

* SHAPE OF TUNNELS :- Unit-4.3 5.4.20

The following shapes of tunnels are commonly adopted :-

- (a) Polycentric
- (b) Circular
- (c) Rectangular or box type
- (d) Egg shaped
- (e) Horse shoe type
- (f) Elliptical
- (g) Segmental.

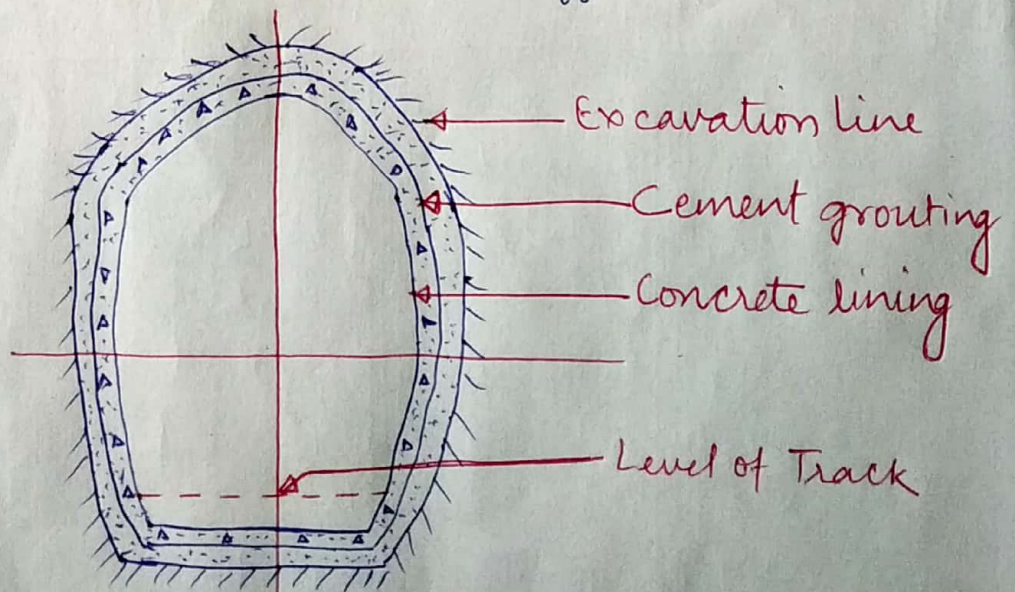
(a) Polycentric :- This type of shapes has number of centres and provides enough flat base to suit traffic tunnels

Advantages of Polycentric shape tunnel :-

- The number of centres and lengths of radii can be fixed to suit the existing condition.
- These tunnels can be conveniently used for road and railway traffic
- Due to their arch action these tunnels can ~~exist~~ resist external and internal pressures.

Disadvantages of Polycentric shape tunnels :-

- The construction of this type of tunnel is difficult
- The lining of these tunnels is difficult



(Polycentric cross-section)

(b) Circular Shape tunnel :-

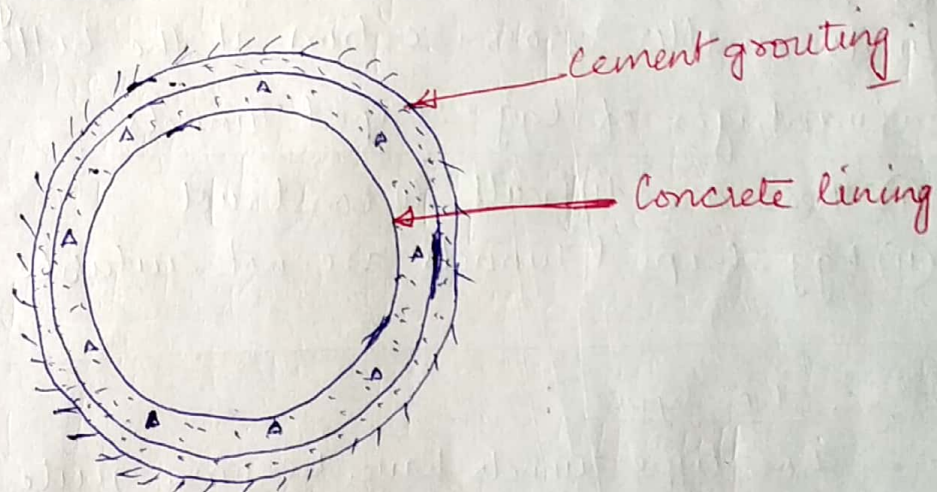
Circular shaped tunnels are used to carry water under pressure. These are not suitable as traffic tunnels because they require more filling to form the flat base.

Advantages of circular shape tunnel :-

- (i) It provides the greatest cross-sectional area for the least perimeter.
- (ii) It is best suited in non-cohesive soil.
- (iii) It is the best for resisting external or internal forces.

Disadvantages of circular shape tunnel :-

- (i) More filling is required to form flat base for providing road or railway track.
- (ii) Their ~~tunnel~~ lining is difficult

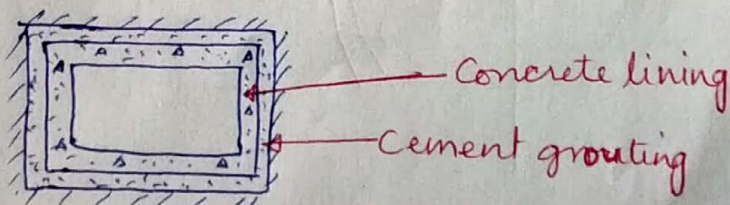


(Circular shaped tunnel)

(c) Rectangular or Box type tunnel :-

Rectangular tunnels are suitable for pedestrian tunnels. These tunnels are sometimes adopted if pre-constructed R.C.C. caissons are used.

This shape of tunnels are not ~~used~~ use in these days.



Advantages of Rectangular or Box tunnel :-

- (i) These tunnels are small in depth.

Disadvantages of Rectangular or Box tunnel :-

- (i) These tunnels are difficult to concrete.
- (ii) The roof of these tunnels are subjected to bending moment and hence steel girders are required to form the roof lining.

(d) Egg-Shaped Tunnel :-

This shape of tunnel has number of centres and length of radii. These are used for sewers.

Advantages of Egg-Shaped Tunnels :-

- (i) The circular walls of these tunnels resist external and internal pressure.
- (ii) These tunnels maintain self-cleansing velocity due to its smaller cross-section at the bottom.

Disadvantages of Egg-Shaped Tunnels :-

- (i) These are difficult to construct.
- (ii) Egg shaped tunnels are not suitable as traffic tunnels.

(e) Horse Shoe Type :-

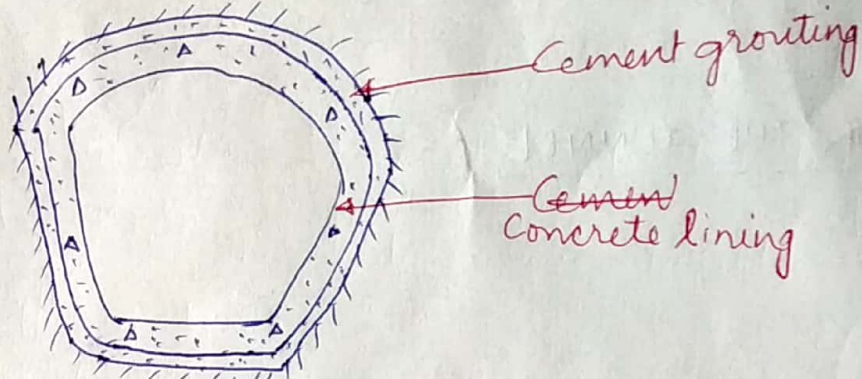
Horse shoe type tunnels have become quite popular. It is a compromise between the arched and circular tunnel.

Advantages of Horse Shoe tunnel

- (i) It is suitable in soft rocks.
- (ii) It is best suited for traffic purposes.
- (iii) It can resist the external pressure by arch action.
- (iv) These tunnels have enough flat base to give working space to the contractor.

Disadvantages of Horse Shoe Tunnel :-

- (i) These tunnels are not suitable as water tunnels
- (ii) These are difficult to construct.



(Horse shoe type tunnel)

(f) Elliptical tunnel :-

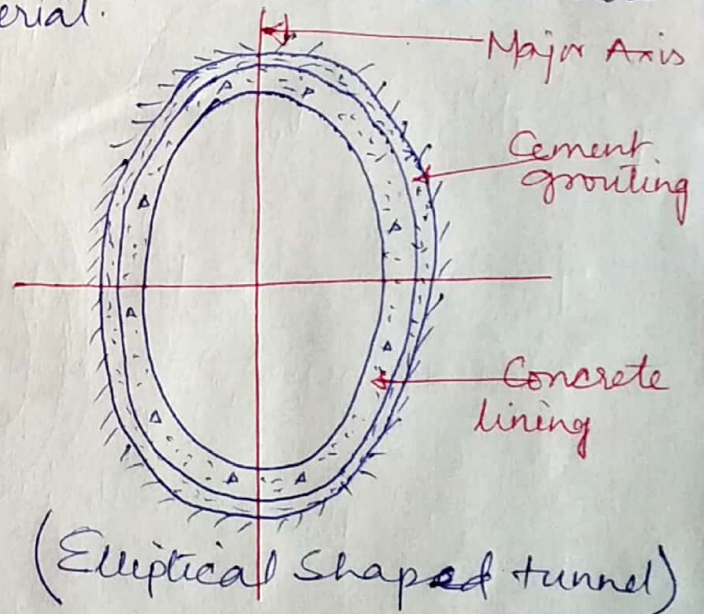
Elliptical shaped tunnels are suitable for carrying water. The major axis of these tunnels is kept vertical for better resistance to external pressure. These tunnels are suitable in softer material.

Advantages of Elliptical Tunnel

- (i) These are suitable in soft rock.
- (ii) These tunnels resist internal and external pressures.

Disadvantages of Elliptical Tunnel :-

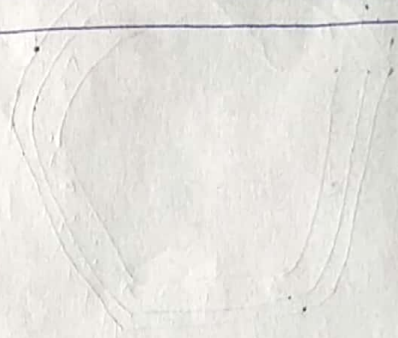
- (i) The lining of these tunnels is difficult.
- (ii) These are suitable for traffic tunnels.



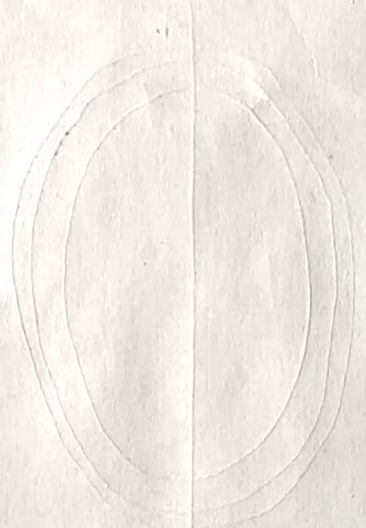
(Elliptical Shaped tunnel)

9) Segmental Shaped Tunnels :- These are suitable for traffic tunnels. These are commonly used in subways or navigation tunnels.

SIZE OF THE TUNNEL :-



(Segmental shaped tunnel)



(Oval shaped tunnel)

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