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Subject Transportation II

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Qno 1

Keeping in view different modes of transportation

compare railway with highway:-

Highway

Railway

* It provide door to door service

It depends on road service.

* car, bus, Truck

Passengers and goods.

* It requires small investment

It requires high investment.

* suitable for short transport

suitable for bulky and heavy goods.

* Saving in Packing cost

larger capacity

* Feeder to other modes of transport.

Employment opportunities.

Five Modes of Transportation^②

- Railway Transport
- Road Transport
- Waterways Transport
- Air Transport
- Pipelines Transport

Qno 2:-

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

Ans: Reference Material are:-

. Aerial photographs

. Maps

. Existing engineering reports

Design procedure like AASHTO and ASTM design procedure, legal load limits.

Design consideration:-

In this stage the location alignment and shape of a highway are selected during the design stage.

Engineering including, topography, geology climate and traffic volumes.

Social and demographic. including land uses and patterns.

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Data to be extracted:-

Any specific site should be excluded from further consideration. If it is found that a site of historic and archeological importance within an area. ~~Exclude~~ ~~it~~

Average daily traffic calculation. to find design ESAL, Material property in the form of MR,

Those route will be selected for which cost is minimum.

The structure number (SN) represents the overall structural Requirement needed to sustain the design traffic loading.

For given combinations of soil support (MR), total traffic expressed in ESAL

terminal serviceability

$$MR = C \left(\frac{0.24P}{dY} \right)$$

$$SN = a_1 D_1 + a_2 D_2 M_2 + a_3 D_3 M_3$$

Routes which give Facility to more people will be adopted.

Qno3:- What is the importance of vehicle performance in highway design?

Ans- Vehicle performance is important in highway design because-

- ▶ Climbing or passing lane
- ▶ Freeway ramps
- ▶ Acceleration and deceleration
- ▶ Maximum grades
- ▶ Setting speed limit
- ▶ Adequate passing and stopping sight distance.

~~Human~~ Human capabilities:-

A:- Perception / Reaction times

B:- Eye sight

Performance of road vehicles forms the basis for roadway design guidelines such as

Qno(4)

Write short note on Directional

distribution in a design of highways.

Directional Distribution:-

Directional distribution, also known as the "D" Factors is an important traffic parameter that is used for design and operational performance analysis.

- Directional traffic is used for multilane roads and streets.
- Total hourly traffic in both directions is used to design two lane road.
- Typically one directional contributes by 55-70% in total traffic although occasionally 80% is observed.
- Highway must be designed to adequately serve the peak hour traffic volume in peak direction of flow.

In the basis of ⁽⁶⁾ ⁽⁷⁾ principles of traffic engineering a "D" Factor is selected as the ratio between the major direction hourly traffic volume to the total traffic volume of both directions

For rural and suburban roads, the directional distribution Factor (D) ranges

From 55 to 80.

Qn. (5)

(8)

Explain broad classification of surface

distress modes:-

Ans. Surface distress is any indication of poor or unfavorable pavement. Distress is a condition of the pavement structure that reduces serviceability or leads to a reduction in service life.

Modes:-

Fracture:-

This could be in the form of cracking or spalling

Distortion:-

This is in the form of deformation.

Disintegration:-

This is in the form of stripping or scaling or removal of paving materials.

Q no 61-

(9)

Explain Alligator cracking, block cracking, longitudinal cracking and Transverse cracking-

Alligator cracking:-

Alligator cracking may be considered a combination of Fatigue and block cracking. Chicken wire cracking, spider web cracking map cracking. Occure in area subjected to repeated traffic loading.

Severity levels:-

Low:-

An area of cracks with no or very few interconnecting cracks and cracks are not spalled.

Medium:-

An area of Interconnected Cracks that Form a complete pattern.

High:-

An area of interconnected cracks Forming a complete pattern cracks are moderately or several spalled.

Block Cracking:- (10)

Rectangular block range in size from approximately 0.1m^2 to 1m^2 . A pattern of cracks that divide the pavement into approximately rectangular pieces with sides generally longer than one foot.

Severity levels:-

Low:-

Cracks with a mean width $\leq 6\text{mm}$

Medium:-

Cracks with a mean width $> 6\text{mm}$ and $\leq 19\text{mm}$,

High:-

Cracks with a mean width $\geq 19\text{mm}$.

Longitudinal Cracking

Expansion and contraction of pavement material. ~~are~~ Cracks predominantly parallel to pavement centerline location.

Severity levels:-

Low:-

A crack with a mean width $\leq 6\text{mm}$

Medium:

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Crack with a mean width ~~≤ 6mm~~ $> 6\text{mm}$ and $\leq 19\text{mm}$

High:-

Crack with a mean width $> 19\text{mm}$.

TRANSVERSE CRACKING:-

It is caused by slabs longer than required and excessive thermal stresses.

Cracks that are predominantly perpendicular to pavement centerline.

Severity level:

Low:-

Unsealed cracks with a mean width

~~≤ 6mm~~ $\leq 6\text{mm}$

Medium:-

Crack with a mean width $> 6\text{mm}$ and

$\leq 19\text{mm}$

High:-

Crack with a ~~mean~~ mean width $> 19\text{mm}$.