SAFETY CHALLENGES IN LAYING GAS PIPELINE INFRASTRUCTURES "PRACTICES AND INITIATIVES"

MAHANAGAR GAS

23rd January 2025

www.mahanagargas.com


MAHANAGAR GAS

MAHANAGAR GAS LIMITED

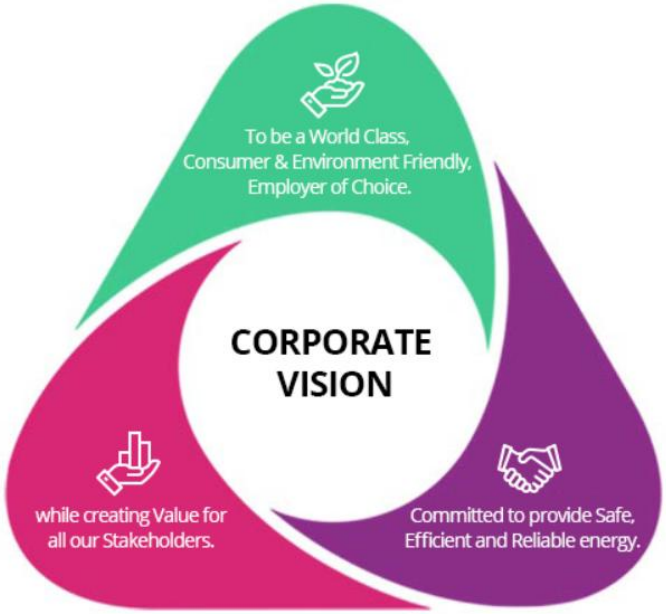
- Mahanagar Gas Limited, (MGL) is one of the India's leading Natural Gas Distribution Company, was incorporated on 8th May 1995. GAIL (India) Limited (Maharatna Company of Govt. of India) is the promoter of MGL.
- 30 Years of Safe & Successful Operation in Mumbai & its Suburban Areas.

ISO 9001 : 2015 ISO 14001 : 2015 ISO 45001 : 2018

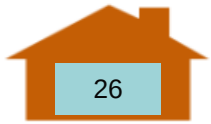
MGL VISION & CORE VALUES

- To be a World Class, Consumer & Environment Friendly, Employer of Choice; committed to provide Safe, Efficient and Reliable energy; while creating Value for all our Stakeholders.

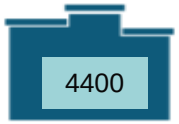
- We believe that "Outstanding Business Performance requires Outstanding Performance in Safety"



MGL CONNECTS TO-



LAKHS HOUSEHOLDS



SMALL COMMERCIAL ESTABLISHMENTS

INDUSTRIAL ESTABLISHMENTS

Above 4 lakhs Rickshaws

Above 0.7 lakhs Taxis

Above 4 lakhs Cars

2450 TMT/MSRTC/NMMT Buses

Above 35600 LCV/Tempo/Trucks/Pvt Buses

MGL NETWORK-

617+ KMS OF STEEL PIPELINE

6560+ KMS OF PE PIPELINE

358 CNG STATIONS HAVING 2168 DISPENSING POINTS

MGL
HSE PRACTICES

SAFETY IN MGL

HSE Management

- Life Saving Rules
- OHSAS 18001,ISO 14001
- COP ,HIRA
- HSE Legal compliance
- Action tracking system
- Safety assurance
- Safety alerts
- Mock Drills

- HSE Policy
- SMG Tours
- Online Incident Reporting
- HSE performance review by Top management
- Online PPE Module
- HSE Rewards

Environment

Environment Day celebration
Sapling Plantation at External Site
MoEF Compliance Reporting
Ambient Air Monitoring
Rainwater Harvesting

Public Safety Awareness

PNG & CNG Customer
Industrial & Commercial Customers
Central & State Authorities
Newspapers & Radio Announcements

- STC(Safety&Technical Competency),
- NO STC NO WORK POLICY
- Safety meetings
- Medical Emergency Mock Drills
- Contractor Safety Forums
- Driving Behaviour Monitoring

LIFE SAVING RULES

Authorization Required

Obtain Authorization before Overriding or Disabling of Safety Critical Equipment

Follow Prescribed Journey Management Plan

Obtain Authorization before Entering a Confined Space

Conduct Gas Tests when required

Work with a Valid Work Permit when required

Ensure Risk Assessment Completed & Controls are in Place before Starting Any Job

Must Do

Verify Isolation before Work begins and Use the Specified Life Protecting Equipment

Protect Yourself against any Untoward Incident at All Places by Ensuring Required PPE Compliance

Protect Yourself against a Fall when Working at Height

Ensure All Safety Compliances while doing Excavation

Ensure Hazards & Near Misses are Reported to Line Manager for Corrective Actions

Wear Your Seat Belt

Must Not Do

Do not Walk/Stand under a Suspended Load

No Alcohol or Drugs while Working or Driving

Do not Smoke in Designated No Smoking Areas

While Driving, Do not Use Your Phone and Do not Exceed Your Speed Limits

HSE AUDITS

Compliance & Continual Improvement

Objective

Identify potential Hazard & Mitigate

Scope

- Operation & Construction
- Stores & Offices
- CNG station
- Terminals

Methodologies

- Standard checklists
- Field visits
- Visual inspections
- Reporting

Deliverables

- Identification of Risks
- Corrective action
- Mitigation Measure

Follow up & Closure

GI

PE

CNG Station

Steel

NON-ROUTINE OPERATIONS

Non-Routine Activity

- High Risk Activities (Construction/Commissioning)
- Hot Tapping
- Diversions

Procedure

- Activity chart
- Contingency plan
- Responsibilities

Review & Approval

- Hazard Identification & Risk Assessment
- Review by Cross Functional Team
- Approval

Site Audit by HSE Team

Execution

- Life Saving Rules Compliances
- HIRA
- Permit to work
- Lock out Tag out

HSE REWARD PROGRAMMES

ON THE SPOT

SAFETY CHAMPION AWARD

MONTHLY

SAFETY CHAMPION AT ZONAL LEVEL

QUARTERLY

REWARD AT THE HANDS OF MD/DMD

ANNUAL BUSINESS PARTNER REWARD

AT THE HANDS OF MD/DMD

UNDERGROUND NETWORK LAYING

SITE CHALLENGES

Crossing of culvert at depth > 4 mtrs

Laying of pipeline amidst cluster of utilities

Narrow Roads

SITE CHALLENGES

Presence of rocky terrain

HT/LT cable at shallow depth

Edge to edge concrete

PRACTICES / CONTROL MEASURES

STEEL PIPELINE LAYING

- Trial Pits and Cable Location Survey.
- Trenching, Frequent checking of Oxygen levels for excavation > 2 mtrs.
- Welding.
- Non-Destructive Testing (NDT).
- Joint coating.
- Lowering.
- Backfilling.
- Hydro Testing.
- Swabbing, Drying and Air Tightness Testing.
- Commissioning.

MDPE PIPELINE LAYING

- Trial Pits and Cable Location Survey
- Trenching.
- Electro Fusion.
- Backfilling.
- Pneumatic testing.
- Commissioning.

COMMON POINTS

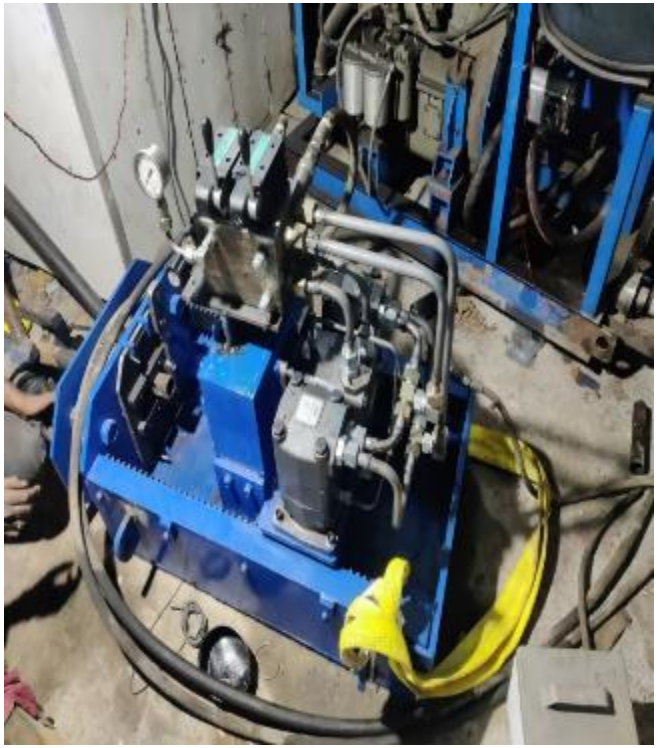
- GPR for trenchless method.
- Intimation to other utilities prior to excavation.
- Shoring shuttering for deep excavations.

INITIATIVES

"Underground pipe laying is primarily carried out through open-cut excavation or, in certain cases, using trenchless methods like Horizontal Directional Drilling (HDD) for areas with constraints such as:
i) Nallah crossings, ii) Road crossings, iii) Concrete roads, iv) Narrow roads, v) Challenging terrains, among others, which are difficult to address with the open-cut approach.

To address these challenges, a mini-HDD machine has been developed. It requires less space, involves shorter drilling paths compared to conventional HDD machines, and effectively overcomes the limitations of the open-cut method.

The mini-HDD machine is compact in size, and its drilling path is guided using a Ground Penetrating Radar (GPR) system."



GI RISER INSTALLATION (WORKING AT HEIGHT)

WORKING AT HEIGHT IN HIGH RISE BUILDINGS

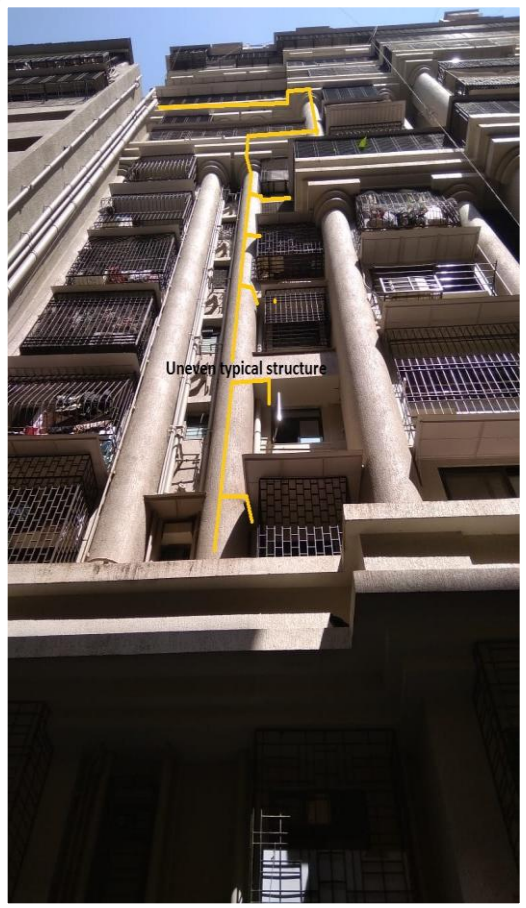
GLIMPSE OF HIGH RISE BUILDINGS IN MUMBAI

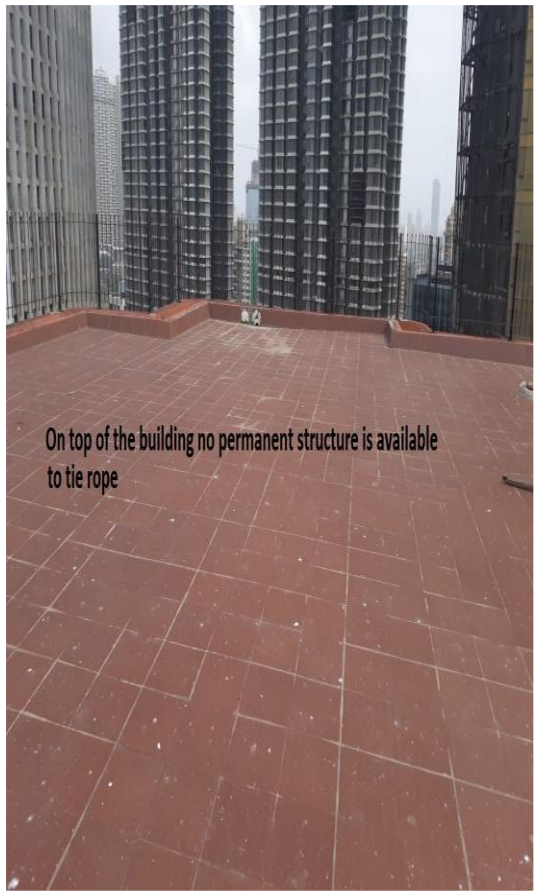
- Palaise Royale Worli- (320m Height and 88 floors) is the tallest building in India.

WORKING AT HEIGHT IN HIGH RISE BUILDINGS-CHALLENGES

1. Non availability of the permanent structure to tie rope.
2. Space constraint (i.e.No space available inside building for riser's fabrication & erection).
3. Uneven & Projected structures of the building.
4. High raised more than 25 storied buildings which required part installation of the risers with welding at height on hanging with Industrial rope.
5. High velocity of the wind in coastal areas like south Mumbai causes oscillation of riser while riser pulling activity.
6. Hanging of plumbers alone for long time on industrial rope access system while installing risers at height.
7. Transportation of material like pipes/fitting and tools at height.
8. Limited access to particular buildings area on personal terrace at top.

TYPICAL HIGH RISE BUILDING CHALLENGES





1. Uneven Projected structure, No permeant structure on top,& no space available for the erection of the riser in building.
2. Shops/stores and other residential structure are close attached to the building.
3. Traffic and public movement on roads and extreme care during working at height.

RISER INSTALLATION METHODS

Rope access system-

Suspended Platform

SOLUTION-Working on Rope Suspended Platform (RSP) :-addressing conventional method challenges

COMPAIRISON OF ROPE ACCESS SYSTEM AND SUSPENDED PLATFORM

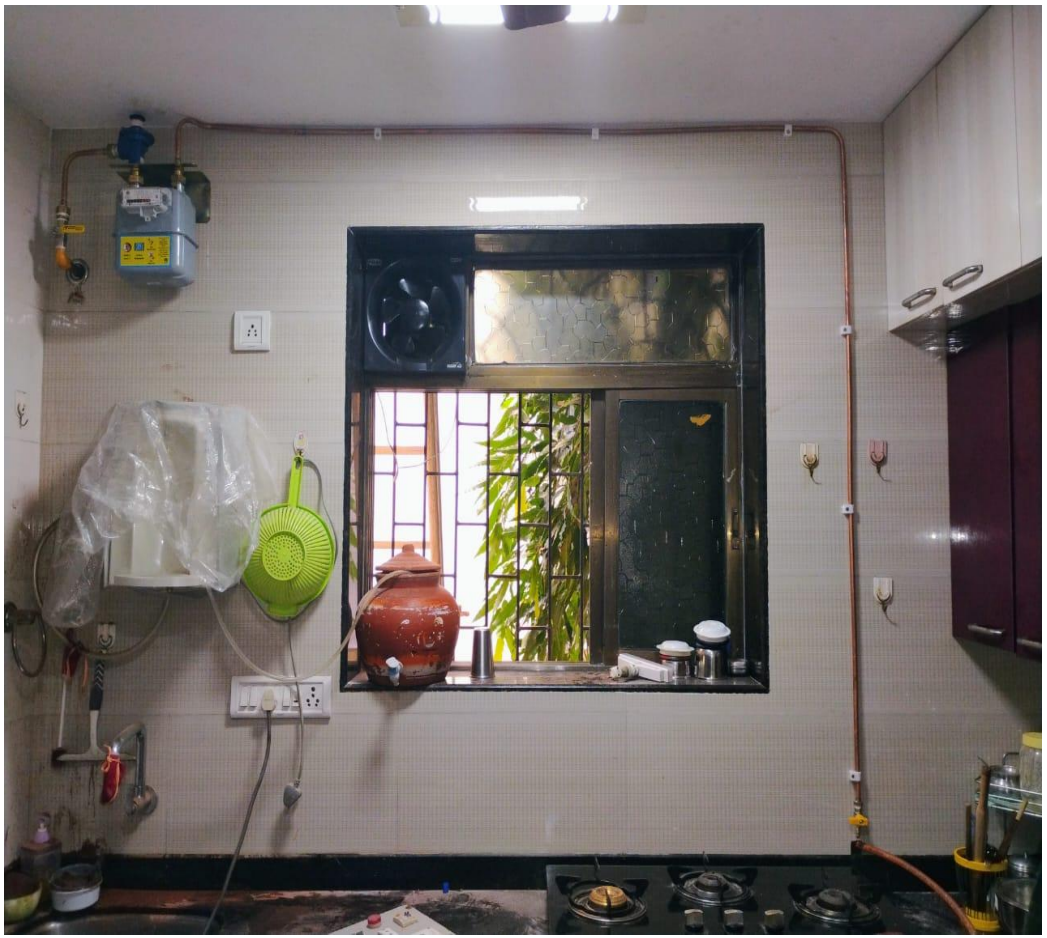
	Rope Access System	Suspended Lift
Installation	Up to 120 m height of the building	Beyond 120 m height of building
	6 to 7 pipes are fabricated on ground and then installation is done	Fabrication is done on location
	Limited use of welding machine at height	Welding machine is carried on the platform
	One person works at height	3 persons (plumber, helper and operator work at height)
	one rope access system is required	3 rope access system required
Time line	One day required for riser installation	2 days for lift installation, 1 day each for inspection, riser installation and testing
Testing	Testing is done on ground before installation.	Testing is done after installation, and leakage is to be rectified at height
Safety	1. First line is working line & Second line is safety line. 2. In case of failure fall arrestor will be activated.	1. Lift operator training is done by DISH approved agency. Card validity is of 6 months. 2. Lift inspection is done by DISH approved agency and Form 11 is issued which is valid for six months. Form 11 is valid for 6 months at a single location. For every location change fresh inspection is required. 3. For each person on the lift one rope access system is used for emergency rescue. In case of failure of cradle emergency lock system is activated

SAFETY FEATURES & KEY ADVANTAGES OF ROPE SUSPENDED PLATFORM

- Fit For Use certificate :- Form 11
- Safety features like electromagnetic brakes, limit switches, manual release safety lock and self-rescue possible etc ,
- Mitigates risk of falling object.
- Stability & can work during high wind speed.
- Heavy load carrying capacity . (i.e. Plumber and Helper & required equipment's like welding machine, grinding machine, wrench etc)
- Risers and lateral at same time & testing in parts is possible.
- Extended working hours with lightning arrangements.
- Ease in Erection with safety and quality .

INSIDE KITCHEN METER COPPER INSTALLATION

INSIDE KITCHEN INSTALLATION



Inside kitchen Meter Installation with Copper tube

Risks Involved in the Installation of Copper Tubes

1.Material Damage:

Copper tubes can be easily dented or deformed during handling, leading to reduced efficiency or the need for replacement.

2. Corrosion Risk:

Improper installation can expose tubes to conditions that accelerate corrosion.

3. Leaking Joints:

Poorly fitted or soldered joints may result in leaks, compromising the system's functionality.

4.**Flash fire:**

Risk of flash fire during soldering work.

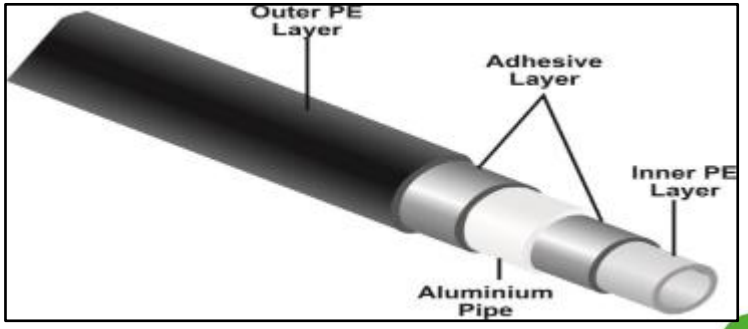
INSIDE KITCHEN INSTALLATION-MITIGATION MEASURE

Inside kitchen Meter Installation with MLC Pipe

USE OF MULTI LAYER COMPOSITE PIPE

Advantages over Copper tube

- Increased safety, as no requirement of flame for jointing.
- Increased productivity.
- Significantly lower requirement of space for storage and more ease of handling, thereby reduction of associated cost.
- Longer service life due to no corrosion and chemically inert.
- Increased aesthetic appearance of the pipes for longer periods of time
- Higher strength of the pipe.



PROCESS IMPROVEMENTS

WORKING AT HEIGHT	CONVENTIONAL JHULLA	1. ROPE ACCESS SYSTEM UPTO 40 FLOORS 2. CRADDLE FOR BEYOND 40 FLOORS
USE OF COPPER TUBE (INSIDE KITCHEN)	SOLDERING WORK	MULTI LAYER COMPOSITE PIPE
WORK PERMITS	MANUAL	APPLICATION BASED-ONLINE PERMITS
ELECTRICAL SAFETY	EARTH LEAKAGE CIRCUIT BREAKER (ELCB)	RESIDUAL CURRENT CIRCUIT BREAKER RCCB
THREAD JOINT SEALANTS	POLY TETRA FLUORO ETHYLENE -TEFLON (PTFE)	PIPE SEALING CORD LOCTITE 55
METER COPPER JOB (INSIDE KITCHEN)	NO MONITORING OF GAS	MONITORING THROUGH GAS DETECTOR AT INTERVALS AND RECORDING THE SAME

Thank You...

MAHANAGAR GAS

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