

TUNNELING

TECHNIQUES

ARASHPREET SINGH (2014011)

ARSHDEEP KAUR (2014012)

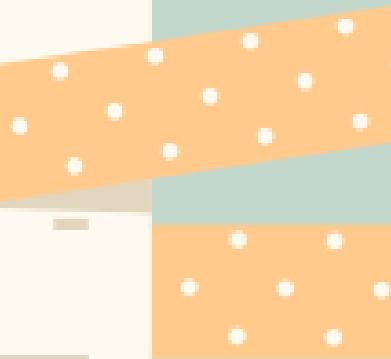
ARSHDEEP SINGH(2014013)

ASHISH RANJAN (2014014)





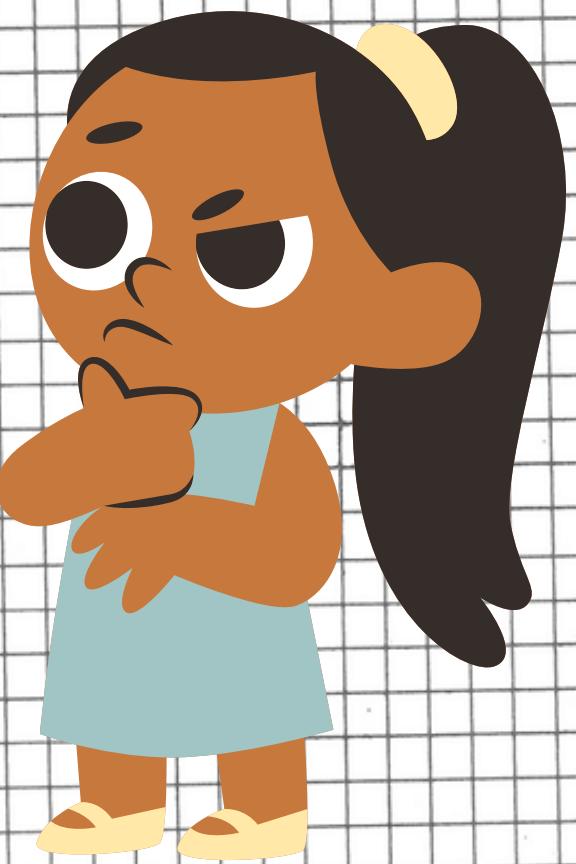
- What are tunnels?
- Requirements
- Purposes
- Methods
- Questions



WHAT ARE TUNNEL'S?

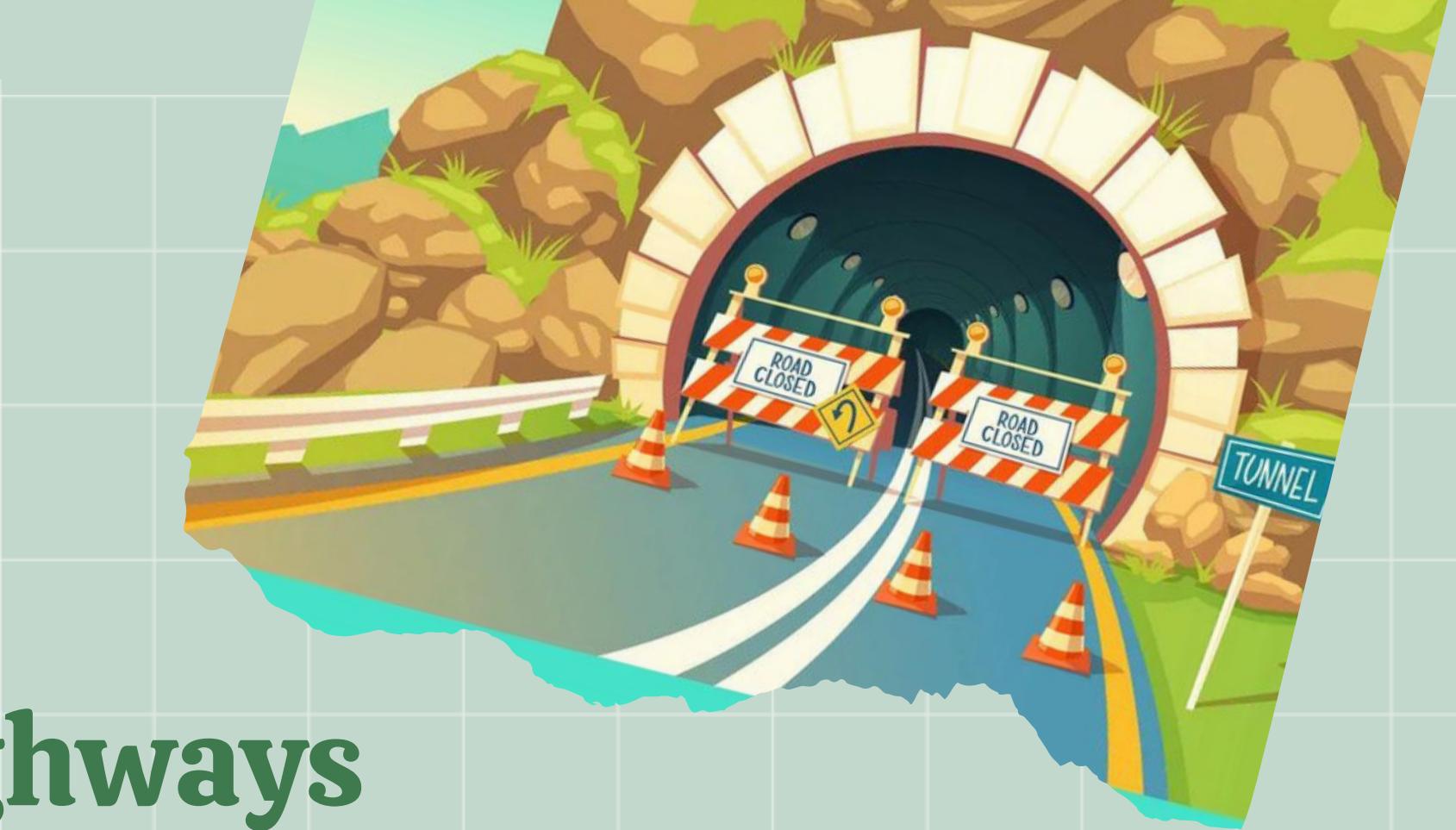
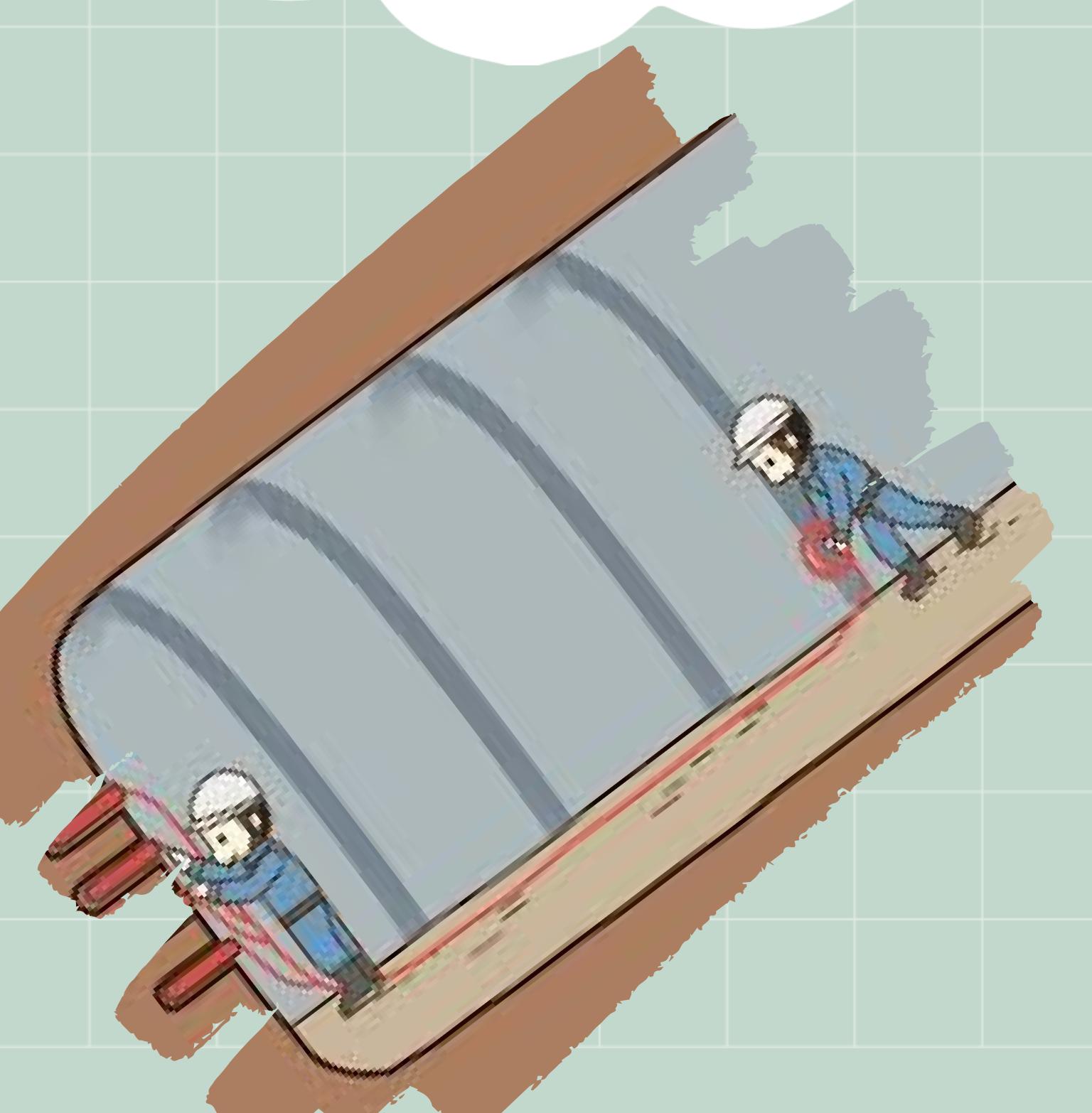


Tunnel's are artificial
underground passages opened
at both ends constructed for
different purposes.



Used For :-

- Highways
- Railways
- Sewerages
- Watersupply
- Public utilities
- Canals
- etc.



REQUIREMENTS:-

- It is very useful where bridge fail to fulfill requirements like in sea, in urban area and in mountains .
- Efficient compared to bridges.
- In war time it is much difficult to destroy a tunnel but destruction of bridge is too easy.
- Lots of land and time saved.



PURPOSES

- In Road traffics
 - In Sewers
 - In Minings
 - In Rail Traffics
 - In Hydroelectric stations
- etc.

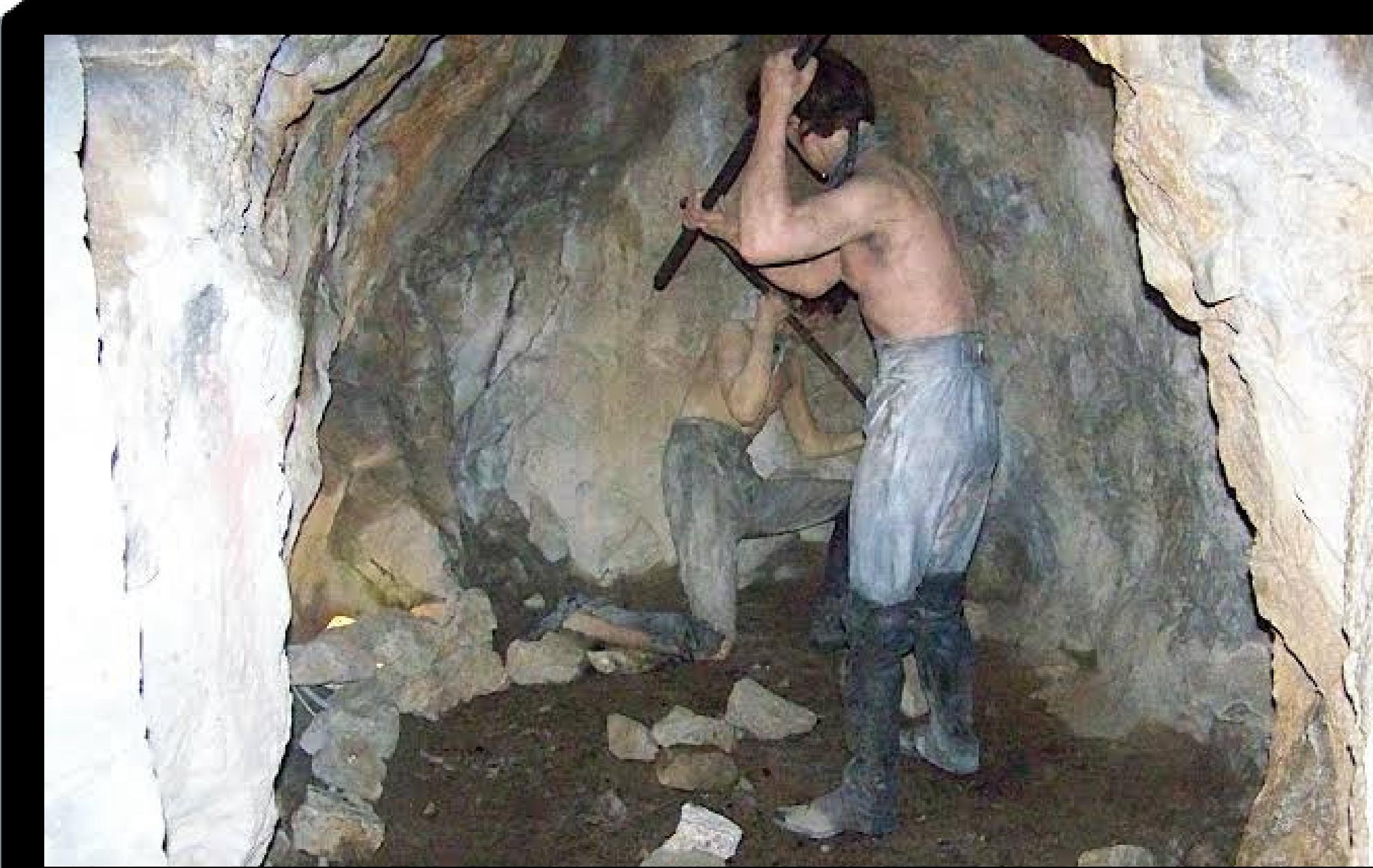


METHODS:

- CLASSIC METHOD
- CUT AND COVER
- DRILL AND BLAST
- BORED TUNNELING
- IMMERSED TUBE TUNNELING



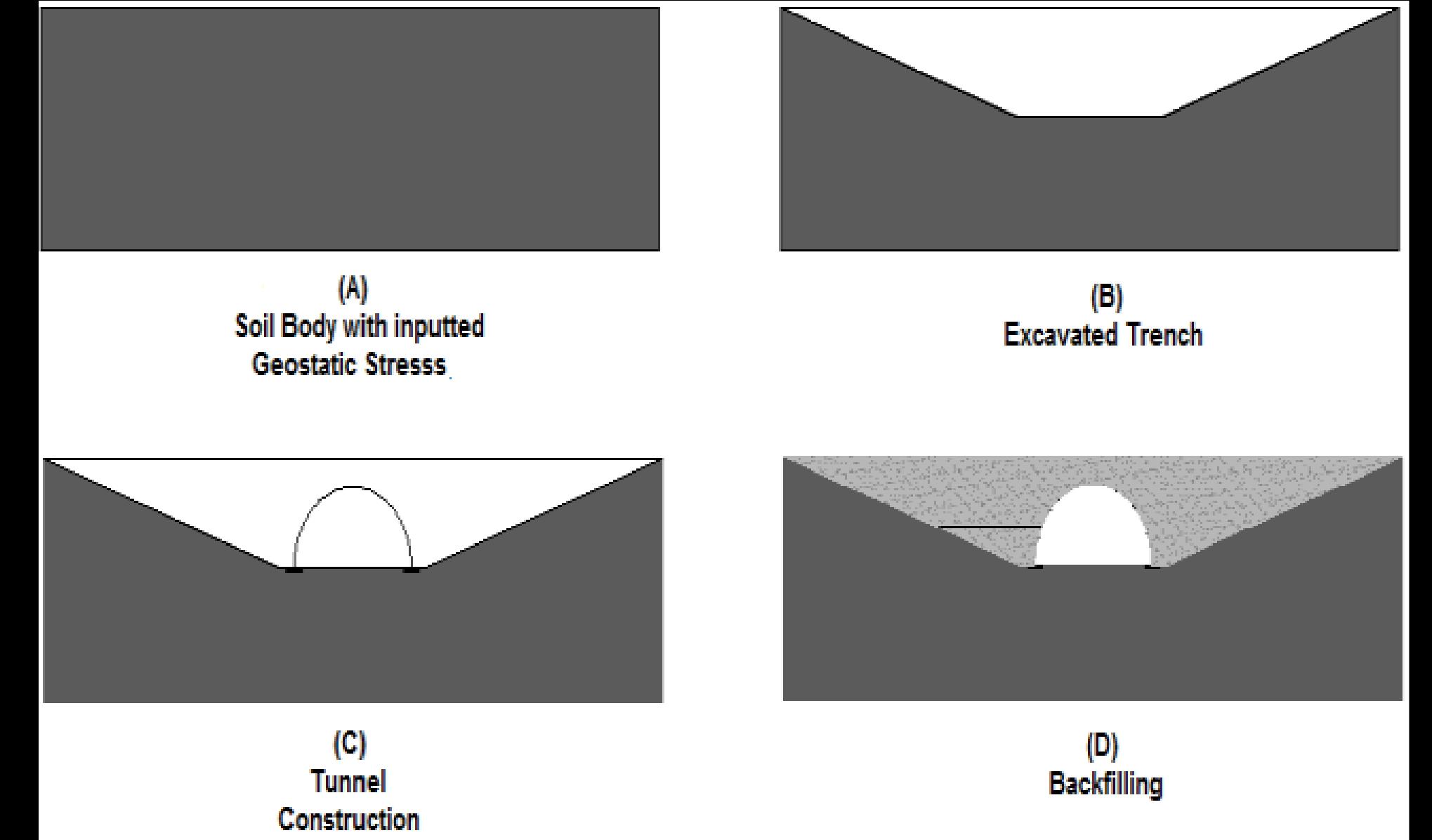
CLASSIC METHOD



- The Classic Method of tunneling, also known as the Conventional Method, is a traditional tunneling technique that has been used for over a century to construct tunnels through a variety of ground conditions.
- The method involves excavating the tunnel in stages, using drilling and blasting techniques to remove the rock or soil. The excavation process is typically carried out by hand, using handheld drills and explosives to break up the rock or soil, and then removing the debris using wheelbarrows or other manual methods.
- After the excavation is complete, the tunnel walls are reinforced with steel or concrete to prevent collapse, and the tunnel is lined with a suitable material, such as concrete, to provide structural support and prevent soil or water ingress



CUT AND COVER



Cut and cover tunneling is a technique used in civil engineering for creating shallow tunnels or underground structures in urban areas. Steps involved in this method are as follows:

- The first step in the cut and cover tunneling process is to excavate a trench or open cut in the ground. Excavation may be carried out using various methods, such as excavation equipment, shoring and bracing, or sheet piling.
- Once the trench has been excavated, the tunnel is constructed within it using various construction methods, such as cast in place concrete, precast concrete, or steel plate.



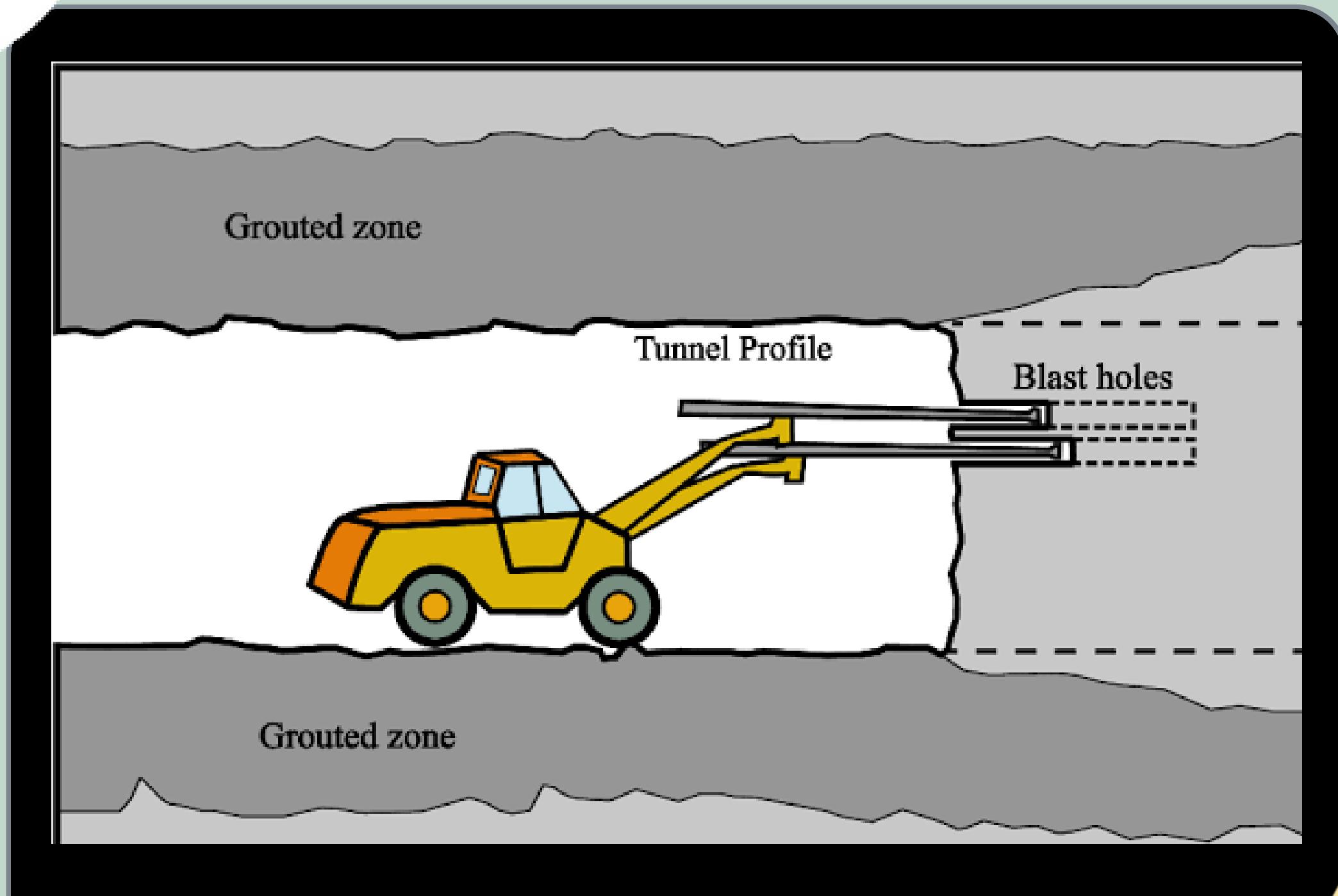
- After the tunnel has been constructed, the trench is backfilled with soil or other materials to restore the surface. The backfilling process is usually carried out in layers to ensure proper compaction and stability.
- Cut and cover tunneling is typically used for shallow tunnels or underground structures, such as pedestrian underpasses, subway stations, utility tunnels, and parking garages. The technique is well-suited to urban areas where surface disruption must be minimized and where space is limited

BORED TUNNELING:



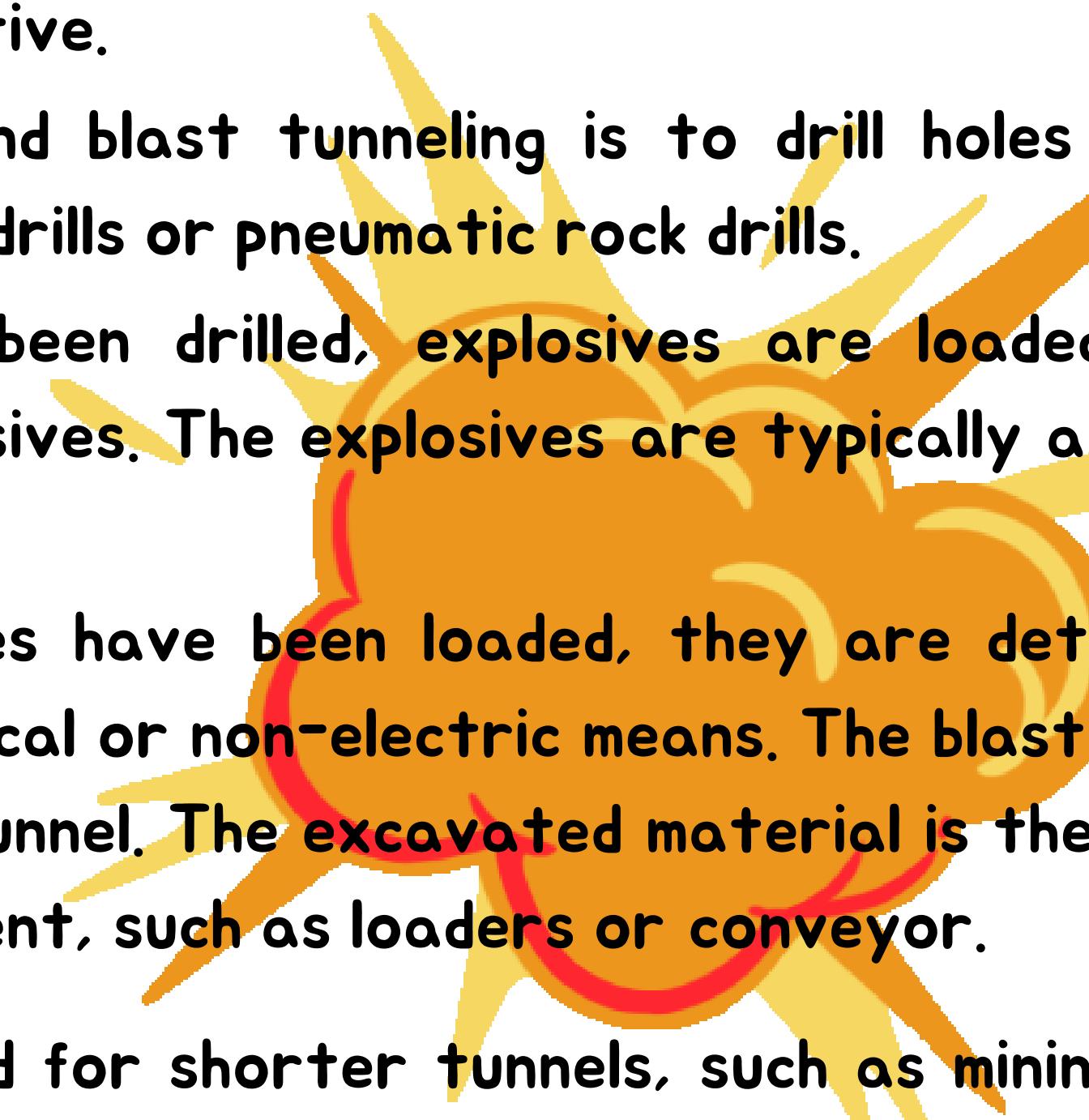
- Bored tunneling is a technique used in civil engineering for creating tunnels through various types of ground conditions, including rock, soil, and soft ground.
- The technique involves using a tunnel boring machine (TBM) to excavate the tunnel, with the machine typically consisting of a rotating cutting wheel, support structures, and conveyor belts for removing excavated material.
- Bored tunneling is a preferred technique for creating longer and deeper tunnels where cut and cover methods are not feasible or cost-effective. It is widely used in transportation projects, such as metro systems, highways, and rail tunnels, as well as in water supply and sewerage projects.
- Bored tunneling can be expensive due to the high cost of tunneling equipment, but it is usually more efficient than other methods, such as drill-and-blast, and results in less surface disruption during construction

DRILL AND BLAST:



Drill and blast tunneling is a technique used in civil engineering for creating tunnels through hard rock conditions where bored tunneling methods are not suitable or cost-effective.

- The first step in drill and blast tunneling is to drill holes into the rock face using drilling equipment, such as jumbo drills or pneumatic rock drills.
- After the holes have been drilled, explosives are loaded into the holes using explosive cartridges or bulk explosives. The explosives are typically a mixture of ammonium nitrate and fuel oil.
 - Once the explosives have been loaded, they are detonated in a controlled manner, typically by electrical or non-electric means. The blast fractures the rock and creates a cavity for the tunnel. The excavated material is then removed from the tunnel using excavation equipment, such as loaders or conveyor.



It is typically used for shorter tunnels, such as mining tunnels or road tunnels in hard rock conditions, where bored tunneling methods are not suitable or cost-effective.

IMMERSED TUBE TUNNELING:-



<https://youtu.be/7dPrPKZmn74>

Procedure :-

Immersed tube tunneling is a tunneling technique that involves building a tunnel under water or below ground level using pre-fabricated tunnel sections called "tunnel elements". These tunnel elements are usually large, hollow, rectangular or circular structures made of steel or reinforced concrete.

- The process starts with excavating a trench in the riverbed or sea floor, where the tunnel will be located. Then, the tunnel elements are constructed onshore and transported to the construction site by barge. The tunnel elements are then floated into position and carefully lowered into the trench using cranes and other specialized equipment.

- Once the tunnel elements are in place, they are secured to the foundation using special grout or concrete, and any gaps between the elements are sealed to prevent water ingress. The tunnel is then covered with a protective layer of rock or sand to protect it from damage and to provide additional stability.
- Immersed tube tunneling is often used for underwater tunnels, such as those connecting islands or spanning rivers, as well as for tunnels located in areas with high water tables, where other tunneling methods would be impractical. The technique allows for faster construction times compared to other methods, and it also minimizes disruption to the surrounding environment and communities.

QUESTIONS :

1. WHICH METHOD IS USED FOR UNDER WATER TUNNELING ?
2. NAME SOME OF TUNNELING TECHNIQUES.
3. WHAT ARE THE PURPOSES OF TUNNELS?
4. CLASSICAL METHOD IS ALSO KNOWN AS.

A photograph of a winding asphalt road through a mountainous landscape. The mountains are covered in green vegetation with some rocky patches. In the background, there are more mountains under a clear blue sky. A large, semi-transparent yellow cursive text "Thank You" is overlaid on the center of the image.

*Thank
You*