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Section # A

Paper # Highway and Traffic
Engineering

Semster # 6

Mode of Transportation:-

various mode of Transportation

are

- (i) Rail Transport
- (ii) Road Transport
- (iii) water Transport
- (iv) Air Transport
- (v) Pipe line.

Comparison between Railway and highway

I have discussed some basic points of comparison between roadways and railways. According to utility the transportation of people and goods for short distance can be speedily and easily done by highways.

(i) Suitability to traffic:-

In roadways, routes are meant for movement of different type of traffic such as buses, trucks, scooters, rickshaws, cycles, pedestrians etc.

⊙ The railway routes are meant only for movement of trains.

(ii) width of sight of way:-

The roadway routes require more width of sight-of-way

⊙ The railway routes require less width of sight of way.

(2)

(iii) Strength of route-

The required strength of roadways is less
(*) The required strength of railway track is more.

(iv) load handling capacity:

The load handling capacity of road vehicles is less and that too at low speeds

(*) load handling capacity of railway vehicles is more and that too at high speeds.

(v) Rate of accidents:-

(*) In roadways, the rate of accidents is high.

(*) in railway, the rate of accidents is less.

(3)

Ans The reference material that I will study for the design of highway include

- (1) Maps
- (2) Aerial photographs
- (3) Charts
- (4) Existing Engineering reports.

The data that I will extract from these sources includes the following characteristics.

- (*) Engineering (Traffic volume, climate geology)
- (*) Social and Demograph (land use and zoning pattern.
- (*) Environment (type of wildlife historic or recreational sites)
- (*) Economic (unit cost for construction)

(4)

(3)
Ans

Importance of vehicles performance in highway design:-

Parameter which are included in determining highway design are

- (*) Acceleration rates
- (*) Deceleration rates.

The performance of road vehicles for the bases for roadway design guideline such as.

- (*) length of acceleration - deceleration rates
- (*) Maximum grades
- (*) Stopping sight distance.
- (*) Setting speed limits
- (*) Passing sight distance.
- (*) Timing of signalized intersections
- (*) Turnout bays for buses
- (*) freeway ramps.

The main reason we study vehical performance in highway design is to be to accomodate a large variety of vehical types on roads.

Q4
Ans

Directional Distribution:-

Highway must be designed to adequately serve the peak-hour traffic volume in the peak direction of flow

- ⊙ Total hourly traffic in both directions is used to design two-lane roads
- ⊙ Typically one direction contributes by 55-70% in total traffic although occasionally 80% is observed

Example:-

for example consider a rural road with a design volume of 4000 vehicles per hour (vph) for both directions of travel combined.

- ⊙ If during the design hour, the directional distribution is equally split or 2000 vph in one direction may be adequate
- ⊙ If 80 percent of DHV is in one direction at least three lanes in each direction would be needed for the 3200 vph.

Qs
Ans

Surface Distress:-

Surface distress is any indication of poor or unfavorable pavement performance or signs of impending failure any unsatisfactory performance of a pavement short of failure.

Classification of Surface Distress:-

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

(i) Fracture:-

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

(ii) Distortion:-

This is in the form of deformation (e.g., rutting, corrugation and shoving) which can result from such things as excessive loading, creep, densification, consolidation, swelling or frost action.

(7)

(ii) Distintegration -

This is in the form of stripping, raveling or spalling which can result from such things as loss of bonding, chemical reactivity, traffic abrasion, aggregate degradation, poor consolidation, compaction or binder aging.

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Ans

(i) Alligator cracking:-

⊕ Chicken-wire cracking, spider web cracking
map cracking etc.

⊕ indicative of fatigue failure of pavement
due to repeated traffic load

⊕ Alligator cracking may be considered
a combination of fatigue and block
cracking.

⊕ It is a series of interconnected cracks
of various stages of development.

⊕ Alligator cracking develops into a many
sided pattern that resembles chicken wire
or alligator skin

⊕ occur in area subjected to repeated
traffic loadings.

(ii) Block cracking:-

A pattern of cracks that divides
the pavement into approximately rectangular
piece with sides generally longer than
one foot.

⊕ Rectangular blocks range in size from
approximately 0.1m^2 to 10m^2 .

⊕ possible cause, shrinkage of asphalt

(iii) longitudinal cracking:-

crack predominantly parallel to pavement
centerline, location within the lane
wheel path versus non-wheel path is

Significant -

Possible causes.

Expansion and contraction of pavement material road bed settlement poorly constructed paving joints.

(iv) Transverse crackings -

- (*) fatigue stresses.
- (*) Thermal stresses
- (*) lack of bearing support or settlement
- (*) poor drainage.
- (*) Existing discontinuities, cracks joints
- (*) Asphalt mix design issue e.g. inappropriate bitumen content etc.