EXCAVATION SAFETY PROCEDURE

Rev No.	Reason for Revision	Prepared By	Checked By	Approval by
Rev 00	New procedure	R&P Sub-Committee	D Kamath	Vijay Chourey
Rev 01	Standardization of procedure	Prakash Sharma (Head - Mechanical Maint.- MPL)	Navendra Singh (Group Head – P & CB; Corp Safety.)	Vijay Chourey (Chief – Corp Safety)
Rev 02	Periodic review	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

Contents

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	PROCEDURES	4
7.0	RECORDS	16
8.0	TRAINING & COMMUNICATION	16
9.0	VERIFICATION	16
10.0	EXCEPTION	16
11.0	REFERENCES	16
12.0	REVIEW	17
13.0	ATTACHMENTS/APPENDIX	17
-	**Annexure -1**-Sample Format for Excavation Checklist TPSMS/CSP/EXS/002/FORM/001	18
-	**Annexure -2**-Trench shoring –Minimum requirements	20

1. **OBJECTIVE:** This procedure is developed to cover the safe practices required for excavation, trenching, shoring and sloping. This procedure is developed to establish mandatory requirements for practices to protect personnel, property and equipment from hazards associated with excavation and trenching activities.

   It covers role and duties of personnel associated with excavation, cable trenching , shoring and slopping to discharge their duties effectively.

2. **SCOPE:** This procedure applies to all operating and project sites of Tata Power Group companies including JVs/ Subsidiaries.

   Note: Deep shaft excavations, tunnel excavation, pile boring and excavation by blasting are excluded from the scope of this procedure.

3. **EXPECTED RESULTS:**

   3.1. Manage Excavation and trenching jobs safely.
   3.2. Control of incidents related to excavation and trenching activities.
   3.3. Compliance to Regulatory requirements to make workplace safety.
   3.4. Ensure safety of person, property and public.

4. **ACCOUNTABILITY & RESPONSIBILITY:**

   4.1. ACCOUNTABILITY: Concerned Division's Heads/Project Heads/Site Heads/ Assets Custodian.
   4.2. RESPONSIBILITY: Concerned Engineer/s

5. **GLOSSARY/ DEFINITIONS:**

   Angle of repose - The greatest angle above the horizontal plane at which the material lie without sliding.
   Benching – Method of protection to prevent cave-ins by excavating the sides of an excavation to form one or series of steps usually with vertical or near vertical surfaces between levels.
   Cave-in – Separation of mass of soil or rock material from the side of an excavation or loss of soil from under a trench shield or supporting system and its sudden movement into the excavation in quantity that it could entrap, bury, injure or immobilize a person(s).
   Competent Person – One who can identify existing or predictable hazards in the surroundings that are unsanitary, hazardous or dangerous to person. He also has

authorization or authority by the nature of their position to take prompt corrective measures to eliminate them. The person shall be knowledgeable about the requirements of the standard.

Excavation- Any man-made cut, cavity, trench or depression in earth surface formed by earth removal. Relatively large volume of earth is involved. Generally have relatively equal dimensions of width and length. Depth will vary but usually is lesser than the smaller dimension. Used for basements, installation or maintenance of underground tanks and pipelines, piling, culverts, and larger spread footings. Size generally makes sloping of banks more economical than shoring.

Hazard: Source or situation with potential for harm, something that can cause body injury / occupational illness, damage property.
Job: A piece of physical work defined by time or other limits and that has a clear start and end point
Qualified/person(s) - Those who by extensive knowledge, training, and experience have successfully demonstrated their ability to carry out sloping and shoring of an excavation.
Ramp – An inclined walking surface specifically provided to gain access from one point to another and is constructed from earth or from structural members such as steel or wood.
Risk: Effect of uncertainty, Risk is a combination of the consequences of an event and the associated “likelihood” of occurrence.
Shoring- A structure that supports the sides of an excavation and protects against cave-in.
Shall: Mandatory requirement
Should: Optional requirement
Sloping – Cutting of the edge back in inclined manner that it will not slide in the trench or excavated area.
Task / Activity: A sequence of steps taken to conduct a job. A task is a sub element of a Job.
Trench -Generally long, narrow, and deeper than its width, but the width of a trench is not greater than 5 feet (1.5Mt). Relatively small volume of earth involved. Used for installation or maintenance of underground pipelines, conduit, cables, or footings for buildings without basement. Size generally makes shoring more economical than sloping of banks.
Note: If depth of excavation or trench is more than 1.5 meter, excavation or trench work shall be treated as working at height.

6. PROCEDURES

6.1. General Excavation:

6.1.1. All the Excavations, more than 5 feet (1.5Mt) deep shall require shoring or sloping.

6.1.2. Excavated material must be kept at least 3 feet (1Mt) away from the edge of the excavation. In case of narrow lanes or public roads distance can be reduced based on the site condition and as per the directions of engineer In-charge. If distance is reduced, earth filled gunny bags should be stacked between the edge of the trench and debris. All necessary precautions shall be taken to avoid caving in of material.

6.1.3. At all time during the work execution sufficient space should be made available on at least one side of the trench for movement of manpower.

6.1.4. Excavated material must not be permitted to accumulate in the work area or aisles. It should be shifted away.

6.1.5. Excavation, bracing and shoring must be checked by qualified person, prior to starting the job, subsequently on daily basis and also after every rain and storm.

6.1.6. Power supply to all electrical equipment/lights should be through ELCB (Earth Leakage Circuit Breakers, Tripping timing of ELCB should be 30 Milliseconds. If tripping timing exceeds more than 50 Milliseconds at 30 Milliamp then ELCB shall be replaced immediately (For more detail refer TPSMS/GSP/ELCB/008 - Earth Leakage Circuit Breaker (ELCB) Testing Procedure)

6.1.7. No hot work shall be done in excavation without a valid hot work permit.

6.1.8. In locations where oxygen deficiency or gaseous conditions are possible, air in the excavation shall be tested. Controls, as set forth in TATA POWER Standard Confined Space Entry, shall be established to assure acceptable atmospheric conditions. When flammable gases are present, adequate ventilation shall be provided or sources of ignition shall be eliminated.

6.1.9. Confined space permit should be taken for excavations more than 6 feet depth (1.8Mt) which come under the purview of confined space.

6.2. Trench Excavation: in addition to 6.1 above, following points to be complied for trench excavation.

6.2.1. The Sides of trenches in hard or compact soil, including embankments, shall be shored or otherwise supported when the trench is more than 5 feet (1.5Mt) in depth. In lieu of shoring, the sides of the trench above the 5 feet (1.5Mt) level may be sloped to preclude collapse, but shall not be steeper than a 1 feet (0.3Mt) rise to each ½ feet (0.15Mt) horizontal. When the outside diameter of a pipe is greater than 6 feet (1.8Mt), a bench of 4 feet (1.2Mt) minimum shall be provided at the toe of the sloped portion.

6.3 Potential Hazards likely to be encountered during Excavation/Trenching

a. Falling of persons into excavated trench or pit
b. Collapse of excavation sides and falling of excavated material onto persons working within excavation trench or pit
c. Collapse of temporary arrangements (shoring etc) made to support sides of excavation.
d. Collapse of adjacent structure due to excavation.
e. Persons within excavation pit struck by fall of spoils from excavator buckets and other objects dropped on them.
f. Worker hit by reckless driving / operation of equipment.
g. Falling of workmen through bottom of excavation into abandoned empty bore of pile, disused shaft or disused sewer line or other cavities in the ground.
h. Persons within excavation struck by other objects falling due to work being done at higher elevation in the nearby vicinity.
i. Risk of electrocution from cables crossing or used for lighting purpose in vicinity
j. Risk of injury due to protruding nails, sharp edges in shoring.
k. Falling of persons while climbing or getting down into excavation
l. Spiking of underground electric cables with resulting flash burns and electric shock.
m. Flooding with risk of drowning.
n. Striking and breaking other underground utilities such as – gas (fire and explosive hazard), water (flooding), and sewage (toxic gases).
o. Fire and explosion from flammable gases heavier than air and vapors especially LPG, entering excavation.
p. Poisoning from gases entering from pipelines or outside.
q. Suffocation / Poisoning due to burning of torches, etc. used in excavation and insufficient ventilation, or from exhaust gases produced by plants and machinery used in connection with the excavation,
r. Toxic and radioactive hazards from the ground itself, usually resulting from its previous occupancy.
s. Accidental explosion through use of explosive in excavation.

t. Objects getting to eyes while chiseling rock, using jack hammers in hard strata, concrete.
u. Falling of trees / Street light pole along side of trench
v. Dehydration during summer season /hot sunny day.
w. Exposure to dust and noise.
x. Bursting of Air receiver, pressurized hoses, pipe & exposure to excessive vibrations while using pneumatic compressor for breaking hard surface.
y.

6.3.2 Excavation Clearance : Wwhen excavation work is to be undertaken on public road, all statutory clearances shall be obtained prior to commencing the work. The clearance shall be obtained as follows:

6.3.2.1 For New Projects – The Project Manager/Site In-Charge shall be responsible for the co-ordination with all the departments and obtaining excavation clearance.

6.3.2.2 For Minor Projects & maintenance jobs - Excavation & trenching jobs both inside and outside battery limit areas, the Plant/Site Head or his authorized representative, is responsible for co-ordination with all the departments and give the excavation clearance to the Site In-Charge/ Project/Maintenance engineer.

6.3.2 Risk Assessment: Risk assessment of the job shall be done to control hazards of site.

6.3.3 Work Permit: Ensure proper Pemit-To-Work is obtained as per the Permit-to-Work (TPSMS/CSP/PTW/008) procedures.

6.3.4 Safety Aspects: Following important safety aspects shall be implemented during execution of excavation activity at project site:

6.3.4.1 Safe access:

a. Safe access must be provided to excavations by means of ladders, stairs or ramps.

b. Provision of safe means of access & egress to workers. E.g. clear passage for entry and exit, ladder, stair case, slope, steps etc. shall be ensured.

c. If the excavation is more than 4 feet (1.2Mt) deep it should be provided with standard ladder to facilitate safe entry and exit.

d. The ladder must be provided at every 25 feet (8Mt) interval.

e. Trenches more than 4 feet (1.2Mt) in depth shall have ladders spaced so that employee's lateral travel to a ladder does not exceed 25 feet (8Mt). Such ladders must be installed in accordance with the ladder safety requirements. The height of the ladder to be extended up to 3.3 feet (1Mt) from the top of ground surface. The ladder must be secured.

f. Ensure proper passage over the excavation for by passers to move from one bank side to other with minimum 2 gratings Placed on horizontal members with guard rail.

6.3.4.2 Caution and Barrication:

a. Excavations should be barricaded to prevent employees and others falling into them-

b. Provide barricading of the area and display of warning signboard in Hindi / English / regional language at conspicuous locations.

c. Warning signs / reflectors / signage / Light signal to be provided as per prevailing local authorities (such as MCGM or other) / Govt authority guidelines No trench, ditch or other excavation shall be left overnight without barricades and warning lights.

d. Adequate illumination should be provided in the night and in day as per site condition so that the area will become visible.

e. If barricades or portions of barricades are removed for work, they shall be replaced as soon as practicable.

f.

g. The warning barricades must be 2 feet away from the edge of the excavation (plastic tape & sign board). In operations area the plastic tape must be at two levels i.e. 21” and 42” height from the ground.

h. The barricades installed closer than 2 feet (1.8Mt) from the edge of the excavation, must be hard barricade which can withstand 100 kg load / thrust. Or it shall adhere to standards specified by Local authority. In absence of local authority specifications the specifications provided by TPCL should be followed. Hard barricade shall have horizontal members at 21 inches and 42 inches respectively from the ground with adequate vertical supports.

6.3.4.3 Precautions against cave in, seepage etc

a. If it is necessary to place or operate power shovels, derricks, trucks, materials, or other heavy objects on a level above and near an excavation, the side of the excavation shall be sheet-piled, shored, and braced as necessary to resist the extra pressure due to such superimposed loads.

b. When mobile equipment is utilized or allowed adjacent to excavations, substantial stop logs, or barricades shall be installed. If possible, the grade should be away from the excavation.

c. Care shall be taken during monsoon or during seepage of water from nearby area.

d. When under cut is required then shoring shall be designed by professional engineer.

e. If there is evidence of cave-ins or slides, all work in the excavation must cease until the necessary precautions have been taken to safeguard employees till further clearance is obtain.
f. Where vehicles or equipment operate near excavations, the sides must be shored or braced as necessary to withstand the force exerted by the superimposed load. Also stop-logs or other substantial barricades must be installed to protect the edge of such excavations.
g. Dewatering from the pit shall be done at remote location to avoid back flow to the pit resulting in soil collapse.
h. Ensure that there are no scaffolds or temporary structures adjacent to where trench or excavation is to be made unless adequate measures have been taken based on a formal risk assessment.

6.3.5 Preparation (to be done in consultation with a competent person)

a. Study the soil characteristics with reference to angle of repose for soil required etc. Please refer Sketch 1 for guidelines.
b. Ensure crow bar used for excavation should meet all applicable standards, dimensions, tests and guideline for insulation as per crow bar specification (ref spec-crow bar_R1)
c. Ensure all excavation tools are as per Tata Power standard (Refer CL Tools for trenching)
d. See that excavated area is not blocking the access to the site for man and material both or otherwise necessary sign shall be displayed at appropriate locations.
e. It should be ensured that there is no exposed live wire in working areas which are accessible to building workers other than those authorized to work on such live lines.
f. Alternate route for traffic should be provided (in case of road blockage). Ensure Road block procedures are followed.
g. Ensure that there are no vibrations from an external source which may impact the excavation.
h. Ensure that consideration has been given to proximity of adjacent structures while finalizing the method of excavation.
i. All efforts will be made to locate underground utilities that may reasonably be expected to be encountered during excavation work. A cable avoidance tool (CAT) must be used before start of excavation to ascertain existing utilities. In the situation where a cable or utility is found to be existent, the engineer will judiciously after obtaining the excavation clearance, excavate a trial pit manually only (Please refer WI Trial Pit excavation.). The depth of trial pit shall not exceed 1.5 meters in general 2.0 meters in special cases so as to ascertain the presence of any cable/gas pipeline/other utility. In case, no cable or other utility service lines detected in the trial

trench, manual excavation upto 1.2 meters depth shall be undertaken. The whole process is repeated for the next 1.2 meters.

6.3.6 Supervision, workforce and Inspection

a. All workmen at excavation sites shall be L1 trained and cerified by TPSDI.

b. It should be ensured that all excavations are supervised by qualified person. TPSDI trained L1,& L3 certification.

c. Give Tool Box Talks regarding safety measures to be observed to the workers involved before starting the job.

d. Confirm methodology to be adopted, explains Risk Assessment and plan of action in case of emergency.

e. Confirm PPEs provided, are as per the work permit.

f. If the depth of excavation is more than 7 feet (2.2 meters) then double lifeline full body harness must be used. The harness to be secured to a suitable lifeline.

g. E I C shall ensure that check list as per Annexure- 1 has been filled and signed for excavations for excavation more than 1 ft.

h. Minimum person shall be kept inside pit. All idle workers should be removed from there.

i. Each excavation shall be inspected daily by the qualified persons, after heavy rains & Storms, or more often if conditions change rapidly.

6.3.7 Precautions during Job

a. If, during excavation, unexpected utilities are discovered, Contractor should stop excavation and immediately Concerned Lead Engineer / Network Manager.. Work shall be resumed only after obtaining further clearance in consultation with the competent person.

b. Hand tool excavation: Whenever the presence of underground pipes, cables, vessels, or structures is known, or suspected, they shall be exposed by hand tool digging before mechanical excavators are used. Hand tool excavation is required within 10 feet (3.0 meters) of the object.

c. Machine excavation: When the location of all utilities or structure have been established by surface markers or hand tool excavation, machine excavation may commence under close surveillance of the Contractor's supervisor.

d. Movement of vehicle and heavy cranes shall be 3 feet (1meter) away or 1.5 times the depth of excavation, whichever is greater.

e.

f. The disposal area should be defined, made safe for receiving the loose excavated material and manner of disposal is defined.

g. All equipment, electrical connection and machinery used for excavation shall be tested and validated by the Plant/site electrical department.

h. In case of excavation more than 15 feet (4.5 meters), ensure adequate means of communication and proper ventilation are provided.

i. Power supply to all electrical equipment/lights should be through ELCB (Tripping at 30mA current leakage to earth).

j. If there is evidence of cave-ins or slides, all work in the excavation must cease until the necessary precautions have been taken to safeguard employees.

k.

l. If any tree or structure(Light pole, FP) is near the edge of excavation said to be safeguarded / supported and / or trench near the tree / structure is temporarily backfilled with earth filled gunny bags till cable laying and backfilling .

m.

n. Wherever required depth of 1.2M cannot be reached due to obstacles suitable arrangement for protecting the cables should be made using GI Pipes/ HDPE Pipes/ Half round pipes, New protection tiles, laying PCC of M15 grade of thickness not less than 150MM, as per the site conditions. Deviation approval to be obtained giving reasons for shallow depth and details of protections to be provided.

6.3.8 Dewatering

a. Incase ground water is in entering excavated area, ensure continuous dewatering is done

b. Persons shall not work in excavations that contain or accumulating water unless precautions have been taken to protect persons from hazards posed by water accumulation. The precautions taken shall include support or sealed systems to protect from cave-ins, water removal to control the level of accumulating water and use of safety harness and life lines.

c. Dewatering from the pit shall be done at remote location to avoid backflow to the pit , resulting in soil collapse .If water is controlled or prevented from accumulating by the use of water removal equipment , the water removal equipment & operation shall be monitored by a person trained in the use of the equipment.

d. If excavation work interrupts the natural drainage of surface water, diversion ditches, dikes, or other suitable means will be used to prevent surface water from entering the excavation. Precautions shall also be taken to provide adequate drainage of the area adjacent to the excavation.

6.3.9 Shoring

a. Bracing or shoring of trenches shall be carried along with the excavations.

b. Trenches 5 feet (1.5 meters) or deeper must be shored or sloped back to the angle of repose. Any excavation in unstable ground will require shoring or sloping.

c. An adequate supply of materials such as timbers, trench sheets & props with which to shore the sites of excavation must be delivered to the site before starting excavation.

d. Material used for sheeting, shoring or bracing must be of good condition. Timbers must be sound, free of large knots and of appropriate dimensions.

e. Shoring with GI sheets shall be firmly supported by steel/ scaffold pipes with spacing of 4 ft in horizontal & vertical direction with cross bracing & shall be suitable clamped.

f. Supporting systems; i.e., piling, cribbing, shoring, etc., shall be designed to meet accepted engineering requirements. When tie rods are used to restrain the top of sheeting or other retaining systems, the rods shall be securely anchored well back of the angle of repose.

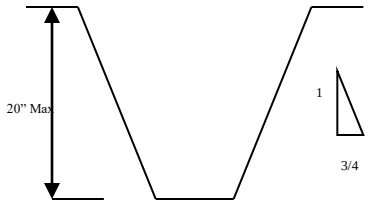
g. For shoring extending below the water table proper means of water drainage with the means of weep holes or other means shall be ensured.

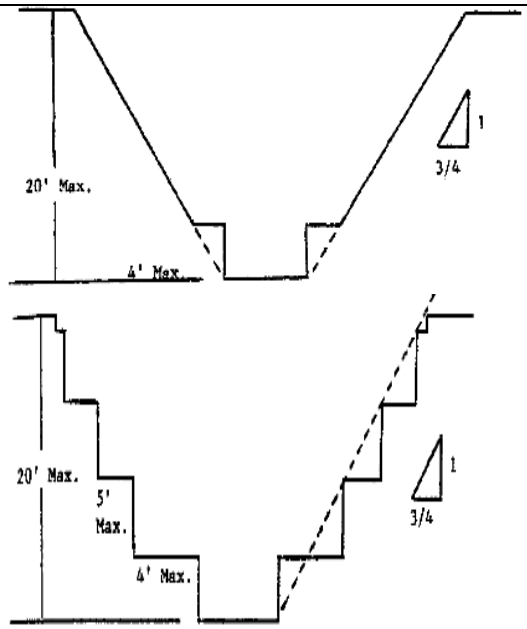
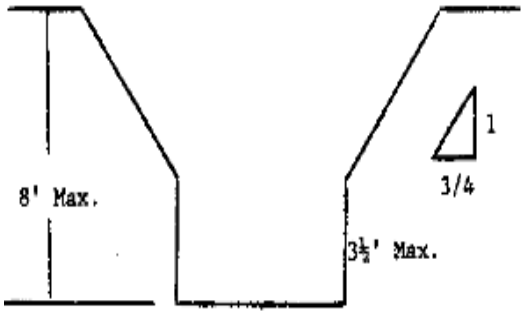
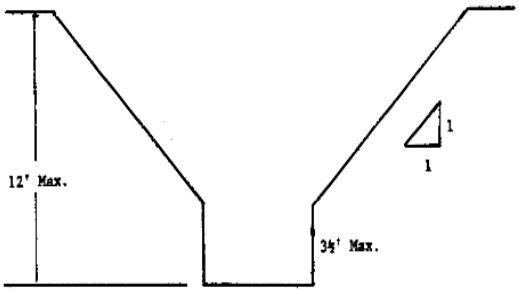
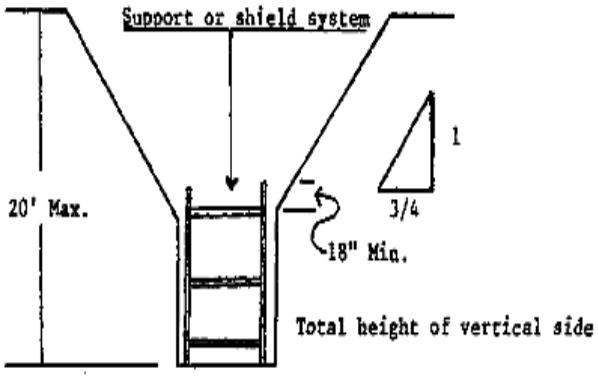
6.3.10 Sloping: For sloping of sides/angle of repose refer Table no1

Table no -1

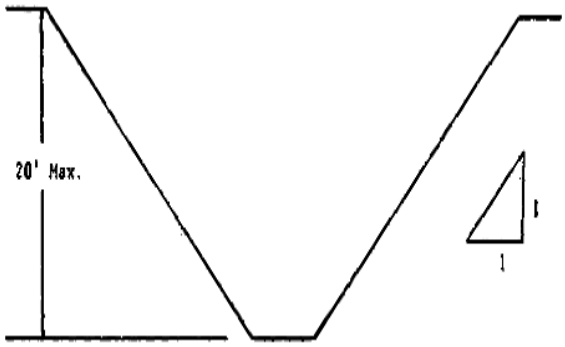
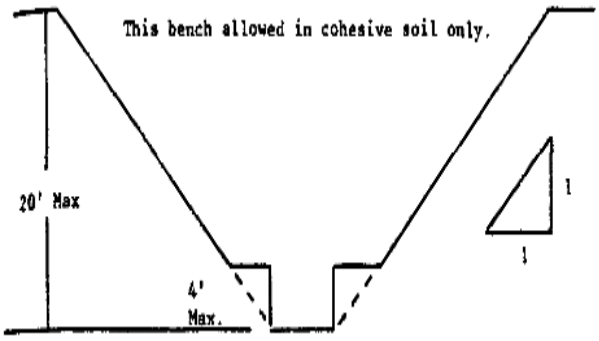
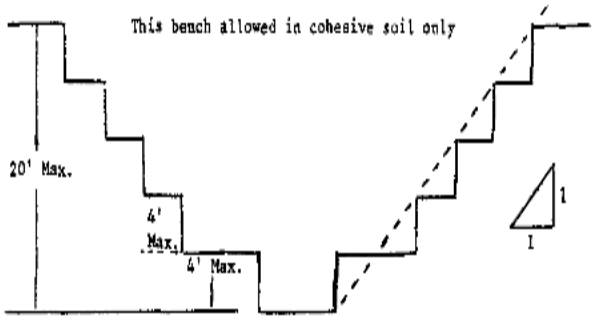
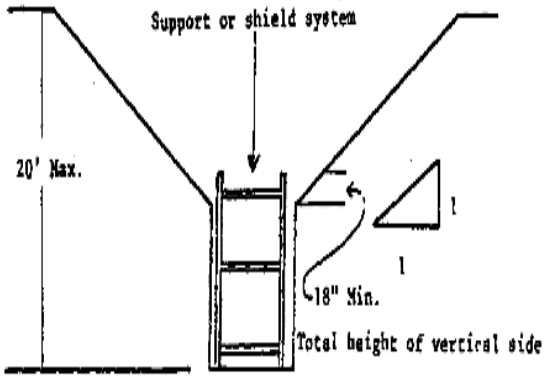
Soil or Rock Type	Type of strata	Soil bearing capacity in T/m^2	Maximum Slope (H:V)	Maximum Slope (Degrees)
Stable Rock	Solid rock, Shale or cemented	45 to 90	Vertical	90
Type A	Soft and hard murrum	20 to 45	0.75:1	53
Type B	Clay and cohesive soil	15 to 20	1:1	45
Type C	Sandy soil, broken rock, gravel and Black cotton soil	0 to 15	1.5:1	34
	Loose sand	0 to 4	2:1	26

Excavations made in type A Soil

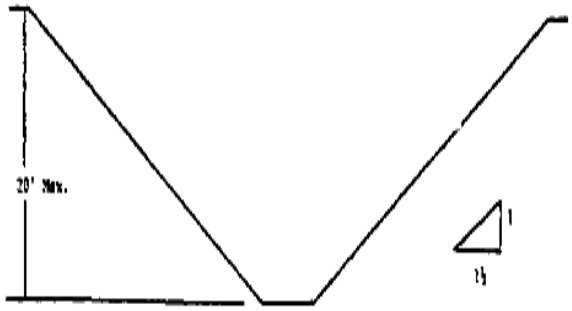
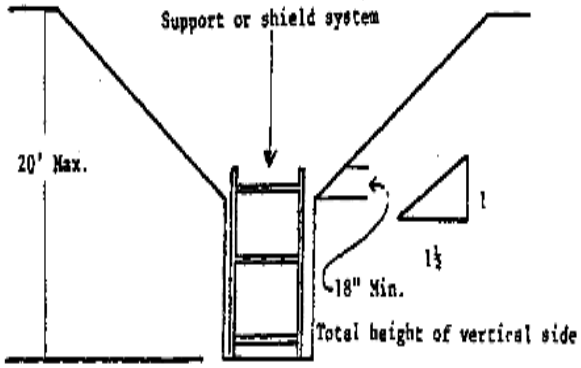
All simple slope excavations 20 feet (6Mt) or less in depth will have a maximum allowable slope of 3/4:1.	

All benched excavations 20 feet (6Mt) or less in depth will have a maximum allowable slope of 3/4 to 1 and maximum bench dimensions as indicated.	
All excavations 8 feet (2.5Mt) or less in depth which have unsupported vertically sided lower portions will have a maximum vertical side of 3 1/2 feet (1.1Mt).	
All excavations more than 8 feet (2.5Mt) but not more than 12 feet (4.5Mt) in depth with unsupported vertically sided lower portions will have a maximum allowable slope of 1:1 and a maximum vertical side of 3 1/2 feet (1.1Mt).	
All excavations 20 feet (6Mt) or less in depth which have vertically sided lower portions that are supported or shielded will have a maximum allowable slope of 3/4:1. The support or shield system shall extend at least 18 inches (0.5Mt) above the top of the vertical side.	

Excavations Made in Type B Soil

All simple slope excavations 20 feet (6Mt) or less in depth will have a maximum allowable slope of 1:1.	
All benched excavations 20 feet (6Mt) or less in depth will have a maximum allowable slope of 1:1 and maximum bench dimensions as indicated.	 
All excavations 20 feet (6Mt) or less in depth which have vertically sided lower portions will be shielded or supported to a height at least 18 inches (0.5Mt) above the top of the vertical side. All such excavations will have a maximum allowable slope of 1:1.	

Excavations Made in Type C Soil

All simple slope excavations 20 feet (6Mt) or less in depth will have a maximum allowable slope of 1 1/2:1.	
All excavations 20 feet (6Mt) or less in depth which have vertically sided lower portions will be shielded or supported to a height at least 18 inches above the top of the vertical side. All such excavations will have a maximum allowable slope of 1 1/2:1.	

6.4 Road /Gate Crossing

6.4.1 Identify the locations along the route where pipes are to be laid.
6.4.2 Check the number of pipes to be laid as per requirement
6.4.3 Excavate trial pits on either end of crossing and check for obstructions, Cable avoidance tool shall be used for detecting any underground utilities before starting the job.
6.4.4 Excavate the road manually , carry out temporary backfilling with gunny bags.
6.4.5 Excavate the full length of the road/gate where road can be closed.
6.4.6 Excavate in phases where traffic cannot be stopped.
6.4.7 Transport and place MS plates if required across the excavated trench.
6.4.8 Transport the HDPE pipes and RCC protection tiles to site after making necessary reservations.
6.4.9 Remove the gunny bags and lay the HDPE pipes in the excavated area in a straight line either in single operation or in phases depending on traffic and other site conditions. Ensure that pipes are laid in a straight line with proper insertion of tail of pipe in the collor end of next pipe.
6.4.10 Place RCC tiles above the HDPE pipes after proper levelling with sand filling in gaps between two pipes
6.4.11 Backfill the trench above the RCC protection tile level and consolidate.

6.5 Backfilling

1. Place signage keep out before starting of backfilling operation

2. Barricading to be provided in the area of backfilling operation
3. Get approved from engineer in-charge before start of backfill activity.
4. Proper Compaction of backfill shall be ensured as per the specifications provided by the engineer in-charge to avoid cave in of road after backfill operation.
5. Backfilling operation shall not disturb existing underground utilities.
6. Creation of dust and dispersion shall be minimized during backfill operation.

7. RECORDS :

7.1. Daily progress report.

7.2 Submission of Work Completion report to local authority /GOvt authority after job completion.

7.2. Filled Excavation Checklist.

7.3. records to be kept for minimum period of 3 years or as per IMS document requirement.

8. TRAINING & COMMUNICATION

8.1. Training of this procedure shall be covered as per Safety Training need identified across divisions.

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

9. VERIFICATION

9.1. Verification of implementation shall be done during Safety audit, field safety visit and site inspections.

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

11. REFERENCES

- National Building Code of India -2005; Part 7 – Construction Practices and safety
- Tata Power Confined Space entry procedure - TPSMS/CSP/CSE/003
- Tata Power Permit To Work Procedure - TPSMS/CSP/PTW/008
- Work Instruction for Taking trial pits, excavation & backfilling of cable trenches EPM/ 10.05.03/WI-019/DC
- Trenching guidelines of MCGM
- Trenching Guidelines of PWD

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-Sample Format for Excavation Checklist

(TPSMS/CSP/EXS/002/FORM/001)

Annexure -2-Trench shoring –Minimum requirements

Annexure-1

TPSMS/CSP/EXS/002/FORM/001

EXCAVATION CHECKLIST

Site Name: _____ **DATE:** _____

Work Permit NO.

1. Description of work : Excavation/Piling /Road Cutting
   (Delete whichever not applicable)
2. Location/Area of the work : _____
   (Attach Drawing/sketch etc.) (Co-ordinates: _____
3. Size of the Excavation : Length_____ Breadth_____ Depth___
4. Date and Time of starting the work: Date_____Time_____

5. Expected duration of the work : _____ _ _ Days/Hours
6. Purpose of excavation : _____
7. Name of the acceptor : _____
8. Contractor's Name : _____

Clearances for Excavation - Check List

Sr. no	Type of Clearance		Description	Clearance Given by		
				Name	Sign	Date
1	Electrical Cables	a	Do not exist			
		b	Exist just below			
		c	Existing within 2 meters			
		d	Not known			
2	Fire Water pipeline	a	Do not exist			
		b	Exist just below			
		c	Existing within 2 meters			
		d	Not known			
3	Utilities pipeline	a	Do not exist			
		b	Exist just below			
		c	Existing within 2 meters			
		d	Not known			

Sr no.	Type of Clearance		Description	Clearance Given by		
				Name	Sign	Date
4	Telephone cables	a	Do not exist			
		b	Exist just below			
		c	Existing within 2 meters			
		d	Not known			
5	IT cables	a	Do not exist			
		b	Exist just below			
		c	Existing within 2 meters			
		d	Not known			
6	Control / inst. cables	a	Do not exist			
		b	Exist just below			
		c	Existing within 2 meters			
		d	Not known			
7	Plant pipelines	a	Do not exist			
		b	Exist just below			
		c	Existing within 2 meters			
		d	Not known			
8	Other clearances (specify)	a	Do not exist			
		b	Exist just below			
		c	Existing within 2 meters			
		d	Not known			

Following Precautions taken by acceptor

Road Barricading done	Yes	☐	Not required	☐
Warning signs incl. Light signal provided	Yes	☐	Not required	☐
Barrication of excavated area carried out	Yes	☐	Not required	☐
Shoring carried	Yes	☐	Not required	☐
Alternate route for traffic is as below or attached	Yes		Not required	
In case of road blockage, SI/PM is informed	Yes	☐	Not required	☐
Any other precautions taken (specify)	Yes	☐	Not required	☐
		☐		☐

Remarks (if any) :

Check by:

Signature & Name :

Annexure -2

Trench shoring – Minimum Requirements

		Size and spacing of members										
		Uprights		Stringers		Cross Braces						
						Width of trench					Maximum spacing	
Depth of trench	Kind of condition of earth	Minimum dimension	Maximum spacing	Minimum dimension	Maximum spacing	Up to 3 Ft	3 to 6 Ft	6 to 9 Ft	9 to 12 Ft	12 to 15 Ft	Vertical	Horizontal
Ft		In.	Ft.	In.	Ft	In.	In	In.	In.	In.	Ft.	Ft.
5-10	Hard, Compact	3 4 or 2 6	6	-	-	2 6	4 4	4 6	6 6	6 8	4	6
	Likely to crack	3 4 or 2 6	3	4 6	4	2 6	4 4	4 6	6 6	6 8	4	6
	Soft, sandy or filled	3 4 or 2 6	Close sheeting	4 6	4	4 4	4 6	6 6	6 8	8 8	4	6
	Hydrostatic pressure	3 4 or 2 6	Close sheeting	4 6	4	4 4	4 6	6 6	6 8	8 8	4	6
10-15	Hard, Compact	3 4 or 2 6	4	4 6	4	4 4	4 6	6 6	6 8	8 8	4	6
	Likely to crack	3 4 or 2 6	2	4 6	4	4 4	4 6	6 6	6 8	8 8	4	6
	Soft, sandy or filled	3 4 or 2 6	Close sheeting	4 6	4	4 6	6 6	6 8	8 8	8 10	4	6
	Hydrostatic pressure	3 4 or 2 6	Close sheeting	8 10	4	4 6	6 6	6 8	8 8	8 10	4	6
15-20	All kinds of conditions	3 6	Close sheeting	4 12	4	4 12	6 8	8 8	8 10	10 10	4	6

>20	All kinds of conditions	3 6	Close sheeting	6 8	4	4 12	8 8	8 10	10 10	10 12	4	6

Notes:

a. Trench jacks may be used in lieu, or in combination with, cross braces.
b. Shoring is not required in solid rock, hard shale or hard slag.
c. Where desirable, steel sheet piling and bracing of equal strength may be substituted for wood.