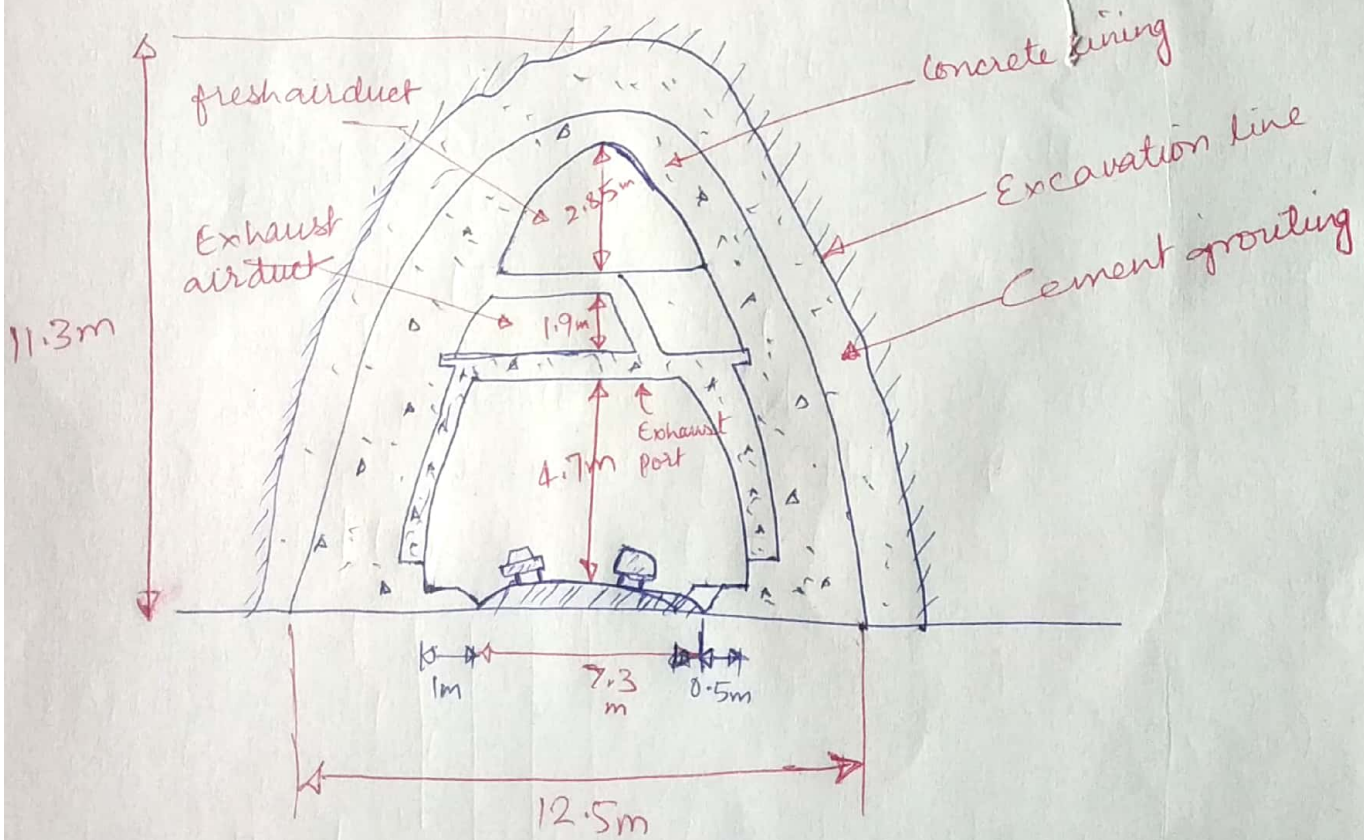


★ Tunnel Cross-section for Highway and Railways.

- Since the construction of a tunnel is costly, only the minimum dimensions required must be adopted.
- The dimensions should be convenient for the actual movement of traffic and also for the maintenance work of communication route which includes:-
 - Ⓐ Space required for the maintenance work of route for example ventilation pipes, water pipes, drainage system, signal wires etc.
 - Ⓑ Space for gangmen to move freely.
- It is essential to have some clear space for the doors when opened, to prevent accidents.

The cross-section of a tunnel, showing the dimensions for a two lane highway (NH) is given in below figure:-



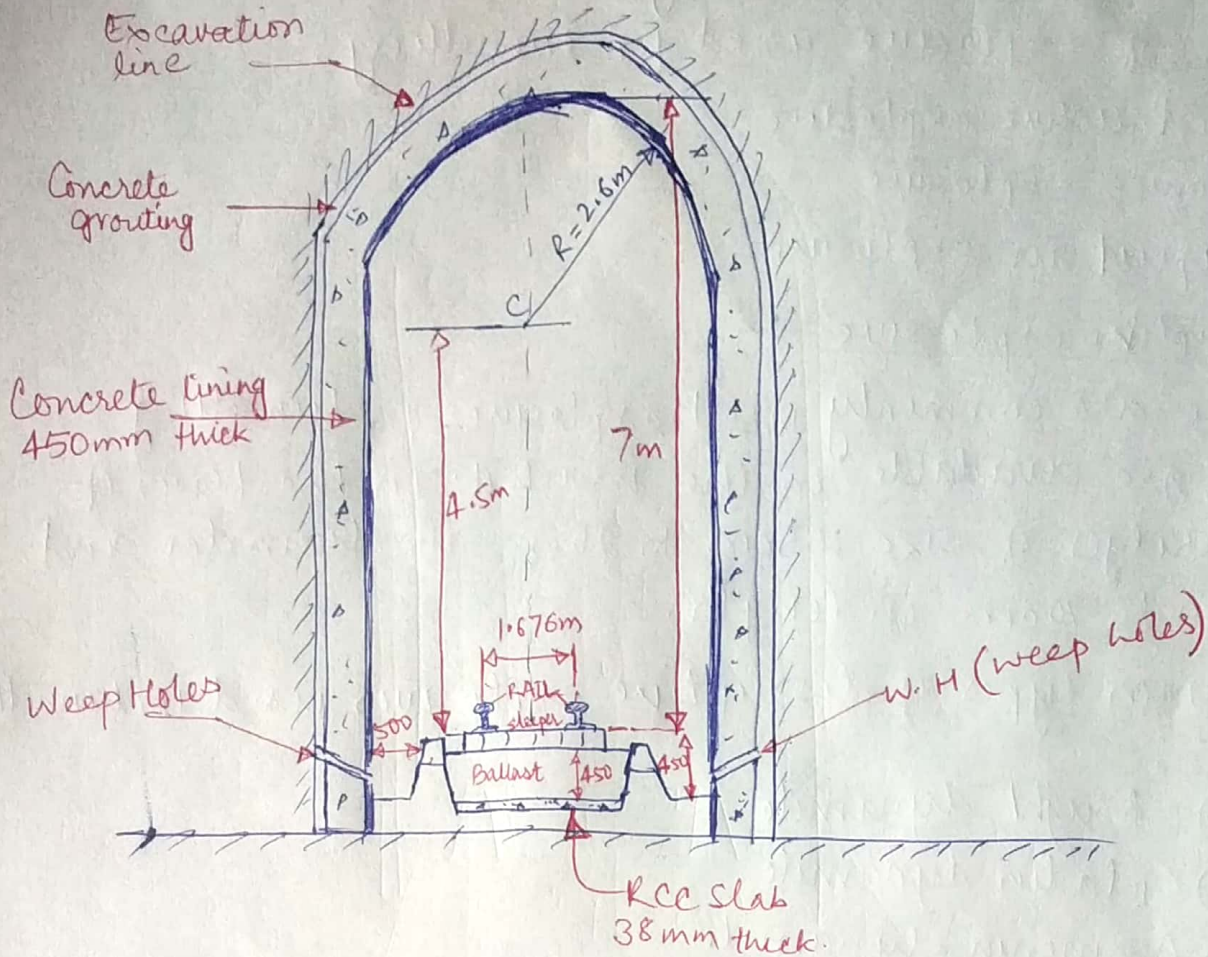


Figure 1 - The cross-section of a tunnel, showing the dimension for a single lane. ~~1300~~
 The figure is of Broad Gauge railway track

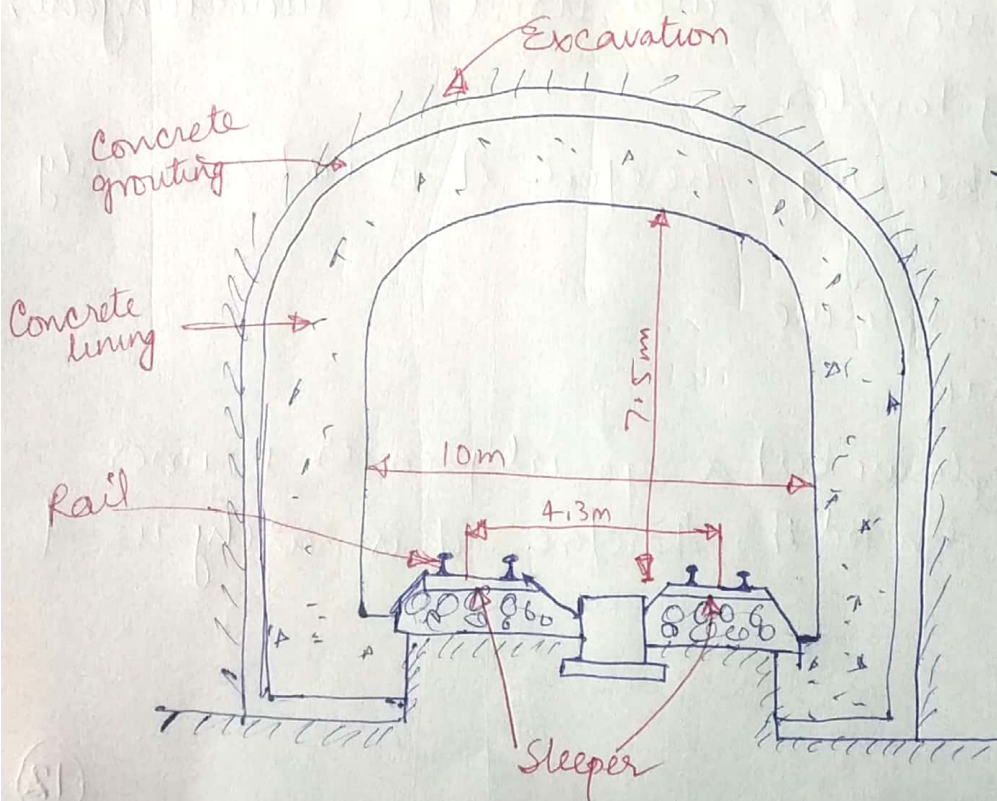


Figure 2 - Cross-section of tunnel for a double line broad gauge railway track.

* Explosive used in Tunnelling

03 types of explosive used for tunnelling :-

- ① Disruptive explosive
- ② Power explosive
- ③ Liquid air explosive

① Disruptive explosive :-

These are commonly used explosives for tunnelling. They are available in the market in the form of cartridges of size 2.5cm to 20cm in diameter and 20cm to 70cm in length.

Common types of disruptive explosives used in tunnelling are :-

- (a) Straight dynamite
- (b) Gelatin dynamite
- (c) Ammonia dynamite
- (d) Blasting dynamite

② Power explosives :-

• These explosives are not commonly used in tunnelling.

• ~~The~~ Types of power explosives used for tunnelling are :-

(a) Blasting Powder

• It is slow in burning, therefore it is not commonly used in these days.

(b) Nitrate explosive

(c) Nitraman

• It is highly explosive but a special ~~primer~~ primer is required to detonate it, therefore, it is rarely used in tunnelling.

(3) Liquefied air explosive

- These explosive usually consist of 9.5% oxygen at temperature of 191°C , which is absorbed by dipping a cartridge of absorbent.
 - Such explosives require special skill in their manufacture, transporting and storing.
 - Therefore, not commonly used.
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