

 Eskom	Task Manual	Technology
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Title: **LIFTING, INSTALLING AND
SECURING OF LV & MV CABLE
ONTO VERTICAL STRUCTURES**

Unique Identifier: **240-76677057**

Alternative Reference
Number: **N/A**

Area of Applicability: **Engineering**

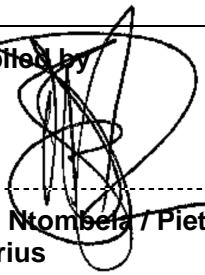

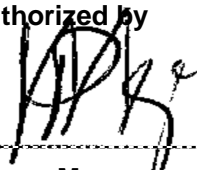

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Disclosure
Classification: **Controlled Disclosure**

<p>Completed by </p> <p>David Ntombela / Piet Pretorius Consultant / OTS Date: 28/05/2014</p>	<p>Approved by </p> <p>Colin Smith Design Base Maintenance Manager Date: 29/05/2014</p>	<p>Authorized by </p> <p>Prince Moyo Power Delivery Engineering GM Date: 5/6/2014</p>
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1. Introduction

The document was compiled to comply with the Occupational Health and Safety (OHS) Act (0 OHS Act No. 85) and 0 NRS 082 requirements and to document the tasks procedure for Lifting, Installing and Securing of LV & MV Cable onto Vertical Structures to ensure that maintenance tasks are carried out in a safe manner

This Task Manual is compiled to formalize the task steps for Lifting, Installing and Securing of LV & MV Cable onto Vertical Structures to be carried out by distribution Business on behalf of Eskom Distribution Division. The document includes the latest updates in information, format, safety precautions from the task analysis to that the task are carried out in a safe manner.

This Task Manual was compiled from the **analysis** that was done on **critical tasks** that are being performed when maintaining network equipment to identify **risks and hazards** attached so that they could be **addressed or remedied**.

2. Supporting Clauses

2.1 Scope

2.1.1 Purpose

- a) The purpose of this task manual is to standardize the procedure followed when performing Lifting, Installing and Securing of LV & MV Cable onto Vertical Structures.
- b) This document also provides persons carrying Lifting, Installing and Securing of LV & MV Cable onto Vertical Structures with a step by step description of how to do the task, including the most critical hazards and technical specifications associated with the task.

2.1.2 Applicability

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

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

2.2.1.1 South African National Document(s)

Document number	Document title	Preparer/author	Revision or date of issue
OHS Act No. 85	Occupational health and safety act and regulations	-	1993
NRS 082	Recommended maintenance policy for electricity networks	Eskom	Latest

2.2.1.2 Eskom National Document(s)

Document number	Document title	Preparer/author	Revision or date of issue
EPC_32-93	Vehicle and driver safety management	Eskom	Latest
EPC_32-846	Operating regulations for high voltage systems	Eskom	Latest
EPL_32-94	Environmental management policy	Eskom	Latest

2.2.1.3 Eskom divisional document(s)

Document number	Document title	Preparer/author	Revision or date of issue
DISASAAN0	Standard for the labelling of high voltage equipment	Eskom	Latest
DISASABW3	Standard for a fall arrest system	Eskom	Latest
DMN_34-2208	Access to work sites	Eskom	Latest
DST_34-1245	Substation earthing	Eskom	Latest
DMN_34-101	Usage of extension, single, 'A' frame ladders or two step platform	Eskom	Latest
DPC 34-1402	Procedure For Using A Fall Arrest System	Eskom	Latest
DST_34-1175	General information and requirements for Medium Voltage cable systems	Eskom	Latest
DST_34-1176	General information and requirements for Low Voltage cable systems	Eskom	Latest
DST_34-1177	General information and requirements for High Voltage cable systems	Eskom	Latest
DPC_34-925	Procedure for refusal to work on the grounds of health, safety and environmental concerns	Eskom	Latest
DST_34-1954	Supervision of people in electrically hazardous locations	Eskom	Latest
DSP_34-1150	Lifting machine operators training	Eskom	Latest
03TI016	PROHIBITION NOTICE: REF. NO. IOSS 2074-003_changing of pole-mounted transformers.	Eskom	Latest
-	Specific local operating instruction / procedure; and	OEM	Latest

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Document number	Document title	Preparer/author	Revision or date of issue
-	Manufacturer`s manual.	OEM	Latest

2.2.1.4 Informative references

Document number	Document title	Preparer/author	Revision or date of issue
32-9	Definition of Eskom documents	Eskom	Latest
32-644	Eskom documentation management standard	Eskom	Latest
474-65	Operating manual of the Steering Committee of Wires Technologies (SCOWT)	Eskom	Latest
DST_34-1710	Provision and use of personal protective equipment	Eskom	Latest
DPC_34-380	Identifying, analyzing, documenting and observing tasks according to criticality	Eskom	Latest
DPL_32-727	Safety, health, environment, and quality (SHEQ) policy	Eskom	Latest
DPC_34-227	Pre-task planning and feedback process	Eskom	Latest
DPC_34-444	Procedure for the application and maintenance of portable earth's; and	Eskom	Latest
DPC_34-04	Procedure for the Preparation and Administration of Distribution Standards.	Eskom	Latest

2.3 Definitions

2.3.1 General

All definitions listed in recognised industry glossaries such as NRS 000, ORHVS and IEV are applicable.

Definition	Explanation
Dangerous/hazardous task	A specific element of work, which has produced and/or which possesses the potential to produce major loss or harm to people, assets, processes/production and/or the environment when performed properly.
Directive	A document which sets out a management objective, the appropriate policy if deemed necessary, as well as the functional accountability for activities to achieve that objective and the interface between functions affected by, or responsible for the execution of, such activities.
Risk assessment	This process involves the combined functions of hazards identification, risk analysis, risk evaluation, determining the risk control strategy/strategies and the identification of the risk control measures that will be implemented during the task execution.

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Definition	Explanation
Task analysis	The systematic examination of all dangerous/hazardous tasks (work) in order to identify and quantify all the potential and existing inherent hazards to which employees are exposed while the tasks are being executed.
NOTE: Only persons who have satisfied the designated person on terms of the Occupational Health and Safety Act (Act 85 of 1993) (General Machinery Regulation 2(1)) that their knowledge is adequate to perform specific duties on specified plant and that their knowledge of these regulations is sufficient may be authorised.	

2.3.2 Disclosure Classification

Controlled disclosure: controlled disclosure to external parties (either enforced by law, or discretionary).

2.4 Abbreviations

Abbreviation	Explanation
CAP	Committee for Accepted Products
LAP	List of Accepted Products
OHS	Occupational Health and Safety
PPE	Personal Protective Equipment
SHE	Safety, Health and Environment
TSO	Technical Services Official
PTO	Principal Technical Official
STO	Senior Technical Official
OTS	Officer Technical Support
OEM	Original Equipment Manufacturer
TO	Technical Official
CO	Construction Official
SCO	Senior Construction Official
TCO	Technical Construction Official
PCO	Principal Construction Official
PML	Pedestal Mounted Ladder
VMC	Vehicle Mounted Crane
ORHVS	Operating Regulations for High Voltage Systems

2.5 Roles and Responsibilities

The designated person or his/her delegate shall ensure that this standard is implemented and adhered to. The authorized/responsible person is responsible for the safe execution of all work and activities as set out in this document.

2.5.1 Plant Managers shall be responsible for:

- a) Ensuring that equipment job plans are available and issued for specific maintenance; and
- b) Ensuring that the maintenance feedback information / data is captured and recorded into the system for future maintenance planning.

2.5.2 Each Sector Manager shall be responsible for:

- a) Ensuring that staff carrying out maintenance tasks is trained, competent and authorized to perform maintenance on the specific circuit-breakers;
- b) Ensuring that this work instruction is implemented and adhered to during equipment maintenance; and
- c) Ensuring that circuit-breakers are maintained in accordance with the relevant Task Manuals.

2.6 Process for Monitoring

Document number	Document title
-	Process Control Manual (PCM) for Execute Work.
DPC_34-04	Procedure For Management Of Technical Documents For SCOT.

2.7 Related/supporting Documents

Document number	Document title
240-76677057	Lifting, Installing and Securing of LV & MV Cable onto Vertical Structures task Observation form
240-76677057	Lifting, Installing and Securing of LV & MV Cable onto Vertical Structures Check sheet

3. Requirements

3.1 Pre-planning

- a) Assessment of the task to determine the scope of work and the resources that would be required:
 - People;
 - Equipment;
 - PPE;
 - Tools; and
 - Material / Spares
- b) Planning of work and resources allocation and responsibilities.

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3.1.1 Spares and Material

- a) Kicker / cover pipe
- b) Strapping and buckles
- c) Clamps / Saddles / Cable cleats
- d) Anti-climb device.

3.1.2 Tools and equipment

- a) Standard tool set;
- b) Aerial Device / PML / Ladder;
- c) Lifting devices
- d) Strapping Tool.

3.1.3 Personal Protective Equipment

All personal protective equipment shall be in accordance with DST_34-1710 and PPE identified from Risk assessment (34-227) performed.

- a) Overall
- b) Hard hat
- c) Safety boots
- d) Fall Arrest System
- e) Gloves

3.2 Safety and Preparation

- a) Ensure that where long distances are travelled when going to work site preparations are done and guidelines given in DGL_34-256 and EPC_32-93 are observed.
- b) Ensure that when visiting the work site the general inspection is done as per DMN_34-2208.
- c) Do an assessment to determine the scope of work and the resources that would be required (people, PPE, equipment, etc) as per DPC_34-227.
- d) Ensure that the panel is isolated and earthed in accordance with EPC_32-846.
- e) Where work is to be carried out under or in close proximity to HV equipment ensure that the equipment is isolated and earthed in accordance with EPC_32-846 before commencing with work.
- f) Ensure that all tools, equipment and materials are not placed in the area where they will hinder or obstruct workers.
- g) Environmental hazards shall be removed in accordance with EST_32-332 and EPL_32-94

3.3 Risk Assessment-(refer to DPC_34-227)

NOTE 1: Ensure that light/lighting is sufficient before the commencement of work.

NOTE 2: Ensure that task analysis of HV operating, Work With/On Extension/Single Ladders and Operating a vehicle mounted crane with a bucket is also applicable.

- a) Ensure that all members of staff are included when performing risk assessment.

- b) Conduct an on-site risk assessment prior to commencement of work and continuously during the task execution by:
- identifying the existing hazards/risks.
 - treating, transferring, tolerating or terminating the identified risks.
 - ensuring that all workers acknowledge identified risks and hazards by signing the risk assessment form / worker's register.

3.4 Work Execution

NOTE 1: Ensure that plant has been isolated and earthed and handed over (works permit) where required in accordance with ORHVS before performing task.

NOTE 2: All steps as identified in analysis of HV Operating are applicable.

3.4.1 Plant Isolation

NOTE 1: Ensure that the permit details are discussed with the personnel and filled in correctly.

- a) Discuss permit with authorised person
- b) Correct if necessary and confirm
- c) Sign
- d) Receive permit for safe keeping
- e) Discuss risk assessment with co-workers and sign workers register

3.4.2 Preparation to work

NOTE 1: All steps as identified in the analysis of operating a Vehicle Mounted Crane/Aerial Device/Ladder is applicable.

NOTE 2: All equipment used at the same work site shall be bonded to common point (earth spike) to create equi-potential zone

NOTE 3: When using a vehicle mounted crane near live overhead line you must comply with Technical Instruction 03TI016.

- a) Apply equipotential earthing in accordance with standard.
- b) Position Ladder or truck

NOTE 4: Ensure that all Aluminium Ladders and vehicles used within equi-potential zone are bonded and any addition to the equi-potential zone thereafter, shall not be done by bare hands, unless with approved insulated equipment.

- c) Attach rope hoist pulley at the top the structure.
- d) Attach second Pulley at bottom the structure
- e) Guide the rope from above through both pulleys

NOTE 5: No personnel shall stand directly under or beneath person working in elevated position.

NOTE 6: Adhere to electrical clearances.

NOTE 7: Ensure that correct ladder for the purpose of the job is used and application is in accordance with the standard.

3.4.3 Lifting and securing the cable

- a) Pull the cable through the kicker / cover pipe.
- b) Ensure that the cable has enough slack
- c) Make off cable end for termination
- d) Attach the rope to the cable.
- e) Hoist the cable against the structure to the final position.
- f) Secure the kicker pipe and the cable onto the structure as per standard.
- g) Cover the cable slack in the ground.

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3.4.4 Task Wrap Up

NOTE 1: Ensure that all personnel involved with the tasks at the same work site sign off workers register when the work is completed.

- a) Remove all redundant equipment/tools/ material and all people from site
- b) Complete substation logbook if applicable
- c) Ensure all doors and gates are closed and locked if applicable
- d) Complete and submit required documentation

4. Forms and Records

A failure report / feedback shall be completed and forwarded to the Plant Department and Work Management Centre together with the work order via Works co-ordinator.

5. Authorization

This document has been seen and accepted by:

Name and surname	Designation
Prince Moyo	Power Delivery Engineering GM
Colin Smith	Design Base Maintenance Manager
Sebastian Pasquallie	SCOT/SC Chairperson
David Ntombela / Piet Pretorius	Consultant / OTS

6. Revisions

This revision of Task Manual DMN_ 240-76677057 is the first issue.

Date	Rev.	Compiler	Remarks
Aug 2014	1	David Ntombela	Document compiled and published as DMN_ 240-76677057.

7. Development team

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

Name	Designation	Department/OU
D M Ntombela	Consultant	PDE DBO
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D F B Lötter	Officer Technical Support	WC OU
J E van Wyngaard	Officer Technical Support	EC OU
J J B Uys (Chairperson)	Senior Supervisor	FS OU

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H C J Nuttall	Senior Supervisor	MP OU
P van der Westhuizen	Senior Supervisor	EC OU
P Diedericks	SHE Manager	FS OU
S Delport	SHE Officer	MP OU
P Ramosili	Field Services Engineer	NW OU
M Lakhan	Officer Technical Support	KZN OU
D LeRoux	Officer Technical Support	WC OU

8. Acknowledgements

N/A

Annex A – Impact Assessment

(Normative)

1. Guidelines

- All comments must be completed.
- Motivate why items are N/A (not applicable)
- Indicate actions to be taken, persons or organisations responsible for actions and deadline for action.
- Change control committees to discuss the impact assessment, and if necessary give feedback to the compiler of any omissions or errors.

2. Critical points

- 2.1 Importance of this document. E.g. is implementation required due to safety deficiencies, statutory requirements, technology changes, document revisions, improved service quality, improved service performance and optimised costs.**

Comment: Statutory requirements and or document revisions.

- 2.2 If the document to be released impacts on statutory or legal compliance - this need to be very clearly stated and so highlighted.**

Comment: No impact on statutory or legal compliance and this is only document revisions.

- 2.3 Impact on stock holding and depletion of existing stock prior to switch over.**

Comment: N/A - No new equipment or item need to be acquired for implementation of this document.

- 2.4 When will new stock be available?**

Comment: N/A –see 2.3 above

- 2.5 Has the interchange ability of the product or item been verified - i.e. when it fails is a straight swap possible with a competitor's product?**

Comment: N/A – No changes made and also see 2.3 above

- 2.6 Identify and provide details of other critical (items required for the successful implementation of this document) points to be considered in the implementation of this document.**

Comment: N/A – The document was only revised.

- 2.7 Provide details of any comments made by the Regions regarding the implementation of this document.**

Comment: None

3. Implementation timeframe

- 3.1 Time period for implementation of requirements.**

Comment: N/A – No technical changes were made to this document

- 3.2 Deadline for changeover to new item and personnel to be informed of DX wide change-over.**

Comment: None

4. Buyers Guide and Power Office

- 4.1 Does the Buyers Guide or Buyers List need updating?**

Comment: Yes

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4.2 What Buyer's Guides or items have been created?

Comment: White locks and keys specification.

4.3 List all assembly drawing changes that have been revised in conjunction with this document.

Comment: N/A.

4.4 If the implementation of this document requires assessment by CAP, provide details under 5

Comment: N/A – The revision requires no new equipment / assessment

4.5 Which Power Office packages have been created, modified or removed?

Comment: NONE

5. CAP / LAP Pre-Qualification Process related impacts

5.1 Is an ad-hoc re-evaluation of all currently accepted suppliers required as a result of implementation of this document?

Comment: NO

5.2 If NO, provide motivation for issuing this specification before Acceptance Cycle Expiry date.

Comment: N/A – The document doesn't specify but stipulated the maintenance procedures on the existing equipment.

5.3 Are ALL suppliers (currently accepted per LAP), aware of the nature of changes contained in this document?

Comment: The document hasn't changed and the addition will be communicated when the white locks and keys are ordered.

5.4 Is implementation of the provisions of this document required during the current supplier qualification period?

Comment: Yes – The changes in the document requires no evaluation as the document currently being implemented covers the current product or service until the new product is ordered.

5.5 If Yes to 5.4, what date has been set for all currently accepted suppliers to comply fully?

Comment: N/A – see 5.4 above

5.6 If Yes to 5.4, have all currently accepted suppliers been sent a prior formal notification informing them of Eskom's expectations, including the implementation date deadline?

Comment: N/A – see 5.4 above

5.7 Can the changes made, potentially impact upon the purchase price of the material/equipment?

Comment: N/A – Not on the current material.

5.8 Material group(s) affected by specification: (Refer to Pre-Qualification invitation schedule for list of material groups)

Comment: N/A – No impact on the current material.

6. Training or communication

6.1 Is training required?

Comment: Yes

6.2 State the level of training required to implement this document. (E.g. awareness training, practical / on job, module, etc.)

Comment: Practical / On job and training module

6.3 State designations of personnel that will require training.

Comment: Technicians, Senior Technician, Senior Supervisor and Engineers / Technologist, TO, STO, PTO etc.

6.4 Is the training material available? Identify person responsible for the development of training material.

Comment: N/A

6.5 If applicable, provide details of training that will take place. (E.G. sponsor, costs, trainer, schedule of training, course material availability, training in erection / use of new equipment, maintenance training, etc).

Comment: N/A.

6.6 Was Technical Training Section consulted w.r.t module development process?

Comment: No.

6.7 State communications channels to be used to inform target audience.

Comment: Training Forums.

7. Special tools, equipment, software

7.1 What special tools, equipment, software, etc will need to be purchased by the Region to effectively implement?

Comment: NONE

7.2 Are there stock numbers available for the new equipment?

Comment: N/A – No new equipment is required

7.3 What will be the costs of these special tools, equipment, software?

Comment: N/A – No new equipment is required.

8. Finances

8.1 What total costs would the Regions be required to incur in implementing this document? Identify all cost activities associated with implementation, e.g. labour, training, tooling, stock, obsolescence

Comment: N/A.

Impact assessment completed by:

Name: David M. Ntombela

Designation: Consultant

Annex B – Observation Form

	FORM TITLE		OBSERVATION FORM							
	FORM NUMBER		240-76677057			REV DATE		August 2019		
	DOCUMENT TITLE		Lifting, Installing and Securing of LV & MV Cable onto Vertical Structures							

1.	OBSERVER'S PARTICULARS									
	Task observer's name: _____					Task observed: Lifting, Installing and Securing of LV & MV Cable onto Vertical Structures				
	Section / department: _____					Location: _____				
	Occupation: _____					Is there a procedure / task manual for this task? YES <input type="checkbox"/> NO <input type="checkbox"/>				
	Date: _____					Task Manual ref. _ 240-76677057 _ _____				
	Time with task: _____					Work order no.: _____				

2.	REASON FOR OBSERVATION									
	Planned: <input type="checkbox"/>					Follow-up: <input type="checkbox"/>				
	Name of employee being observed: _____									

3.	TASK OBSERVATION									
	Did employee adhere to the procedure/practice requirements?									
		Yes	No	N/A		Yes	No	N/A		
	1. Preplanning carried out correctly				4. Use of correct PPE					
	2. Emergency contacts numbers Obtained				5. Ensure that the panel / equipment to be commissioned is isolated and earthed in accordance with EPC_32-846					

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3. Tools equipment:				6. Carry out the task as per task manual 240-76677057			
a) Used correctly							
b) In good and safe condition							
c) Test instrument calibrated							
4. Toolbox Talk:							
a) Task manuals used							
b) Complete Worker's register							
c) Risk Assessment been done							
d) Valid work permits available							
Could observed practices / conditions lead to:							
1. Injury:				2. Illness (fumes, gas, etc.)			
a) Risk of getting caught by				3. Costs (delays)			
b) Risk of striking against/get struck by				4. Poor quality (non-conformance)			
c) Risk of fall from same level							
d) Risk of fall from different level							
e) Risk of slip, trips and falls							
f) Risk of electrocution							
4. NON COMPLIANCE PRACTICE OBSERVATION							
	Yes	No	N/A		Yes	No	N/A
1. Working at unsafe speed				7.Failure to warn			
2. Using unsafe equipment				8. Taking chances			
3. Using equipment unsafely				9. Failure to identify hazards			
4. Unsafe loading, placing & lifting				10.Failure to secure lock-out			

	5. Taking unsafe position				11. Safety signs ignored			
	6. Safety rules ignored							
	NOTE: ALL OBSERVED CLASS HAZARDS SHALL REQUIRE IMMEDIATE INTERVENTION							
5.	OBSERVED DEVIATIONS / NON-CONFORMANCES							
6.	RISK BEHAVIOURS							
7.	PROPOSED CONTROLS							
	Compile a procedure for this task					Issue a standing instruction		
	Revise present procedure					Change work methods		
	Retraining of employees					Professional referral		
	Engineering revision					Coaching		
8.	ANALYSIS							
	IAC – inadequate capability		ABU – abuse or misuse / equip / drugs or alcohol		MAIN – inadequate maintenance			
	KNO – lack of knowledge		NAT – natural factors		EQU – inadequate equipment			
	SKI – lack of skill		LEA – inadequate leadership		STA – inadequate work / train Standards			
	STR – stress		ENG – inadequate engineering		WEA – wear & tear			
	MOT – improper motivation		PUR – inadequate purchasing		CON – inadequate control			

9.	DISCUSSION BETWEEN SUPERVISOR/OBSERVER AND EMPLOYEE	
	1. EMPLOYEE EXPLANATION FOR RISK BEHAVIOUR:	
10.	FOLLOW-UP ACTIONS	WHEN / WHO

Person being Observed signature: _____ Date: _____

Signature (Task Observer): _____ Date: _____

Signature Chairperson Safety Committee: _____ Date: _____
(if deviations were found)