1. Machine Overview

Machine Name: M-TBM (Mobile Tunnel Boring Machine)

Application: Internal pipeline cleaning, descaling, debris removal, and high-risk confined pipeline operations

Operating Environment: Industrial pipelines, confined and hazardous zones

Deployment Type: Insert-and-operate (no pipeline dismantling)

The M-TBM is a wireless, DC-powered, remotely operated pipeline maintenance machine designed to eliminate manual entry into large-diameter pipelines. The system enables internal cleaning and cutting operations while maintaining operator safety and reducing downtime.

2. Pipeline Compatibility

Minimum Pipe Diameter: 900 mm

Maximum Pipe Diameter: 1600 mm

Current Operational Configuration:

Fully equipped for 1200 mm diameter pipelines

Expandable Design:

Outer shell, leg branches, linear actuators, and wire-rope layout can be reconfigured for other diameters

3. Mobility & Drive System

Drive Type: Chain-driven wheel system

Wheel Configuration:

Wheels mounted on either side

Both wheels share a common shaft

Transmission:

Chain and sprocket system on both sides

Motor Type: DC geared motor

Traversing Speed:

Up to 1 km/hour (application dependent)

4. Support & Load-Bearing Structure

Central Load-Bearing Leg:

Mounted on bearings

Allows free sliding when actuators are retracted

Linear Actuators:

Control radial expansion and anchoring

Enable firm positioning inside the pipe

Outer Shell:

Liftable enclosure

Machine can be placed inside shell and lowered directly into the pipeline

5. Cutting & Cleaning System

Cutting Method: Wire-rope based cleaning and cutting

Front Shaft:

Equipped with wire ropes configured for 1200 mm pipes

Cutting Shaft Speed:

Up to 5000 RPM

Contact: Adarsh Gautam (Founder & MD) — adarshgautam4455@gmail.com
JAMSHEDPUR 831001 --- +91 6204488701

Application:
Scale removal
Sediment and buildup cleaning
Internal pipe surface conditioning

6. Water Management System
Water Input:
Accepts industrial fire hydrant hose at rear end
Water Flow Distribution:
Primary Exhaust:
1-inch diameter outlet
Water turns left and exits at rear
Acts as major drainage path
Secondary Exhaust:
1/2-inch diameter outlet
Water moves forward briefly, turns right, exits at rear
Additional drainage support
Cutting Water Supply:
Remaining water enters an aluminium distribution block
Six outlets (1/4 inch each)
Water flows through 6–10 mm tubes
Directed towards wire ropes for:
Cooling
Debris flushing
Dust suppression

7. Power & Control
Power Source:
DC powered (battery operated)
External Power Requirement:
None
Control Type:
Wireless remote operation
Advantages:
No trailing power cables
Suitable for wet and hazardous environments

8. Vision & Monitoring
Onboard Camera:
Real-time internal pipe monitoring
Lighting System:
Integrated high-intensity lights
Enables clear visibility in dark pipelines

Contact: Adarsh Gautam (Founder & MD) — adarshgautam4455@gmail.com
JAMSHEDPUR 831001 --- +91 6204488701

9. Safety & Operational Advantages

Eliminates manual entry into confined pipelines

No need for:

Pipeline dismantling

Cutting and re-welding

Extended shutdowns

Reduces exposure to:

Toxic gases

Heat

Water-filled sections

Mechanical hazards

10. Deployment & Retrieval

Machine can be:

Lowered directly into pipe using outer shell

Retrieved by reversing drive or external pulling support

Designed for fast deployment and extraction

11. Proven Field Validation

Successful Trials Conducted At:

TATA Steel – Kalinganagar

Evidence Available:

Working videos

Official work order

Current Model:

Improved and more capable than trial version

12. Target Industries

Steel plants

Thermal power plants

Cement plants

Oil & gas facilities

Mining slurry and process pipelines

Industrial utilities and maintenance contractors

13. Development Status

System design: Complete

Mechanical build: Complete

Electrical & control systems: Operational

Documentation: Complete

Ready for industrial demonstrations

Manufacturer

GRASS ENGG.

(Engineering solutions focused on safety, automation, and indigenous development)

Contact: Adarsh Gautam (Founder & MD) — adarshgautam4455@gmail.com
JAMSHEDPUR 831001 --- +91 6204488701