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NAME # Syed Ghayur Shah

ID # 7801

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Section # A

Paper # Highway and Traffic
Engineering

Term # Mid Term

Q1: Keeping in view different modes of Transportation compare railways with Highways.

Ans: Railways:

→ It is one of the most important commonly used and very cost effective modes of commuting and good carriage over long as well as short distance.

→ The Carrying Capacity of Railways is Extremely large

→ Railways Transport cannot provide door to door service.

→ Service as it is tied to a particular track.

→ Railway Transport is better organised than any other medium of transport.

→ It has fixed route and schedules.

* Advantages of Railways Transport:

- faster than other transport.
- On Railway, Trains are operating at a higher speed than that of road vehicles.
- Suitable for Bulky goods.
- Railway are more suitable for heavy goods.

* Disadvantages:

- Huge investment.
- Railways have to incur high overhead costs.
- NOT provide personalized services.
- Lack door to door service.

* Highways:

- Transportation of goods and personal from one place to the other place.

→ Highway road is a route between two destinations.

→ The cost of construction operating cost and maintaining roads is cheaper than of the Railways.

→ Delivery of goods between cities, towns and small villages is made possible only through Road Transport.

* Advantages :

- Less Capacity outlay.
- Way to Door Service
- Very good for short distance
- more suite than railway.

* Disadvantages :

- Irregular nature
- Mishaps and Breakdown
- Chances of accident more.
- The rate charged for transportation are likewise precarious and unequal.

Q02 - You are a Transportation Engineer - You have been Tasked to Conduct office Study as a preliminary step for design of new highway. What reference material you study and what data you will extract.

ANS:

- As a Transportation Engineer, I have given Tasked to Conduct Office Study as preliminary step for design a new highway.
- ① am studying following things

→ Site Map:

- first of all to study the map of the site because map give me large information of that Area.
- Also study the topographic map of the Area to help and give me artificial thing, natural places of that Area

→ The site map study give me how to do the survey.

→ Information About Pre-Existing:

→ Collected the information ~~are~~ already taken about the place, people of their area where to constructed the highway.

→ Also I will study frequency of the area which help me to decide the road dimension mean width and number of the lanes of the road.

→ Also the study about the area of the soil and its types of soil.

→ Collected The Data:

↳ I will study materials different particles and to extract the following data.

→ Permanent structure of the area

→ Soil characteristics

→ Geological features

- Religious places of The Area
- High flood level of The Area.
- Hills, valley, lakes etc of The Area

Q03: What is importance of vehicle performance in highway design?

ANS: Most critical parameter which are included in determining

Highway designs guideline such as

- * Maximum grades
- * Length of Acceleration and deceleration rates
- * Passing Sight Distances
- * Freeway ramps-
- * Turn out bays for buses.
- * Timing of Signalized intersection

The most important reason to study the vehicle's performance in highway design is to be

able to accommodate a large variety of vehical types on roads

Q04# write short note on Directional distribution in design of highways?

Ans:

* DIRECTIONAL DISTRIBUTION:

- ↳ Highways must be designed to adequately serve the peak-hour traffic volume in the peak direction of flow
- ↳ Total hourly traffic is used in both direction to design two lane Road.
- ↳ On the design of highways with more than two lanes and on two lane Road where important intersections are encountered or where additional lane are to the provided later.
- ↳ The Hourly traffic volume for each direction of flow is essential directional traffic is used for multilane Roads and street.
- ↳ Normally, one direction contributes

55-70% in Total Traffic, Although
Sometime 80% is observed.

→ Significance:

→ Cts used to convert
average daily Traffic to
directional peak hour Traffic

QOS: Explain Board Classification
of Surface distress modes.

Ans:

Surface distress modes can be
classified into three groups:

- Fracture
- Distortion
- Disintegration

→ Fracture:

This could be in the form of
cracking i.e. in flexible and rigid
pavement or spalling resulting from
such things as excessive loading or
contraction.

→ Distortion:

This Distortion is the form of
deformation i.e. corrugation, shoring etc
which can result from such
things as excessive loading, creep
Frost, swelling etc

→ Disintegration:

This is in the form of stripping, raveling or spalling which can result from such things as loss of bonding, chemical reactivity poor consolidation

Q6: Explain Alligator Cracking, Block Cracking, Longitudinal Cracking and Transverse Cracking:

Ans:

1) → Alligator Cracking:

→ Alligator Cracking refers to a surface damaged in such a way that cracks form a pattern that look like reptile scales, most notably those on an alligator or crocodile back.

→ Alligator Cracking also called "Crocodile Cracking."

→ Causes:

- * Main cause of Alligator Cracking is unlike surface-level asphalt damage fatigue cracking is almost always caused by problems beneath the asphalt in the underlying layers.
- * Alligator Cracking happens when the pavement is carrying burden that

That Supporting Structure cannot hold up.

2) Block Cracking:

→ Block Cracking is a series of interconnecting cracks that form in a rough rectangular pattern.

→ It can occur in both concrete and flexible road pavements.

Causes:

→ Mainly caused by shrinkage of the asphalt concrete and daily temperature cycling and it is not load associated.

→ Usually occurrence are indicates that the asphalt that has hardened significantly.

→ Normally occurs over a large portion of pavement Area.

3) Longitudinal Cracking:

* Longitudinal Cracking To The centerline of the pavement. They can be caused by poorly constructed joint, shrinkage of the Asphalt layer.

→ Causes:

Following Causes of Longitudinal Cracking.

- The Reflection of a Crack or joint in the road pavement
- An expansive weak subgrade
- Differential settlement in cut and fill.

→ Repair:

- 1- Low Severity Crack :-> Crack Seal To prevent
→ Entry of moisture into the subgrade through the cracks.
- 2- High Severity Crack :-> Remove and Replace the cracked pavement layer with an overlay

4) Transverse Crack:

It is an unconnected crack that runs across a Road pavement perpendicular to the direction of the Road.

→ Causes:

→ The Reflection of a Crack or joint in an underlying pavement layer.

→ A Construction joint of shrinkage in a asphalt surface.

→ Structural failure of a concrete base course.

→ Repairing:

→ Crack Sealing

→ Remove and Replace the Cracked pavement layer with an overlay.

→ Raveling of the Crack edge.