled.

(Tower top clamps) Three clamps on either side of earth wire.

(Down lead clamps) Securely held onto tower, all in position (typical 1 – 2 meter separation).

(Attachments) Clamps in place, mast bypass fibre not tight / chafing against tower members.

(Lash tape) Lashing tape tightness, torn lashing tape, loose lashing tape.

(Vibration dampers) Vibration dampers in place and in good order.

Joint Towers

(Protective metal tube) Still there, rusting.

(Box mounting) Securely mounted by three clamps.

(Box height) Risk of fire, Vandalism (related to vegetation and settlements).

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(Box condition) Rusting and water ingress, missing, cracking, broken, burnt and insect infestation.

(Earth lug) Attached to tower and box.

Vibration dampers in place and in good order.

(Down lead clamps) Securely held onto tower, all there (typical 1 – 2 meter separation).

(HDPE tube) All clamps are in place, dielectrics still clamped.

(Records) Record tower numbers of the joint boxes

Environment

(Predatory birds) Are there any predatory birds in the vicinity of the box?

(Monkeys / Baboons) Are there any Monkeys or Baboons in the vicinity of the box.

(Bird guards) Does the tower have bird guards.

(Fire risk) Is there any fire risk prone vegetation within a 5m radius of the tower.

Line span

Loose tape resulting in mid span cable sag

Loose tape and clamps resulting in cable sagging and tower structures

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4. Acceptance

This document has been seen and accepted by:

Name	Designation
A Maseko	Manager: Eskom Telecommunications
U Dyantyi	Manager Network Management Centre
Z Hassen	Regional Manager: Western Region
P Masoka	Regional Manager: Northern Region
M Ganesan	Regional Manager: Central Region
B Nala	Regional Manager: Eastern Region
C Pitt	Manager: ET SHEQ
M Hina	Manager: Engineering Services
E Marshall	Chief Engineer: Live Work Eskom Transmission Technology

5. Revisions

Date	Rev.	Compiler	Remarks
May 2022	1	R Morgan	1 st revision

6. Development Team

The following people were involved in the development of this document:

R.R Morgan	Senior Advisor - Fibre Optic Network
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