



ATL's Way of Doing things with Safety

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Introduction

Adani Transmission Limited (ATL) is one of the largest integrated private sector utility company in India with a presence across the western, northern and central regions of India. ATL as a developer company, constructs Transmission assets and also operates, maintains assets with longevity at optimum costs.

So it is imperative to construct project with utmost quality and in safe manner, which can lead to smooth operation and maintenance activity for the rest of the asset life.

This document, "ATL's way of doing things with Safety" showcases the practices followed in foundation, erection, stringing, stores, O&M sites and offices.

Methodology

" ATL's way of doing things with Safety " document contains photographic presentation of various good practices with description for sites during various phases of transmission & S/S projects.

This document, "ATL's way of doing things with Safety" is presently applicable for:

- A. Transmission Lines
- B. Substations
- C. Offices

Key Activities

Survey:

Right practices	Description
Mandatory use of PPE's 	During the site activity, use of PPEs - Safety Helmet, Shoes, Reflective Jacket, Hand Gloves and Goggles / over specs is mandatory. Gum boot may be required in terrain like bushy area, muddy area etc. Ensure availability of First-Aid box and emergency contact numbers with survey team.

Excavation:

Right Practices	Description
Fencing and Warning Signs 	Ensure survey of land for any underground utility during excavation Proper fencing with warning signs need to be provided near approach roads of villages. Hard barricading / Tape - Two layer at 525 mm & 1050 mm

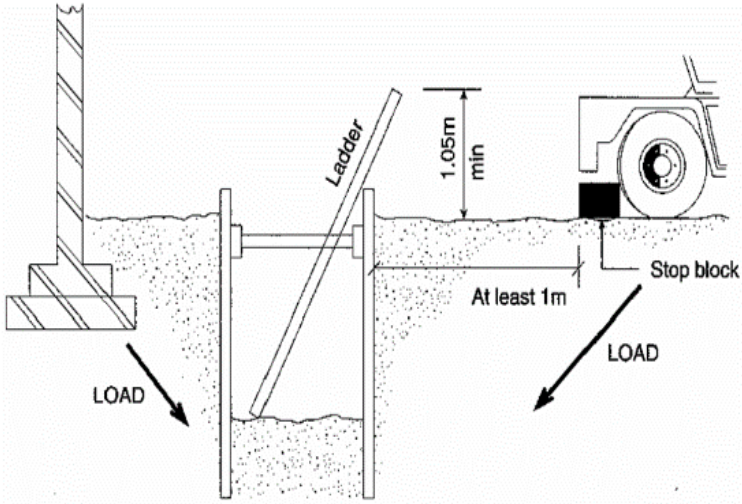
Right Practices	Description
Step excavation 	Provide Step or slope excavation in sandy / loose soil locations, to prevent collapse of soil.
Blasting 	Blasting, if any, should be carried out with adequate precautions as per IS: 4081 – 1986. The blaster shall be competent and qualified by virtue of his training, knowledge or experience in the field of transporting, storing, handling, using of explosives and having a working knowledge of Rules and Regulations pertaining to explosives. The blaster shall be in good physical condition and not be under influence of drugs, alcohol, intoxicants, etc. Adequate arrangement should be made to inform public by caution making (Red flag / Public Notice) and signal man posted.

Right Practices	Description
Barricading 	Barricade the area surrounding the excavated pit for protection, when no activity is going on. Avoid time delay between excavation and foundation activities. If any excavated pit is left overnight, then red light should be provided.
Clear Edges 	Clear edges to prevent fall of objects inside the pit - the excavated earth, stones and tools should be dumped at least 1.5 m away from the edge of the pit.

Foundation:

Right Practices	Description
Positioning of Jacks 	Ensure Jacks used for supporting the template should be placed at safe distance from the edge of pit to avoid sliding down of the template from the jacks and endangering the workers. Jacks are to be placed on flat surface having bags filled with sand, this provides proper stability and avoids dislocation
Usage of Chute plate 	The steel chute plate used for pouring the concrete into the pit should be properly anchored to prevent the same from falling into the pit, endangering the persons working inside the pit.

Right Practices	Description
Metallic ladder 	Usage of Metallic ladders of adequate length and free from any defect are recommended for easy movements of workman in and out of the pit. Note: Metallic ladders should not be painted Always ensure 3-point contact with the ladder. Ladders need to be extended at least three rungs above the edge of the pit.
Full Body Safety Harness 	Full Body Safety Harness with shock absorber and Double lanyard need to be used by the workers who are pouring concrete into the form box/ involved in ramming activity.

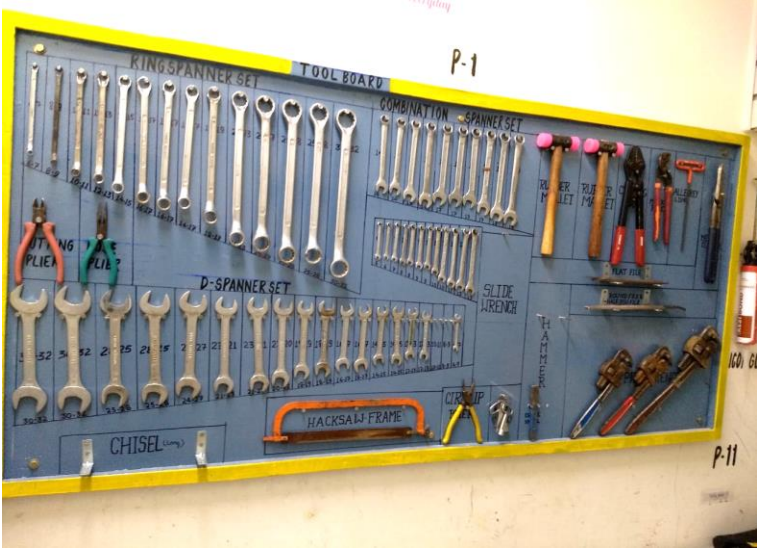
Right Practices	Description
Shoring 	Arrangement of shoring and shuttering to prevent collapse of pit wherever necessary. Pits > than 1 m depth must have shoring
Heavy Machinery 	Heavy machinery is to be placed at least 1 mtr. to 1.5 mtr away from the edge of the pits and anchored, to avoid collapse of the pit due to vibrations produced by these machines. Vibrators should be placed adequately away from pits and anchored. Wheel Chocks are to be provided for the concrete mixers.

Right Practices	Description
Concrete mixer machine  	All the rotating parts of machines/equipment should be guarded during work. • Protective guard must be provided for concrete mixer machine • Diesel cap should be tightened properly • Position of workmen during mixer operation must be assigned
Usage of PPE's 	All workmen working inside the excavated pit must wear safety helmets, gum boots, reflective jackets and hand gloves.

Right Practices	Description
First-Aid Box and Emergency Rescue Vehicle  	Following things should be available at site • First-Aid box with items as per BOCW Act and IS 13115 • Number of First-Aid Trained persons and their names • First Aid Register • Nearby medical facilities for use during exigencies should be identified (Location/Phone No.) • At least one vehicle (four wheeler) for use in case of an emergency with a clean stretcher

Erection:

Right Practices	Description
Full Body Safety Harness 	Ensure all the workers working at height have anchored their Double Lanyard Full Body Safety Harness.
Rope grab Fall arrestor 	Ascending and descending from the tower should be done through step bolts only. Ensure workers are tying Rope Grab Fall Arrestor while ascending / descending from tower with Full body safety harness 

Right Practices	Description
Tools and Plants 	T&P'S are to be thoroughly checked for their healthiness and suitability daily before use. Ensure all lifting tools and tackles that are under use at site have been tested for safe working load and have valid test certificates
Derricks  75/100 MM Dia. 8.5-9.0 M Length with Joint.	Derricks and other load bearing T&P's must be of good quality, sufficient capacity and have proper test certificates.

Right Practices	Description
Guy ropes 	Derricks are to be provided with three guy ropes (and not two as is being followed). Guy ropes are to be anchored to a strong anchorage point.
Damaged Tools and Plants 	Discard Damage T&P immediately. Do not take chance by using damaged T & P.

Right Practices	Description
Winch Machine 	Power winch machine should be used for tower erection. Tractor is prohibited for tower erection
Crow bars 	Provide three crow bars for anchorage of guy rope. (Anchoring arrangement to be made according to the picture shown.) One anchorage point must not support more than one guy rope. Maximum angle for the guy rope is 45 degrees.

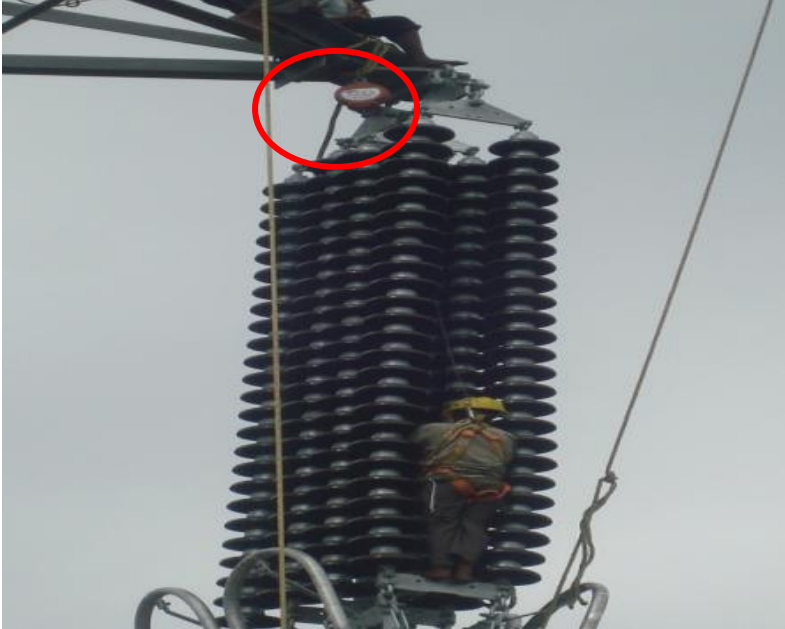
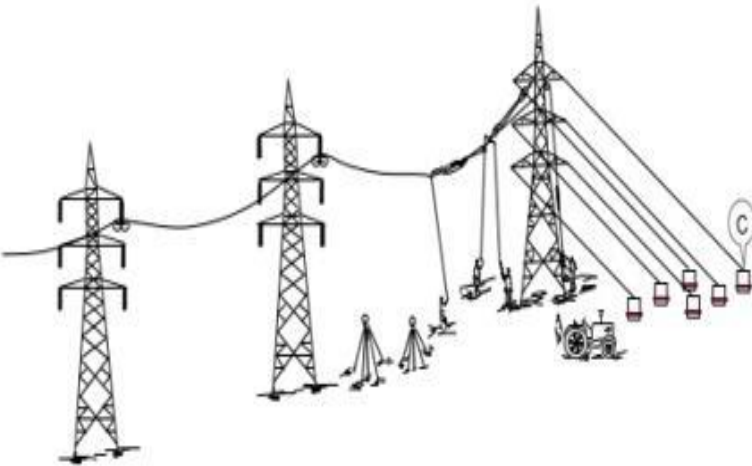
Right Practices	Description
Sequential erection 	Towers are to be erected in a sequential manner. All diagonals of relevant section shall be in place prior to assembly of upper section.
Wrapped wire ropes 	Protect wire rope/PP rope wrapped around tower members using gunny bags.

Right Practices	Description
Safety Net 	Provide Safety Net during erection of tower to prevent fall hazard.

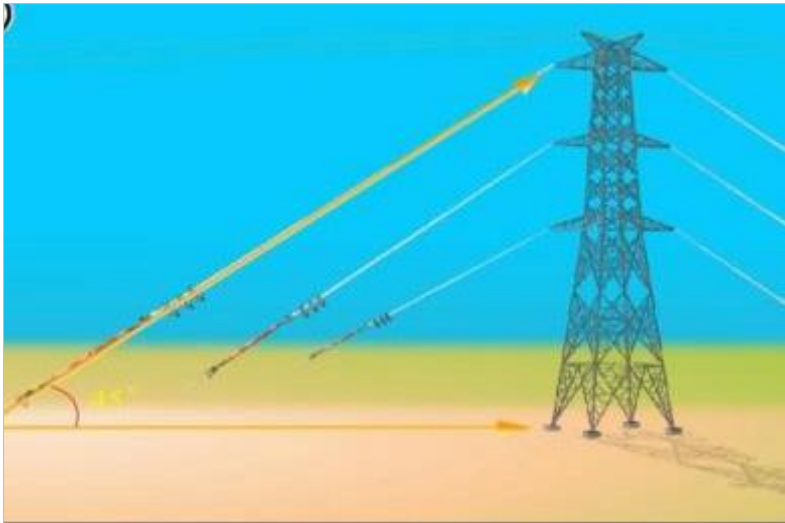
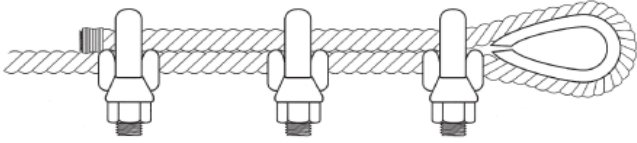
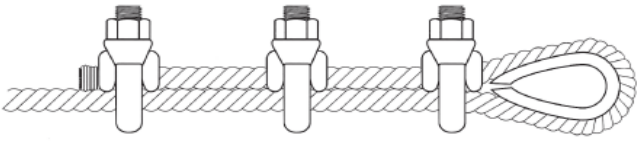
Stringing:

Right Practices	Description
Tension stringing equipment 	TSE and all other load bearing T&P'S must be of good quality of sufficient capacity for the job and have proper test certificates. Physical inspection of TSE must be done daily before use to identify any damage
Tools 	All the tools like Equalizer pulley, D-shackle, Wire Rope and Four Sheave Pulley should be thoroughly checked for every 15 days and daily before use.

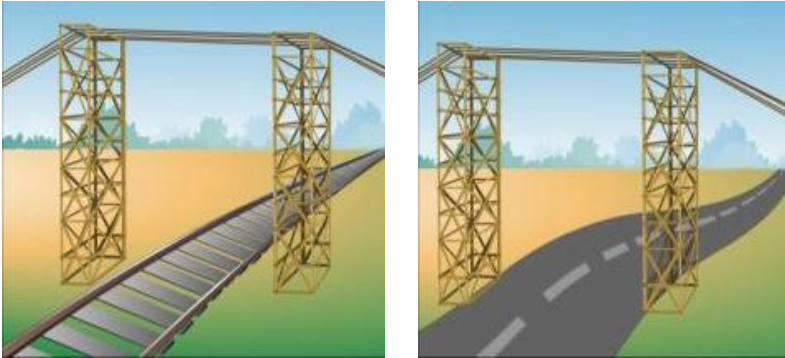
Right Practices	Description
Aerial Roller 	Aerial Roller should be checked for the Rubber Coating and Rotation. Damaged one should be replaced promptly
TSE and Necessary Safety Measures  	Manual of the TSE machine must be obtained from manufacturer. Guying arrangement of the TSE Machine must be checked before starting the paying out. Operator must be experienced in the Operation of TSE Machine All the TSE Machines must be earthed. Position of people near operating TSE machine should be prohibited, further area should be barricaded

Right Practices	Description
Retractable Fall arrestor 	Retractable fall arrestor must be used while working on insulator.
Back Stay arrangement 	As per written SOP, Proper guying and back-stay is to be provided on one side of the section tower.

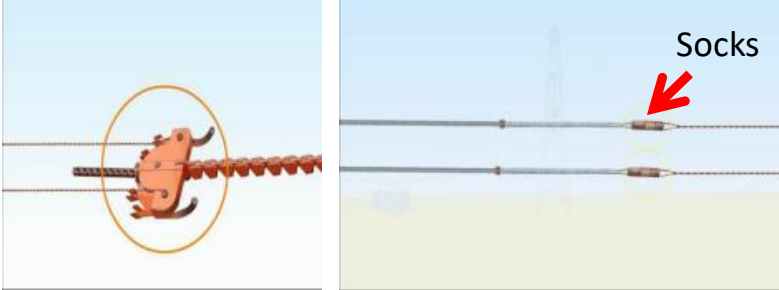
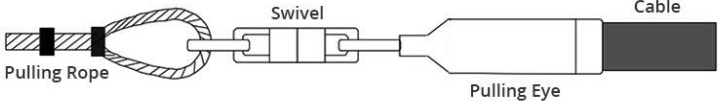
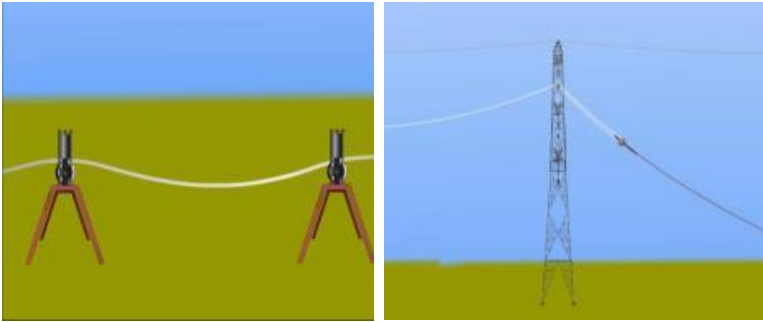
Right Practices	Description
Shifting of Conductor Drums 	Place the conductor drums properly with the help of stoppers, while lifting them with Forklift Ensure obstacle free movement
Wooden Packs 	Wooden pack should be provided to protect the wire Rope as well as tower.

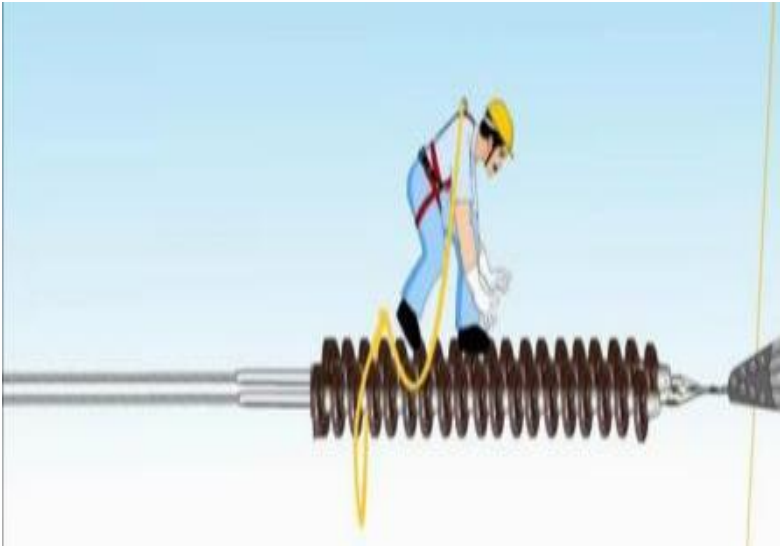
Right Practices	Description
Guy ropes 	The angle of the guy rope should be 45 Degree from ground.
U-Bolt clips <i>Right</i>  <i>Wrong!</i> 	U-Bolt clips should be tightened in a uniform order, while providing back stay arrangement.

Right Practices	Description
Loading and Unloading of Conductor Drums 	Web sling and rope wires must be inspected before use as per the mandatory checks
Handling of Conductor Drums 	Never come in front of conductor drum while rolling it on the ground.

Right Practices	Description
Provision for Scaffolding 	A well designed and certified Scaffolding is to be provided on the Road and Railway Crossing. Permission must be obtained from the concerned authority before starting the stringing activity
Issuance of Shut down Permit 	Shut Down permit must be obtained from the electricity board in written. Lock out and Tag out need to be ensured. Earthing of the line must be done by telescopic discharge rod.

Right Practices	Description
Usage of Walkie-Talkie 	Worker must always be present to caution the people and inform the other workers with Walkie-Talkie and Flags. Walkie- Talkie should be available in sufficient numbers within suitable range
Paying out of Cables 	Villagers well-being must be taken care while Paying out of cables. All the obstructions should be informed Immediately to the operators over walkie-talkie. Stage wise paying should be carried out as normal practice.

Right Practices	Description
Condition of Headboard and Socks  	Headboard is to be checked before Paying out. Connection of the socks to the conductor should also be checked.
Usage of Ground roller 	Ground Roller is to be provided while Paying out. During passing of the headboard through aerial Roller pulling speed should be kept down

Right Practices	Description
Use of Winch Machine 	Final Sagging must be done by winch machine, to avoid the jerk coming on the cross arm. Final sagging of conductor by Tractor is strictly prohibited.
Use of Full Body Safety Harness 	While crawling on insulator, both lanyards of the full body harness must be wrapped (anchored) around the insulator.

Right Practices	Description
Use of Full Body Safety Harness 	Fitter should reach the come-along clamp by anchoring safety belt hook with conductor. At any moment, any one lanyard out of the two should be fixed.
Clipping Activity  In suspension tower, attaching the conductor to the Insulator fitting after lowering the aerial Roller is called Clipping activity.	• Separate retractable fall arrester should be used by each fitter along with double lanyard full body harness. • Care must be taken while lowering the aerial roller. No one should stand below the roller while lowering. • Adequate number of workmen should hold the PP rope while lowering the Aerial roller.

Right Practices	Description
Spacer activity 	• Only Experienced fitter should be deployed for spacer work • Spacer cycle should be checked for any defect before starting of spacer fixing activity • Both lanyard of the safety Harness should be Anchored to the conductor
Usage of ladder and Sag bridge 	Ladder and sag bridge need to be used during stringing.

Right Practices	Description
Turn Table 	Turn table should be used while paying out of earth wire.

Additional Requirements

Right Practices	Description
Height Pass 	Height pass must be issued to the fitters and Technicians after height phobia (acrophobia) test
Barricading and Isolation 	During shutdown, the area near discharge rod should be barricaded and isolated.

Right Practices	Description
Fiber Reinforced Plastic (FRP) Ladder 	All the ladders at O&M sites must be ensured for proper insulation or replaced with non-conductive ladders (such as FRP ladder) with hand rails
Earth Leak Circuit Breaker (ELCB) 	Power should not be supplied unless ELCBs (30 mA) are installed in a booth and a distribution board. Regular tests with proper testing equipment is required.

Right Practices	Description
ELCB Tester 	Digital ELCB tester should be available.
First-Aid Box 	First Aid box should be provided as per the requirement of BOCW Act and IS 13115 at all the locations. Number of First Aid Trained persons and their names should be displayed Nearby medical facilities for use during exigencies should be identified (Location/Phone No.)

Right Practices	Description
Display in Offices 	Ensure display of LSSR, Emergency contact numbers, policy, certificates, Organisation chart etc. on office notice board
Positioning of Fire Extinguisher in Office 	Proper Placement of Fire Extinguisher with wall mounting unit at site office.

Right Practices	Description
Positioning of Fire Extinguisher at Site  	Fire extinguishers should be placed on platforms or in cabinets and it should be at least 750 mm above ground level. Such equipment if placed outside the building, should be placed under shed or in covered area Fire buckets should be placed on hooks attached to a suitable stand or wall and it should be above ground level by at least 750 mm. Fire buckets should be filled with clean sand.

Right Practices	Description
Emergency Evacuation Layout 	Display of Emergency Evacuation Layout should be provided in switchyard
New Generation Hydra 	As far as possible new generation Hydra should be preferred.

Right Practices	Description
360° Swivel coupling 	All Tractor trolley should be coupled with 360-degree swivel coupling so that even if trolley topples, tractor should not be toppled.
Arc Flash Suit 	Electrical Arc Flash suit must be used while performing Electrical maintenance work.

Right Practices	Description
Lockout Tagout  	There should be availability of LOTO kit at O&M locations. LOTO tags are to be removed by authorized person only.

Right Practices	Description
Electrical Insulated Rubber Mats 	Electrical insulated Rubber Mat (Dry and Dust free) should be ensured in the Control room.
Signs and Symbols 	Signs, Symbols, Tags and Barricades should be provided to warn personnel of potential electrical hazards.

Right Practices	Description
High Voltage Detector 	Use of High Voltage Detector before start of any work on live electrical systems
Man lifters 	Man lifters should be equipped with fire extinguisher, Front / Back Horn

Right Practices	Description
Beam Detector 	Beam detector can be provided for unmanned store/ building for protection from fires, this covers large areas with high Roof
Foam Nozzle 	Fire Monitor should be installed with foam nozzle for liquid fires

Right Practices	Description
Eye washer 	Eye washer must be provided in the battery room
ESD Equipment's 	Use of ESD equipment's. This prevents the chance of a sudden discharge of electricity via the sensitive component, therefore protecting it from damage.

Right Practices	Description
Earth switches 	Colour identification of earth switches in switch yard
Modular type fire extinguisher 	Modular type Fire extinguishers need to be installed in the battery room

Right Practices	Description
Barricading 	Barricading need to be provided for tall vehicles
	Barricading need to be provided for High EMF PLC zone

PPEs Matrix

Activity	Type of Protection						
	Head	Foot	Hand	Eye	Ear	Body	Respiratory
Mandatory PPEs for Site	Safety Helmet	Safety Shoes	Cotton Gloves	Safety Goggle	-	Reflective Jacket	-
Gas Welding/ Cutting	Safety Helmet	Safety Shoes	Leather Gloves	Welding Goggle	-	Boiler Suit	Supplied Air Mask/Hood / Self Contained Breathing Apparatus (Confined Space)
Electric arc Welding	Helmet Mounted Welder's Shield	Safety Shoes	Leather Gloves	Helmet Mounted Welder's Shield	-	Boiler Suit, Leather Gloves	
Rigging	Safety Helmet	Safety Shoes	Cotton Gloves	Safety Goggle	-	Reflective Jacket	-
Lathe Operations	Safety Helmet	Safety Shoes	Leather Gloves	Safety Goggle	Ear plug	Reflective Jacket	-
Working at Height	Safety Helmet	Safety Shoes	-	-	-	Full Body Harness	-
Grinding / Chipping	Safety Helmet	Safety Shoes	Cotton Gloves	Safety Goggle / Face shield	Ear plug	Boiler Suit	-
Working in High Noise area	Safety Helmet	Safety Shoes	-	-	Ear plug / Ear muff	Reflective Jacket	-
Handling of Cement /Concrete	Safety Helmet	Gumboot	Rubber Gloves	Safety Goggle	-	Reflective Jacket	Dust mask
Blasting	Safety Helmet	Safety Shoes	Cotton Gloves	Safety Goggle	Ear plug	Reflective Jacket	-
Excavation	Safety Helmet	Gumboot	Cotton Gloves	Safety Goggle	Ear plug	Reflective Jacket	-
Chemical Handling	Safety Helmet	Safety Shoes	PVC Gloves	Chemical Splash Goggles	-	PVC Apron	-

Share your feedback & suggestions at (9099991100) and / or hse.transmission@adani.com