TOPIC – TUNNELS

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WHAT IS TUNNEL?

- A tunnel is an underground passageway, dug through the surrounding soil/earth/rock and enclosed except for entrance and exit, commonly at each end. ... A tunnel may be for foot or vehicular road traffic, for rail traffic, or for a canal. The central portions of a rapid transit network are usually in the tunnel.

TYPES OF TUNNELS

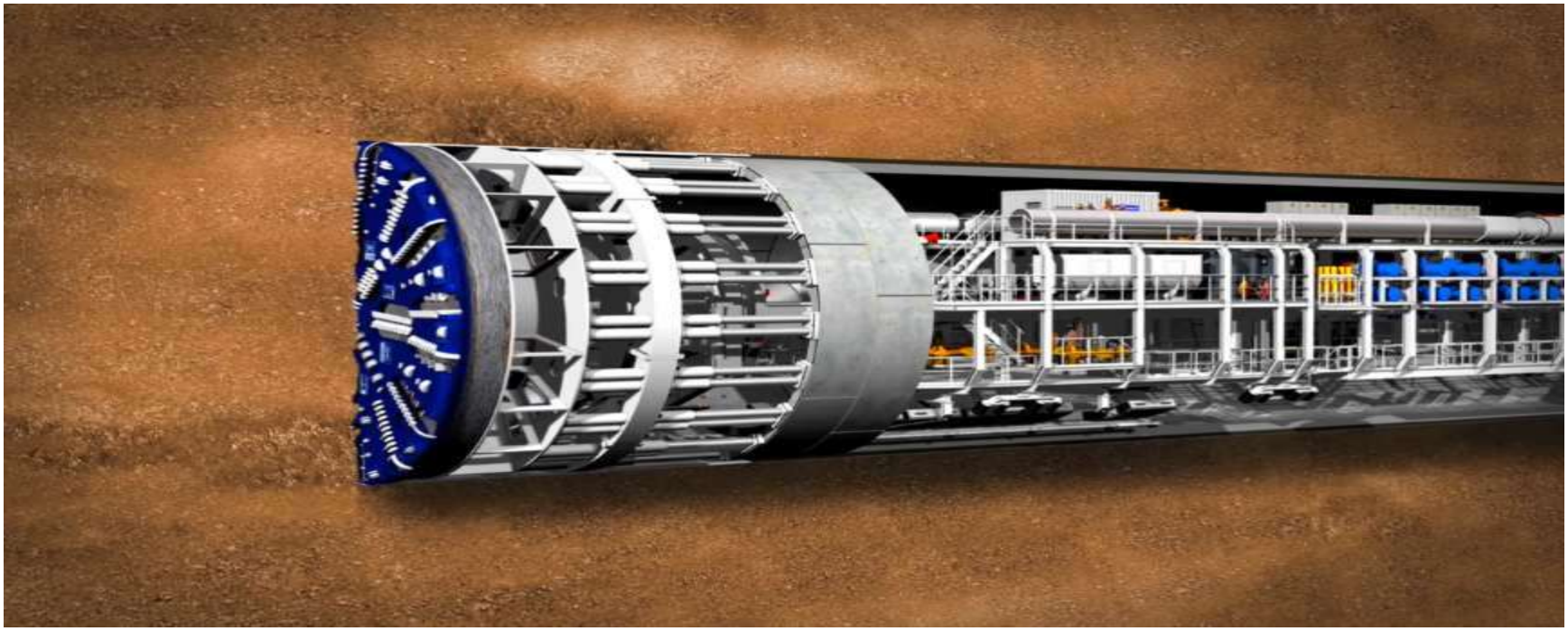
- There are three basic types of tunnel construction in common use:
- Cut-and-cover tunnel, constructed in a shallow trench and then covered over.
- Bored tunnel, constructed in situ, without removing the ground above.
- Immersed tube tunnel, sunk into a body of water and laid on or buried just under its bed

1.) CUT AND COVER TUNNEL

- Cut-and-cover is the oldest method of tunneling. The basic concept involves the digging of a trench, the construction of a tunnel, and then returning the surface to its original state. As such, it is a disruptive technique, but it is also usually the most economical construction method

2.) BORED TUNNEL

- The bore construction method for tunnels involves digging a tube-like passage through the earth. This usually refers to mountain tunneling, however it has also been used for tunneling under bodies of water. ... Once a certain distance has been excavated (roughly 1.5-2 meters), a new tunnel ring is built using the erector



TUNNEL BORING MACHINE

- A tunnel boring machine, also known as a "mole", is a machine used to excavate tunnels with a circular cross section through a variety of soil and rock strata. They may also be used for microtunneling. They can be designed to bore through anything from hard rock to sand.

HOW DOES A TUNNEL BORING MACHINE WORKS?

- With its rotating cutting wheel, the tunneling machine breaks the material from the tunnel phase. ... The material is then transferred to the belt conveyer system in the rear of the shield via a screw conveyer while the hydraulic cylinders press the machine forward continuously.

3.) IMMERSED TUBE TUNNEL

- The immersed tunnel (or immersed tube) is a tunnel construction method commonly used for crossing a body of shallow water. ... They mainly serve as road or rail tunnels, but immersed tunnels are also used for water supply and electric cables.

*CLASSIFICATION OF TUNNEL ACCORDING TO THEIR SHAPE

- A) Circular Shaped Tunnels:-This Type Of Tunnels Strong In Order To Resistance To External Pressure Caused By Water, Soil and Ground.Circular Shape Tunnels Not Suitable For Railways, And Highway Transportation Mainly Used For Sewage Lines.

D SHAPED TUNNELS

- Where The Risk Of Failure Or Collapse Caused By External Pressure From Water Or Loose Unstable Soil Conditions On Tunnel Lining Is Non-Existent, These Types Of Tunnel Roof Also Called Segmented Roof Takes Up All The Load And Distributes It To The Straight Walls.

HORSE SHOE TUNNELS

- Horse Shoe Tunnels Can With Stand Internal And External Pressures, Having Semi-Circular Rood With arch Sides, Commonly Uses For Railway And Roadways.

ELLIPTICAL TUNNELS

- The smaller Cross Section At The Bottom Maintain Flow At The Required Self Cleaning Velocity, They Used In Grounds Compare To Rocks And These Tunnels Serve As Water Sewage Conditions.Elliptical Tunnels Difficult To Construct

RECTANGULAR TUNNELS

- Rectangular Tunnels Suitable For Hard Rock Sites And Mainly Uses For Pedestrian Passage, But This Type Of Tunnels Are Costly.

EGG SHAPED TUNNEL

- Egg Shaped Tunnels Suitable For Sewage Lines As They Have Self Cleaning Velocity In Dry Weather, Egg Shaped Tunnels Can Resist External As Well As Internal Pressure.

CLASSIFICATION OF TUNNELS ACCORDING TO TYPES OF MATERIALS

- A) Tunnels In Hard Rock:-
  Tunneling Through Hard Rock Almost Always Involves Blasting

B) Tunnels In Soft Ground:-

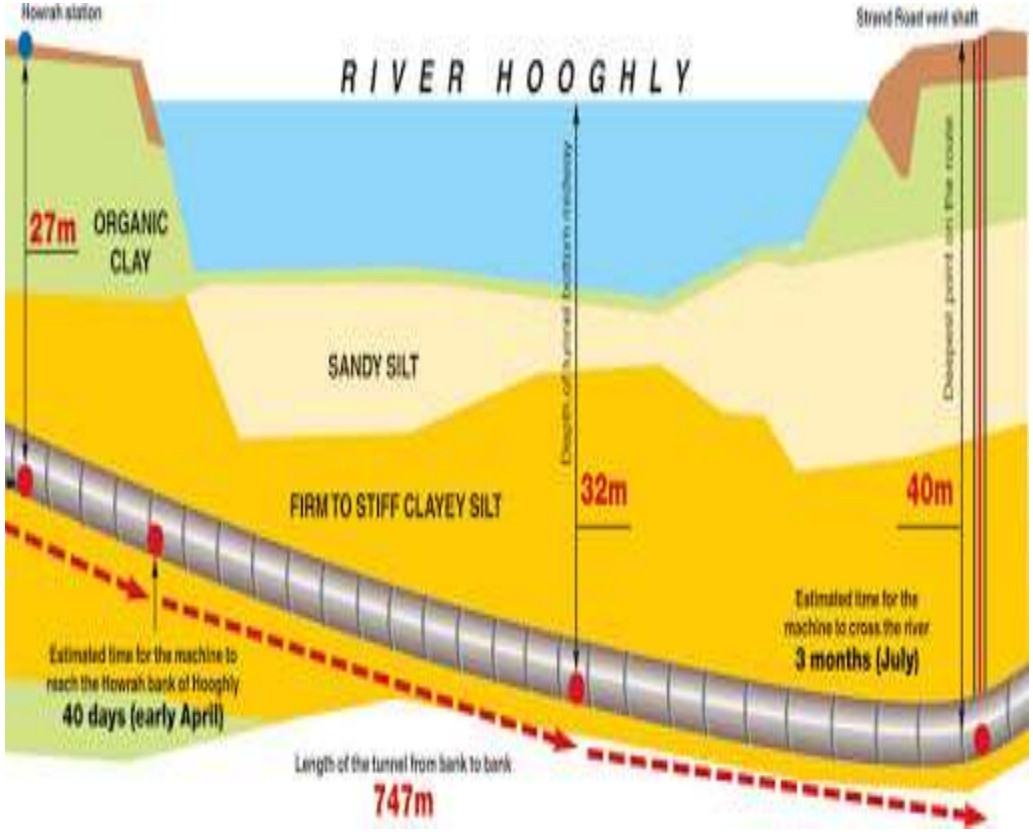
A Tunnel Built In Soft Ground Such As Clay, Silt, Sand, Gravel, Or Mud Requires Specialized Techniques Compared To Hard Rock.

Tunnels In Open Cuts:

- A Tunnel Constructed By Excavating A Trench From The Surface, Building The Structure Within The Trench, And Then Backfilling To Restore The Surface

D) Tunnels Underneath River Bed:-

- Tunnel Constructed Under River Bed Required Special Technique’s



TUNNELS ON THE BASIS OF THEIR PURPOSES

- TRAFFIC TUNNELS
- HYDROPOWER TUNNELS
- PUBLIC UTILITY TUNNEL

TRAFFIC TUNNELS

- tunnel built at the intersection of heavily traveled urban traffic arteries to allow various types of vehicles to cross the intersection at different levels (see). ... Traffic tunnels are constructed at a shallow depth and most often in open trenches

PUBLIC UTILITY TUNNELS

- A utility Tunnel, utility corridor, or utilidor is a passage built underground or above ground to carry utility lines such as electricity, steam, water supply pipes, and sewer pipes. Communications utilities like fiber optics, cable television, and telephone cables are also sometimes carried

ADVANTAGES OF TUNNEL

- The surface life or ground activities like transportation are not disturbed when tunneling is undergone.
- The method ensures high-speed construction with low power consumption.
- Tunnels allow rapid and unobstructed transport facilities in big congested cities.
- Tunnels protect the system(Railway track, Highway etc) for which it is constructed from weather effects such as snow, rain etc thus tunnels reduce the maintenance cost of the system .
- It diverts water for Power generation .

DISADVANTAGES OF TUNNELS

- The initial cost of tunnel construction is more.
- Tunnel construction requires high skilled labour and technical supervision of high order.
- The construction duration of tunnels is more than Bridges or Open cuts .
- It has adverse effect on Environment such as Air Pollution , Ground water Pollution , increasing noise , Traffic Problems and Earthquake etc .
- It increases Land sliding Possibility

- Which is India’s longest Tunnel?

- Dr. Sayma Prasad Mookerjee

- It is a Road Tunnel in J&K, India and is constructed on NH44.
- It is not only India’s longest Highway Tunnel but also Asia’s Bi-directional Highway Tunnel.
- It is 9.28 km long long and the country’s first tunnel with a fully integrated tunnel control system .

Q)WHICH IS WORLD'S LONGEST TUNNEL?

- The Gotthard Base Tunnel

- It is the longest Railway Tunnel in the World with a geodetic distance of 55.782kM.
- It is in Switzerland and is world's longest as well as Deepest Tunnel.

- THANK YOU