



TRENCHLESS TECHNOLOGY

Saurabh Gonnade¹, Rushikesh Jagtap², Radhe Gulhane³, Yogesh Borkar⁴¹Student, Civil Engineering, J.D.I.E.T, Yavatmal (M.S), India, saurabhashokgonnade@email.com²Student, Civil Engineering, J.D.I.E.T, Yavatmal (M.S), India, rushikeshjagtap111@email.com³Student, Civil Engineering, J.D.I.E.T, Yavatmal (M.S), India, radhegulhane967@email.com⁴Assistant Professor, Civil Engineering, J.D.I.E.T, Yavatmal (M.S), India, yogesh_borkar71@gmail.com

ABSTRACT

Trenchless technology is the science of installing, repairing and renewing underground pipes ducts and cables using techniques which minimize or eliminate the need of excavation. It can reduce environmental damage, social cost and produce in alternative to open trench method of installation, renewal and repair it includes in, development of all kinds of underground napping techniques, tunneling devices and specialist material and equipment.

Keywords: -tunneling, installation, canals pipe, ducts pipes, renewing.

1. WHAT IS TRENCHLESS TECHNOLOGY/ INTRODUCTION?



Fig.1 Trenchless Technology

- Trenchless technology is a basically making a tunnel below the surface and staling service like water or gas pipes, electric or telecommunication cables etc. without any disruption to the public. It also makes it possible to install the utilities under river canals and other obstacles with no disruption of flow and with minimum or no damage to the environment.
- Excavation is not necessary between access points.
- Require less space underground, minimizing chances of interfering with existing utilities or abandoned pipes.
- Are generally quiet and nondestructive.
- Require less expose working area and therefore safer for both workers& community.

1.1 INDIAN HISTORY FOR TRENCHLESS TECHNOLOGY

- Trenchless technology has been around for may decades.
- FIRST PROJECT IS OF 3.5 KM In 1998 ,

Mumbai.

- In Cuttack 10 km is constructed for sewer using trenchless method.
- Other projects are less than 8km is completed in Goa, Hyderabad, Kolkata, Delhi, Assam etc.
- A total of around 100km is build so far using trenchless method so far.

2. ONGOING PROJECTS :



Fig.2 Interceptor sewer on Yamuna river

- 59 Km of interceptor sewer along 3 major drains for reduction of pollution in Yamuna River at New Delhi.

2.1 TRENCHLESS TECHNOLOGY IN INDIA :

- **DIRECTIONAL DRILLING**
- **RAMMING**
- **MOLING**
- **AUGER BORING**

2.1.1 DIRECTIONAL DRILLING:



Fig.5 Directional Drilling

Directional Drilling involves steerable tunneling systems for both small and diameter lines. The first step consist of drilling a small diameter pilot hole along the desired centre line of a proposed line of a proposed line and in the second stage , the pilot hole is enlarged to the desired diameter to accommodate the utility line and to pull the utility line through the enlarged hole.

2.1.2 RAMMING



Fig.3 Ramming

In this method, the pipe is rammed through the soil by using a device attached to the end of the pipe to drive the pipe through the soil. In this method the tool does not create a borehole. It acts as a hammer to drive the pipe through the soil. When the ramming pipe, the leading edge cuts a borehole, the soil enters the pipe and is compacted as it is being forced to the rear of the pipe.

2.1.3 MOLING

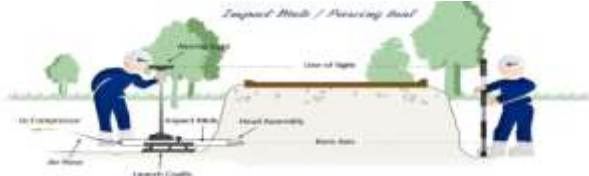


Fig.4 Moling

Moling is the method, which forms a borehole by compressing the earth that immediately surrounds the compacting device which is an underground mole is propelled by a power source. The tool is streamline into bullet or shape. The method is restricted to relatively small diameter lines in compressible soil conditions.

2.1.4 AUGER BORING:

AUGUR BORING



Fig.6 Augur Boring

The auger horizontal earth boring is a process of simultaneously jacking casing through the earth while removing the spoil inside the casing by means of a rotating flight auger. The auger is a flighted tube having dual functions, firstly it has couplings at each ends that transmit torque to the the cutting head from the power source located in the bore pit and secondly, it serves to transfer spoil back to the machine.

3 HOW TRENCHLESS TRENCHLESS TECHNOLOGY IS BETTER THAN OPEN TRENCH METHOD? / WHY SHOULD WE MAKE THE SWITCH TO TRENCHLESS TECHNOLOGY?

In traditional method, i.e.opens trench method, laying the utility lines below the earth surface. In present days, there are so many disadvantages and difficulties have to face are as follows :

• **TRAFFIC**

As the open trench is going to create obstruction roads, busy areas, diversions have to be provided before start of any digging word.

As the obstruction is created, the traffic has to be rerouted causing traffic jams.

• **COSTING**

Trenchless technology is cost-effective. In many cases the cost of trenchless technology is less then just open trench method.

When any community road is dug up, the many amount of fuel is wasted with potential for accidents and building damage. The trenchless technology is helps to minimize the waste and damage caused by excavating trenches.

• **DIGITAL**

By the help of Trenchless Technology, we able to see if and where there are problems in your pipe structure by Sonar Sewer Profiling, Virtual CCTV Pipe Inspection, & Laser Scanning Capabilities. So we can take an action for that.

✓ Sonar Sewer Profiling helps to know the volume measurement that can be used by Engineers or Contractors to accurately prepare scopes of work for procurement of sewer pipe cleaning and helps to avoid costly time and material cost.

- ✓ Laser Scanning measure the pipe loss within the pipe and can be conducted while the line in service.
- ✓ Robots of Trenchless Technology can identify and log levels of hydrogen sulphide in the range of 0-220 ppm.

APPLICATIONS

- Transportation of oil, gas & energy
- Storm water.
- Telecommunications
- Wastewater removed out.
- Water transportation.

ADVANTAGES

- It reduces damage of valuable surface.
- It reduces the danger of improperly compacted excavations.
- It saves resources.
- It is accident free.
- It avoids traffic jams.
- It saves underground space.
- It reduces the impact on the environment.
- It provides the hassle-free road surface.

DISADVANTAGES

- Special equipment is required
- Very high degree of operation skill is required.
- As the cost of equipment and the operation are high, bore length should be sufficient in order for it to be

economical.

- Mainly steel pipe is being installed by the method.

4 CONCLUSION:

By adopting this technology we can successfully implement pipes under the surfaces without making any disruptions to the environment and public.

With all around development in various fields like petrochemicals where conveyance of gas, crude and refined products over long distances is common, telecommunication and power, water supply and sewerage etc. and that lines are necessarily laid underground leaving space above surface comparatively free. i.e. Adoption of trenchless technology is only remedy.

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