

ASSIGNMENT

ID: 7224

MODULE: 2012

Batch SUBJECT: Highway and traffic engineering

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QUESTION NO # 1

Keeping in view different modes of transportation compare railway and highway?

Answer; -

COMPARISON BETWEEN RAILWAYS AND HIGHWAY

➤ **Railways:**

Railways are **steel tracks** laid on the **ground**, over which the trains move. Railways have been developed both for long as well

as for short distances and for urban travel. Transportation by railway system is advantageous for **longer distances**.

The railway system could serve as arteries for transportation by land and the road system as a feeder system for transportation to the interior parts and to the intermediate localities between two railway stations.

The train can move at much higher speeds than pneumatic tire vehicles on modern highways. Steel tracks can also take heavy axle load about three to four times heavier than the road. The energy required

To haul a unit load through a unit distance by railway is about **16% in comparison** to road transport. Thus full advantage should be taken of this mode of Transportation where ever it is available.

➤ HIGHWAY

- 1- A Highway is a multi-lane roadway that is especially built for high speeds and connecting major population centers.
- 2- IT provides maximum service at all (provide door to door service) and other modes are dependent on it.
- 3- It donot provide much faster service as camopared to railways.
- 4- Engine cost of a motor vehicle is cheaper than a railway engine.

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QUESTION NO # 2

You are a transportation engineer. You have been tasked to conduct office study as a preliminary step for design of a new highway. What reference material you will study and what data you will extract ?

Answer

Office study is the first phase in designing a new highway. It is the examination of all available data of the area of proposed highway.

By taking help from several sources such as maps, chart, photographs, etc. the area is investigated.

PRELIMINARY ANALYSIS OF DATA: -

This step is usually done by taking help from several data source for example small sell research project and from other secondary source the extracted data help in indicating whether any specific site we should exclude for other consecration or not.

ENVIROMENTAL INCLUDES :-

Types of wildlife exists.

Location of archeological historic site.

Possible effect of population air, nose, water.

ECONOMIC INCLUDES: -

Unit construction cost and trend of agricultural industrial activities.

After the analysis of all the above data transportation engineer become able to select the general area are proposed area.

After that preliminary location survey is conducted in which the following elevations are done.

1 - ECONOMIC ELEVATION: -

For determining the possible future effects of utilizing the source during construction period this elevation is conducted for each alternative route.

During this elevation following factors are considered.

- 1- Road user cost
- 2- Construction cost
- 3- Maintenance cost
- 4- Road user benefits and disbenefits.

2 – ENVIRONMENTAL ELEVATION: -

For determining the significant effect of construction the surrounding this elevation is done.

Following are the cases that badly affect the presence of living and non-living organisms

- 1- Plants are badly affected

- 2- Deforestation

QUESTION NO 3: -

What is importance of vehicle performance in highway design?

Answer: -

A vehicle that move on highway always accelerates and this decelerates depending on the traffic volume on that roadway.

So these two parameters accelerations and deceleration rates often critical in determining the design of a highway.

- 1- For accommodating different type of vehicle (high traffic and low traffic) on roadway, vehicle performance in highway design in studied. Other rates that often govern the dimensions of design factors are:*
- 2- Effect of a road grade (steep grade for truck climbing etc)*
- 3- Effect of horizontal curvature*
- 4- Highway alignment (sufficient stopping and passing site distances)*
- 5- Freeway ramps.*

QUESTION # 4: -

Write short note directional distribution in design of highways?

Answer: -

Directional distribution in design of highway: -

Directional distribution is the predominant one-way traffic volume expressed as a percentage of two-way traffic.

- *It accounts for the directional distribution of traffic and also use to convert average daily traffic to directional peak hour factor.*
- *In the design process of two or more than two-lane highway where important intersections or observed or where further lanes are to be provided*

in future, so sufficient knowledge of the hourly traffic volume in each direction of travel is important.

- *Occasionally 80% is observed but typically one direction contributes 55 to 70% in total traffic.*
- *For example:-*
- *Consider a rural road with a design volume four thousands vehicle per hour (vph) for both directions of travel combined.*
- *If the directional distribution during the design hour equally splits or two thousand vph in one direction, two lanes in each direction may be adequate.*

QUESTION # 5: -

Explain broad classification of surface distress mode?

Answer: -

Surface distress modes can be broadly classified into the following three groups:

Fracture:-

This could be in the form of cracking (in flexible and rigid pavements) or spalling resulting from such things as excessive loading, fatigue, thermal changes, moisture damage, slippage or contraction. Distortion.

DISTORTION: -

Distortion occurs in the form of deformation

- *The reason of distortion are: -*

- *Excessive loading*
- *Weakness of base or subgrade layer*
- *Densification*



QUESTION # 6: -

Explain alligator cracking, block cracking, longitudinal cracking and transverse cracking?

Answer: -

Alligator cracking, also referred to as fatigue cracking or crocodile cracking, refers to a pattern of asphalt damage that resembles the scales on an alligator's skin. The cracks form co-joined, irregular "blocks" that are often four-sided, such as rectangles, but they can also have more sides and on occasion, as few as three sides.

Left unrepaired, alligator cracking can result in the need for extensive work to salvage the pavement. Typically, alligator asphalt must be removed and replaced, and since the cracking will continue to spread, the entire surface can be destroyed in a relatively short time.

Block Cracking

Block Cracking is a series of interconnecting cracks that form in a roughly rectangular pattern. It can occur in both concrete and flexible road pavements.

LONGITUDINAL CRACKING:

- *This types of cracking occurs parallel to asphalt pavement.*
- *This reason of longitudinal cracking.*
- *Poorly constructed joints.*
- *Improper paver operation.*
- *Expansion and contraction of pavement material, these cracks are not load related.*

TRANSVERSE CRACKING: -

Extend across the pavement at approximately right angle to the pavement's center line or direction of laydown. They may be caused by two or three. These types of cracks are not usually load associated.



THE END