



**Student ID: 13639**

**Program: B.Tech Civil**

**Subject: Highway and Transportation Engineering**

**Submitted to: Engr Marvan Raza**

**Exam: Mid-Exam**

**Date: 22/8/2020**

Page  
2

H-Transportation

13639

Q1

Modes of Transportation

=> The Modes of Transportation describes the way goods are transported.

=> There are basically five different Modes.

- ① Rail
- ② Road
- ③ Air
- ④ Water
- ⑤ Pipeline

① Railway Transportation

=> It is a means of transport in which the goods are transferred from one place to another place and as well as transfers the passenger from one place to another destination. It is preferred due to high speed. Invariance to road transport, where vehicles run on a flat road or surface, rail vehicles are directionally

Manage by their rail tracks on which they run.

⇒ Rail transport helps to provide administrative facilities to the government. The public servants and defense forces run their mobility from the railways.

### Advantages

- ⇒ It is economical for long distance b/c it can easily cover all area of states and cities.
- ⇒ This means of transport is very faster than roads.
- ⇒ Most suitable for carrying a bulky amount of goods and products.
- ⇒ It provides proper protection from exposure to sun and dust pollutions.
- ⇒ It is most dependable means of transport.
- ⇒ It is the very safest means of transport.
- ⇒ Rail transport help to provide employment opportunities to both skilled and unskilled individuals.

Page

3 Q2

H-T

13639

## Disadvantages

- ⇒ Huge capital required for construction maintenance
- ⇒ It is not suitable for hilly areas.
- ⇒ It is not flexible in nature.
- ⇒ The cost and time of terminal operations are the major disadvantages of rail transport.
- ⇒ Monopoly in nature.
- ⇒ It consists much time for booking of goods, though the comparison of road transport.

## ② Roadways Transport.

- ⇒ A Road is an identifiable route way or path b/w two or more places. This mode of transport helps to transport the goods from one place to another place by road through various methods like auto, Buses, trucks, cargos and other suitable factors.
- ⇒ In Road transport, the chances of an accident are very high and it also very risky.

Page

4

Q1

H-T

=

13639

=

## Advantages

=

- ⇒ It is very flexible in nature.
- ⇒ It helps to facilitate the movement of goods even in areas.
- ⇒ It provides alternatives in the form of car, rickshaw, auto, cars, bus, trucks and so on.
- ⇒ It is good for transporting perishable products.
- ⇒ It required low capital investments.
- ⇒ It is very suitable for a short distance journey.

## Disadvantages

=

- ⇒ It is not suitable for long distance as it is not economical.
- ⇒ Slow as compared to railways.
- ⇒ Goods can be destroyed/damaged due to specks of dust and pollutions.
- ⇒ It is time-consuming.
- ⇒ Accident and Breakdowns.

1000

Q1

H-T

13639

### ③ Water Transportation

⇒ water transport is very important B/c it is the cheapest way of transporting bulky goods over a long distance.

⇒ In the world, there are two types of water transport.

#### ① Inland water transport

⇒ This is the system of transport through all navigable rivers, lakes, and man made canals. Many large rivers in different parts of the world are used by ship and barges for transportation.

#### ② Ocean Transport

⇒ However, ocean waterways carry a lot of the world's trade, the majority of the bulky goods, materials, and passengers pass through ocean waterways from one country to another at the cheapest cost.

### ④ Air Transport

⇒ It is the newest means of transport, it was introduced in 1903 but developed into full means of transporting people and goods in the 1930s. The greatest air transportation started after the second world war. This mode of transportation can be used for both domestic and international flights.

### ⑤ Pipeline transport

⇒ This system of transportation involves the use of hollow pipes in the transportation of water, crude oil, (petroleum) and gas. This mode of transportation is safer than using tankers or trailers in the transportation of these liquids.

Page

7

Q2

A

Coning of Wheel in Rails

= = =

H - T  
= =

13639  
=

=> In coning of wheel the tread or rim of wheels of railway vehicles is made in the shape of a cone with slope of about 1 in 20. It maintains vehicles in the central position w.r.t the track. On straight track, portions of wheels running on track have same diameter. While on curved path, the outer wheel has to cover larger distance than the inner wheel. Thus the portions of wheel running on track have different diameters which help in smooth running of wheels.



Page  
8

Q2A

H-T

13639

## Advantages

- ⇒ Smooth riding - Help vehicle to negotiate curves smoothly.
- ⇒ Reduces wear and tear of wheel flanges, Damage is caused B/C of the friction action of rims with inner forces of the rail top.
- ⇒ It gives an option of lateral drift of the hinge with its wheels.
- ⇒ It prevents to some extent the slipping of the wheels.

## Disadvantages

- ⇒ The pressure on the horizontal component of force near the inner edge of outer rail has a tendency to wear the rail quickly.
- ⇒ The horizontal component has to turn the rail outwards and hence the gauge may be widened.
- ⇒ If no base plate are provided, sleepers under the outer edge of the rail may be damaged.

In order to minimize the above mentioned disadvantages, the ~~is~~ Tilting of Rails is done.

Page

9

Q 2

B

=

Types of Rails

= =

H-T  
= =

13639  
=

⇒ Formerly wooden rails are used with thin plates.

Later

⇒ cast-iron

⇒ Malleable iron

⇒ Wrought iron

⇒ Steel

⇒ At present, classified mainly into 3 types

① Double headed rail.

② Bull headed rail.

③ Flat footed rail.

Page

10

Q.2

B

H-I  
- =

13639  
=

## ① Double Headed Rail

⇒ consists of three parts.

- ① upper table
- ② web
- ③ lower table

⇒ upper and lower tables are identical.

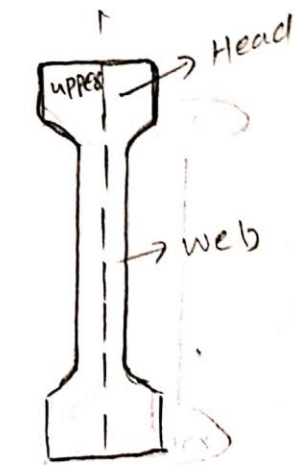
⇒ idea was to double the life of rail - failed.

⇒ long contact with chairs made the surface of lower table very rough and smooth running of trains is not possible with them.

⇒ Now practically out of use.

⇒ length varies from 610 to 732 cm.

⇒ wrought iron was used to manufacture these rails.



Double Headed

Page

11  
Q2

H-T  
=

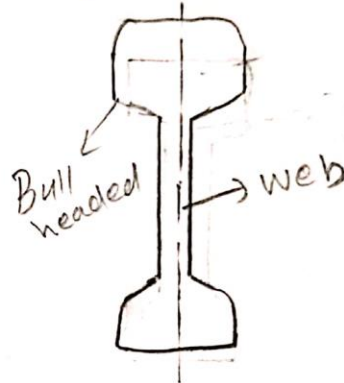
13639  
=

## (2) Bull headed Rails = = =

⇒ The rails sections having their head of more dimension than that of their foot are known as bull headed rails.

⇒ These rails consist of.

- ① ⇒ Head
- ② ⇒ Web
- ③ ⇒ Foot



⇒ The foot is designed only to properly hold only wooden keys with which the rails are secured to chairs.

⇒ only to provide necessary strength to the rail.

⇒ 2 cast iron chairs are required for each sleeper.

⇒ Extensively used in England and in some parts of Europe

⇒ weight of standard rail of this type is 47 kg per meter on main lines and 42 kg for branch lines.

⇒ length of rail is generally 18.29m.

Page

12

=

H-7

=

13639

=

Q<sub>2</sub>

B

Types of Rails

### ③ Flat Footed rails

⇒ Invented by Charles Vignoles in 1836.

⇒ Also called Vignoles rails.

⇒ On this type of rail, foot is spread out to form a base.

⇒ Highly popular and most used in railways.

⇒ 90% of the present railway track consists of Flat footed rails.

⇒ It was initially thought that the flat footed rails could be fixed directly to wooden sleepers and would eliminate chairs and keys required for the B-H rails. But later on, it was observed that heavy train loads caused the foot of the rail to sink into the sleepers and making the spikes loose. To move the defect.

page

13

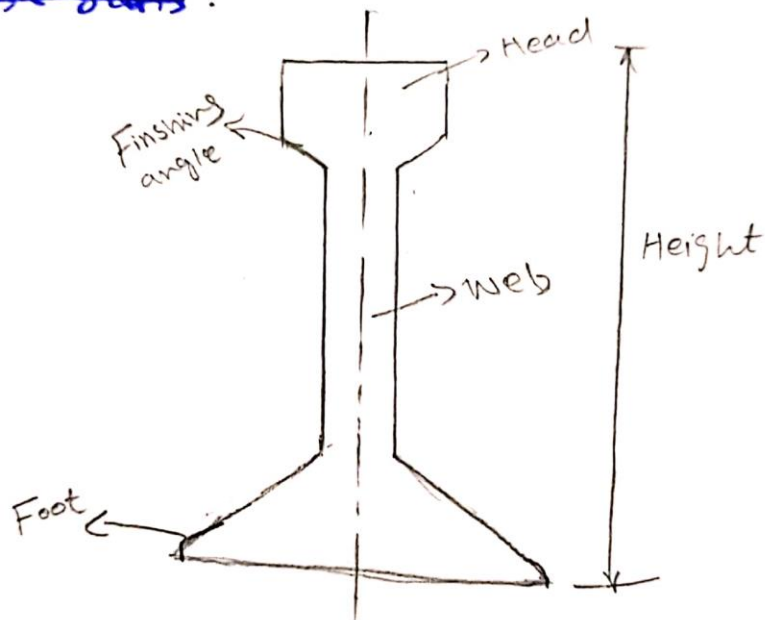
Q2

B

H-T

13639

⇒ Steel bearing plates were used in B/w  
flat footed rails and the wooden sleeper.  
~~These rails.~~



Flat footed rails.

Q3  
=

H.T

13639

Page  
14

Component of An Airport Layout  
=

① Runway  
=

⇒ A runway is the area where an aircraft lands or takes off. It can be grass, or packed dirt, or a hard surface such as asphalt or concrete. Runways have special markings on them to help a pilot in the air to tell that it is a runway and to help them when they are landing or taking off. Runway markings are white.

⇒ Most runways have numbers on the end. The number is runway's compass direction. (e.g. runway numbered 36 would be pointing north or 360°) Some airports have more than one runway going in the same direction, so they add letters to the end of the number R for Right, C for center and L for Left.

Q3  
Page  
15

## ② Terminal Buildings

- ⇒ Also known as airport terminal, these buildings are the spaces where passengers board or alight from flights. These buildings house all the necessary facilities for passengers to check-in their luggage, clear the customs and have lounges to wait before disembarking. The terminals can house cafes, lounges and bars to serve as waiting areas for passengers.
- ⇒ Ticket counters, luggage checkin or transfer, security checks and customs are the basics of all airport terminals. Large airports can have more than one terminal that are connected to one another through linkways such as walkways, sky-bridges or trams.
- ⇒ Smaller airports have only one terminal that houses all the required facilities.



page

16

= Q3

H.T

13639

### (3) Aprons

⇒ Aircraft aprons are the areas where the aircraft park.

Aprons are also sometimes called ramps.

⇒ They vary in size, from areas that may hold five or ten small planes, to the very large areas that the major airports have.

### (4) Taxiway

⇒ A Taxiway is a path on an airport connecting runways with ramps, hangars, terminals and other facilities.

⇒ They mostly have hard surface such as asphalt or concrete, although smaller airports sometimes use gravel or grass.

Page

17  
Q3

H-T

13639

### (5) Aircraft Stand

⇒ A portion of an designed as a taxiway and intended to provide access to aircraft stand only

### (6) Hangar.

⇒ A hangar is a closed building ~~structure~~ structure to hold aircraft or spacecraft. Hangars are built of metal, wood or concrete.

⇒ Hangars are used for protection from the weather, direct sunlight and for maintenance, repair, manufacture, assembly and storage of aircraft.

### (7) Control Tower

⇒ A Tower at an airfield from which air traffic is controlled by radio and observed

⑧ Physically and by radar.  
Parking.

⇒ Parking is a specific area of airport at which vehicles park.