TREE TRIMMING PROCEDURE

Rev No.	Reason for Revision	Revised By		Reviewed By	Approval by
R0	Initial release	H A Atre (Group Head - Transmission Line)	Navendra Singh (Group Head – R & P and CB; Corp Safety.)	Rajesh Sharma (Head – Corp Safety Operation)	Vijay Chourey (Chief – Corp Safety)
R1	Periodic review	MV Deodhar/ P P Kamble & Transmission Line team (MO)	Mr. Anand Gurav Group head- Office Safety & Strategy Deployment; Corp safety	Navendra Singh Head- Safety (T&D) Corp safety	Suresh Khetwani Chief - Corporate Safety & Environment

Content

Section	Description	Page No.
1.0	OBJECTIVE	3
2.0	SCOPE	3
3.0	EXPECTED RESULTS	3
4.0	ACCOUNTABILITY & RESPONSIBILTIY	3
5.0	GLOSSARY/ DEFINITIONS	3
6.0	PROCEDURE	3
7.0	RECORDS	9
8.0	TRAINING & COMMUNICATION	9
9.0	VERIFICATION	9
10.0	EXCEPTION	9
11.0	REFERENCES	9
12.0	REVIEW	9
13.0	ATTACHMENTS/APPENDIX	10
-	Annexure 1- Use of Man - Lifter for tree trimming	11
-	Annexure 2 - Schedule for tree trimming	12
-	Annexure 3- Safety Clearances (CEA)	13
-	Annexure 4- Guidelines for Tree Plantation	15
-	Annexure 5- Examples of Mechanized tree climber	16
-	Annexure 6- Web Anchorage Sling	17
-	Annexure 7- Tree Pruning equipment	18
-	Annexure 8- Certificate for fitness	20
-	Annexure 9- Pre-startup checklist for Tree trimming job	21

1. **OBJECTIVE:**
   The objective of this procedure is to define guidelines and minimum requirements for Tree trimming.
2. **SCOPE:**
   This procedure applies to all operating & Project sites of TATA Power Group Companies including Residential (Employee) Colonies, Guest Houses, Field Hostels and any other establishments including JVs/Subsidiaries.
   .
3. **EXPECTED RESULTS:**
   3.1. Manage activities/jobs associated with tree trimming safely.

   3.2. Control of incidents related to tree trimming.

   3.3. Compliance to Regulatory requirements to ensure safe work place.

4. **ACCOUNTABILITY & RESPONSIBILITY:**
   4.1. ACCOUNTABILITY: Concerned Division's Heads / Assets Custodian
   4.2. RESPONSIBILITY: All Line Managers and their team members (Staff) dealing in tree trimming work are responsible for adhering to the procedure during tree trimming activities
5. **GLOSSARY/ DEFINITIONS:**
   JSA: Job Safety Analysis
   LOTO: Lock Out Tag Out
   PPE: Personal Protective Equipment
   PTW: Permit-To-Work
   Shall: mandatory requirement
   Should: Optional requirement
   Tree trimming: An activity which involve cutting/pruning of branches of tree to maintain safe distance of branches from buildings, structures, transmission lines, switchyard, other electrical equipment like transformers etc.
   Standby Person: Person present at ground to monitor activity of climber engaged in tree trimming.
6. **PROCEDURE:**
   6.1. **GENERAL REQUIREMENT:** Any of the following options may be adopted for tree trimming considering site conditions and nature of trees-

   6.1.1 Tree Trimming with Telescopic Tree pruner from ground level shall be considered as foremost option for tree trimming. Tree pruning equipment preferably petrol engine driven (refer Annexure - 7) shall be used from ground for small and lean trees.

6.1.2 Use of man lifters (refer Annexure -1) shall be considered as second option for tree trimming.

6.1.3 Wherever access to man lifter is an issue, than secondary options like use of H frame scaffold/Mobile scaffold/ladders (step or extendable) shall be explored.

6.1.4 Climbing on trees for any purpose which include tree trimming shall be considered as last option (with approval from Divisional Chief).

6.2. Tree like palm, bottle pam and coconut that grow close to the overhead conductor will have to be removed because the way these grow they cannot be trimmed to avoid the lines like other trees. Hence cutting of these trees close to ground shall be explored.

6.3. Refer **Annexure - 2** for schedule for tree trimming.

6.4. For new tree plantation by company/approved by company, in the proximity of buildings, structures, transmission lines, switchyard, other electrical equipment like transformers etc. refer **Annexure- 4**. **Statutory Clearances, JSA and Permit-To- Work (PTW)**:

6.4.1. Ensure all the compliances applicable as per the statutory requirements are in place. Which may include ESIC, PF, and Form 11 for Man-lifter, Driving license of Operator, Checklist for climber (Refer Pre-startup checklist for tree trimming), Permission for Tree trimming etc.

6.4.2. Ensure that site specific JSA based upon the subjected tree and site conditions like type of ground surface, nearby structure like fencing, hutments etc. is prepared and approved.

6.5. Assess Site Hazards

6.5.1. Survey the job site to assess the hazards and controls needed before starting the job and continuously throughout the duration of the job.

6.5.2. Note proximity to power lines, roads, buildings, machinery, etc.

6.5.3. Do not attempt to trim or climb trees during inclement or windy weather.

6.6. Assess Tree Hazards

6.6.1. Look for dead limbs or debris above or in nearby trees.

6.6.2. Look for branches or vines interlocked with other trees.

6.6.3. Inspect trees and limbs for any visible defects before climbing.

6.6.4. Learn to recognize trees weakened by disease; and types of trees prone to cracking.

6.6.5. Clear any obstructions or reposition by mate so the top of the tree is visible.

6.6.6. Determine the tree's predominant side lean.

6.6.7. Assess the crown weight and location of the heaviest branches, to determine the potential fall direction.

6.6.8. Plan the trimming cuts, worker's movements around the tree, and escape routes.

6.6.9. Mark off the area around the tree or alternatively depute mate for prevent access by the public.

6.6.10. Envisage shifting of Centre of Gravity of tree and its imbalance after trimming of branch.

6.6.11. As far as possible, tree branch shall be tied and lowered after trimming.

6.6.12. If tree trimming is being done on scaffolding, it is to ensure that trimmed branch should not fall on scaffolding / man lifter / climber/transmission lines.

6.7. Protect Yourself While Working Around Power Lines

6.7.1. Assume all power lines are energized, and take appropriate precautions to avoid all contact until lines have been de-energized. Contact the power utility company before working on trees near power lines to implement additional safety measures (e.g., cutting off power to the lines and grounding them. De-energized condition of all other power lines is to be specified in Site Specific JSA. Maintain a safe distance from the power line, depending on the voltage. For safety clearances from powerline refer **annexure -3**.

6.7.2. Ensure that outage of concerned EHV line is availed if tree branch has grown sideways above any line conductor.

6.7.3. Ensure that Permit-to-Work (PTW) is issued to the contractor for the job as per the permit to work procedure (PTW). PTW shall be prepared by the concerned engineer and approved by permit approving authority.

6.7.4. Ensure cordoning off the area underneath the area of work.

6.7.5. Explore use of Safety nets to eliminate if risk of fall of objects on people/structure below/around. JSA shall be discussed by the concerned engineer in details with the contractor's supervisor. Copy of JSA should be available with site Supervisor at working site.

6.7.6. Tool box talk shall be conducted and record to be maintained before starting the work by concerned engineer/supervisor when the trimming is planned.

6.7.7. In case of change of scope during execution of work a new JSA as well as permit- to- work shall be made and to be got approved. Work shall be halted till fresh approval is obtained in such case.

6.7.8. Concerned Engineer/Supervisor to ensure adequate training as per safety capability building procedure is imparted to contractor's workmen and supervisor on hazards & controls pertaining to tree trimming.

6.7.9. Person climbing on tree shall be medically fit with valid height pass.

6.7.10. Mobile crane/Rope & Pulley arrangement should be used to lower heavy trimmed branches or if entire tree is required to be removed to avoid sudden/uncontrolled fall to prevent injury to person and damage to surroundings.

6.8. **TOOLS & OTHER SPECIAL EQUIPMENT:** Tools & equipment should selected based upon methodology used for tree trimming. Typical list of tools & equipment but not limited to are as under-

1) Full Body Harness with Double lanyard
2) Work positioning full body harness with double lanyards.
3) Anchorage webbing sling for making anchorage points of stem/main branch (refer **Annexure-6**)
4) Safety Helmet
5) Safety shoes
6) Hand Gloves dotted Polka
7) Safety goggles
8) Bill Hooks.
9) Sickles
10) Petrol Engine Driven Chain Saw (capacity to engine, fuel tank etc. to be selected as per usage and application requirement)
11) Felling Axe
12) Aluminum Ladder.
13) Poly propylene ropes.
14) Mechanized climbing apparatus (refer **Annexure-5** for Examples of mechanized climbers)
15) Twin tools lanyard for securing fall of tools.
16) Telescopic Tree Pruner
17) Snatch Block
18) Wooden Holder for Sickles.
19) First-Aid Box.

Note: Abovementioned list of Tools & equipment is exhaustive. Actuals Tools & equipment should selected based upon methodology used for tree trimming.

6.9. Step for Safety Tree trimming:

Step No	Activity	Hazard	Safeguards
1	Pre-requisites	Injury to workmen	1) Ensure Daily tool box talk is conducted before job commencement of tree trimming work along with contractor's workmen, to explain nature of job,

			location of work and hazards involved and safeguards to be followed. 2) Ensure that all workmen use required PPE as per Permit to Work and identified in the document. 3) Ensure that all the Tree trimming tools such as bill hooks, sickles and felling axes are inspected and are in proper working conditions. 4) Size, Balance and sharpness of tree trimming tools e.g. Bill hooks, Sickles and Felling axes are three important safety factors for selection. 5) Ensure that handles of the trimming tools stated in point no 3 above are intact, smooth and round in shape 6) Ensure that all tools are inspected by site supervisor before beginning of the work. 7) Tools shall not be carried with climber. Separate tool kit bag should be used to carry tools and that should be sent by rope pulley drive after climber reaches to the point of work.
2

	than palm, bottle pam and coconut	Difficulty in initial riding on tree at ground level Falling from height	away foremost branches from bottommost power conductor such as. a) 110 kV Parel Mankhurd Line. b) 110 kV Dharavi BKC 3 & 4 c) 110 kV Borivali Malad 1 & 2 d) 110 kV Chola Kalyan 1 & 2 e) 110 kV Trombay Parel 1 Wadala 1 f) 110 kV Trombay Parel 4 Wadala 2 g) 220 kV Kalwa Salsette 3 & 4
4	Climbing on palm, bottle pam and coconut trees	Difficulty in climbing tree due to smooth surface of palm, bottle palm and coconut tree	1) The person will first climb on ladder and then on tree by continuous tie-off using his double lanyards of safety belt, lifeline, rope grab and web anchorage sling (refer **Annexure-6**) 2) Supervisor shall be present on site all the time and a standby person should be deputed with each climber who should be vigilant and in communication with the climbing person directing him for safe climbing. All those involved in the activity should be appraised of the status of line outage. 3) After reaching the required height/s at every occasion the workman will safeguard himself by using his double lanyards at two distinct points on tree branches using his own judgment about strength of branches
5	Collection of cut / trimmed tree branches		1) Mechanized climbing apparatus is mandatory for climbing 2) Use of fall arrester with full body harness with double lanyards is compulsory while ascending and descending such trees. After reaching the height of crown the workman shall anchor himself at two distinct anchors available on the tree crown. Mounting

		Falling of branch on persons	on crown should be avoided. Web anchorage sling shall be used for making anchorage point on tree stem(refer **Annexure -6**) 1) All crew at site to be notified before the trimming activity commences. Only one person to control activity and shall give instruction to climber.

7. RECORDS : NA (Record of PTW, JSA, LOTO etc. to be kept per respective procedure)

8. TRAINING & COMMUNICATION

8.1. Training of Tree Trimming procedure shall be covered along with Work at height Training.

8.2. Initial Communication to be done through Corporate Communication, Email and subsequently this procedure shall be made available at safety portal at Sangam.

9. VERIFICATION

9.1. Verification of implementation of Tree trimming procedure shall be done during Safety Audit, Field Safety visit and inspections.

10. EXCEPTION: Any Exception to this procedure shall only be done as per section 6.3 of Document Control .Procedure (**TPSMS/GSP/DC/014/REV01).**

11. REFERENCES

11.1. Tata Power Electrical Safety procedure (TPSMS/CSP/ELEC/010).

11.2. Tata Power Work at Height procedure (TPSMS/CSP/WAH/004).

11.3. Tata Power JSA procedure (TPSMS/CSP/JSA/009).

11.4. Tata Power Permit-To-Work procedure (TPSMS/CSP/PTW/008).

11.5. Tata Power LOTO procedure (TPSMS/CSP/LOTO/001)

11.6. Tata Power Safety Capability Building procedure (TPSMS/CSP/SCB/016)

11.7. Rajasthan Rajya Vidyut Prasaran Nigam - Construction Manual

12. REVIEW

12.1. Review of this procedure shall be done as and when but not later than once in every three (03) years. Typical Factors like Changes in legislation, Review of

Incident Reports, Inspection & Audit findings, Feedback from users, Recommendations in Incident investigation reports may be inputs for the review and revision of the procedure.

12.2. In case release of revised procedure gets delay due to obtaining feedback or any other reasons, safety advisory may be issued immediately to take precautions for the proposed changes in the procedure and revised procedure should be released subsequently

13. ATTACHMENTS/APPENDIX :

Annexure 1 - Use of Man - Lifter for tree trimming
Annexure 2 - Schedule for tree trimming
Annexure 3- Safety Clearances (CEA)
Annexure 4- Guidelines for Tree Plantation
Annexure 5- Examples of Mechanized tree climbers
Annexure 6- Web anchorage sling
Annexure 7- Tree Pruning equipment
Annexure 8- Certificate for fitness
Annexure 9- Pre-start up checklist for Tree trimming job

Annexure - 1

Use of Man - Lifter (Genie) for tree trimming

Annexure-2

Schedule for tree trimming

Sr No.	Period	Remark
1	Begin from Month of November and continue till subsequent March	After the end of monsoon and Progressively before the beginning of monsoon
2	Periodic Trimming throughout the year	Based on the routine patrolling of the overhead conductor.

Annexure- 3

SAFETY CLEARANCES

1.0 SAFETY CLEARANCES:

1.1 The various elements and associated / required facilities have to be so arranged within the substation that specified minimum clearances are always available from the point of view of the system reliability and safety of operating personnel. These include the minimum clearances from live parts of adjacent circuits / bays. It must be ensured that sufficient clearance to ground is also available within the Sub Station so as to ensure safety of the personnel moving about within the switchyard.

1.2 The Table below gives the minimum values of clearances required for Sub Stations up to 765 kV:

Table for Minimum Clearance

(Ref. Rajasthan Rajya Vidyut Prasaran Nigam - Construction Manual - Chaptor-3 Page 34)

Nominal System Voltage (kV)	Highest System Voltage (kVp)	Lightning Impulse Voltage (kVp)	Switching Impulse Voltage(kVp)	Minimum clearances$		Safety Clearances (mm)	Ground Clearance * (mm)
				Between Phase	Between Phase		
11	12	70	--	178	229	3000	3700
33	36	170	--	320	320	3000	3700
132	145	550 650	--	1100 1300	1100 1300	4000 4000	4600 4600
220	245	950 1050	--	1900 2100	1900 2100	4500 5000	5500 5500
400	420	1425	1050 (Ph - E) 1575 (Ph - Ph)	3400 --	-- 4200	6500	8000
765	800	2100	1550 (Ph - E) 2550 (Ph - Ph)	6400 --	-- 9400	10500	13000

$ These values of air clearances are the minimum values dictated by electrical consideration and do not include any addition for construction tolerances, effect of short circuits, wind effects and safety of personnel, etc.

- For safety of personnel moving in the switchyard with tools & plant.

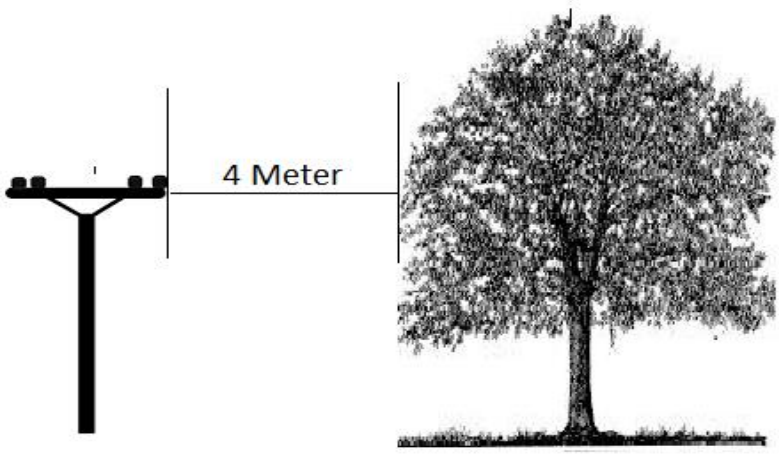
Notes:

1) The values in the Table above refer to an altitude not exceeding 1000 Meters and take into account the most unfavourable conditions which may result from the atmospheric pressure variation, temperature and moisture. A correction factor of 1.25 percent per 100 Meters is to be applied for increasing the air clearance for altitudes more than 1000 Meters and up to 3000 Meters.

2) "Safety Clearance" is the minimum clearance to be maintained in air between the live part of the equipment on one hand and earth or another piece of equipment or conductor (on which it is necessary to carry out the work) on the other.

Annexure- 4

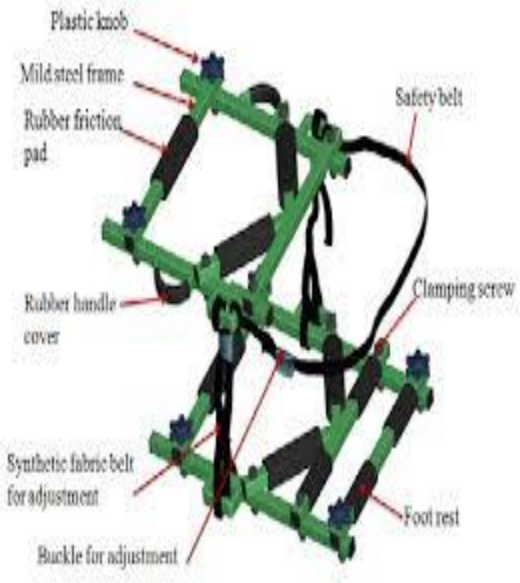
Guidelines for Tree Plantation



STOP	CAUTION
No tree Zone! No tree within 7M of overhead conductor/ electric installation	Small tree Zone. Plant tree such that minimum 4 Meter clearance between Overhead conductor/Electric Installation and branch of the tree.

Annexure - 5

Some Examples of Mechanized Tree Climber



Annexure - 6

Anchorage webbing sling for making anchorage points of stem/main branch

Correct Method of use of **Anchorage webbing sling**

Wrong Method of use of **Anchorage webbing sling**

Annexure- 7

Tree Pruning equipment (Typical)

Annexure- 7 contd.

Tree Pruning equipment (Typical)

Petrol Engine Driven Pole Tree Pruner	

Annexure - 8

TPSMS/GSP/TTRM/017/FORM/001

Certificate of Fitness

1. Serial No. ..... Serial No. .....

   Date .....Date .....

2. Name ..... I hereby certify that I have personally
3. Father's name…….....Examined (Name) .....
4. Sex.....
5. Residence.....son/daughter of .....

.....

.....

6. Date of birth, if available and/or residing at certified age.
7. Physical fitness .....
8. Descriptive marks

   who is desirous of being employed in factory, and that his/her age as nearly as can be ascertained from my examination is ..... years, and that he/she is fit for employment in factory as an adult child his/her descriptive marks are:

9. Reason for-

   (1) refusal of certificate .....……..

.....

or

   (2) certificate being revoked .....

.....

Left hand .

Thumb

Impression/Sign

Initials of Certifying Surgeon.

Note.- Exact details of cause of physical disability should be clearly stated.

Annexure – 9

TPSMS/GSP/TTRM/017/FORM/002

PRE-START UP CHECK LIST FOR TREE TRIMMING JOB

Company/Entity Name:	**Date:**
Contact Person Name:	**Contact Person Mobile No:**
Inspection Site:	**Location:**

Sr. No.	Description	Yes	No	Remarks
1	Medical certificates are available for all workmen.			
2	Valid Admin passes of all workmen available at site.			
3	L1 training for workmen's and L3 for supervisors is completed & cards are available.			
4	All valid safety PPE's are available (Such as Full body harness, Safety helmets, safety shoes, safety goggle, etc.)			
5	Web slings are available at site (Minimum 6 no. s shall be made available)			
6	Bill hook holder are available			
7	Tool lanyard is available for each bill hook.			
8	2 numbers of Aluminum Ladder are available			
9	First box with adequate medicines is available for each working crew.			
10	List of Trained first Aider with valid certificates are available with each working crew			
11	Emergency contact number list is available at site for working area.			
12	"Stakeholder app" is available on Owner / Supervisor mobile. (Safety observation / Unsafe conditions / Unsafe act shall be reported either on App or "What's app" group. Minimum 10 to 15 SO shall be reported by each supervisor per month)			

13	Rescue Kit with valid test certificate of snatch block is available with each working crew			
14	Toolbox talk records are available at site			
15	JSA & PTW hard copy is available at site.			
16	Daily authorization copy is available with all signatures at site.			
17	Identification of tree climber & workmen working on ground is done & visible at site.			
18	Availability of mechanized climber at site & it is in good condition			
19	Adequate drinking water is available at site to avoid dehydration.			
20	No Smoking or striking of fire to be discussed by Supervisor on daily basis in TBT.			
21	Condition of transport vehicle is in good condition & valid driving license of driver is available.			
22	Availability of tree trimming permissions from concerned authority shall be made available at site			

Name inspecting person: Sign Inspecting parson Signature: