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Q NO! 01

Compare Railway & Highway

Railway	Highway
• The transportation along the railways track could be advantageous by railway between the Stations both for the passenger and goods particularly for long distance.	* It gives the maximum Service to one and all.
It depends upon the road transport i-e road could serve as a feeder system.	* It gives maximum flexibility for travel with reference to route choice, direction, time and traveling speed.
Energy require to drag a unit load through unit distance by the railway	* It provide door to door Service.
	* Other modes are depend on it.
	* It requires small investment for the government.

is only 1/4 to 1/5 of that required by road	* motor vehicles are chaper than other carrier like rail engines.
* Safety (minimum crash rate if handled carefully else sever charsh can occur)	* It saves the time for short distance.
* Railway is a track made of steel rails along which trains run	* High degree of accident due to flexibility of movement.
* The chances of accident are very low.	* The chances of accident are very high.
* maintenance cost is high	* maintenanic cost is less in highway.

Q NO! 02

Preliminary Steps for design for New highway :

The preliminary survey is alarge scale study of one or more feasible roots within a corridor, that is made for the propose of collecting all physical information that may affect the location of the proposed road-way.
it result in a paper location that defineds the line for the subsequent final location survey.

Refrence material to Study.

1- The Topographic map that shows both horizontal and vertical data.

2- Contours maps that are simple lines of equal elevation on Terrain.

3- exiting Engineering reports.

4- Aerial photographs.

5- charts.

Data to extract :-

1- The positions and invert levels of streams and ditches.

2- The position of trees, Banks, Bridges, Culverts, existing tracks.

3- Roads, power lines, pipe lines, house, monuments and other natural and man made cultural places need to be clearly determined.

4- The limits of water catchment areas, the position and invert level of streams and ditches.

5- Engineering, including Topographic, geology, climate and Traffic volume.

6- Social and demographic including land use and Zoning pattern.

7- Environmental including Types of wildlife, location of recreational, historic and Archeological sites and the possible effects of air, noise and water pollution.

Q No! 03

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Importance of vehicle performance in highway design.

* Acceleration and deceleration rates of vehicles are often critical parameters in determining highway design.

These rates often govern the dimensions of such design features:

* Freeway ramps
* Climbing or passing lanes
* Turnout bays for buses
* Acceleration and deceleration lanes
* Highway alignment (adequate passing and stopping sight distance).
* Determine the need for truck climbing lanes. (steep grade).

Q NO! 04

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Direction distribution in design of highways

Direction Distribution

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

Totally hourly traffic in both direction is used to design two-lane roads.

In the design of highways with more than two lanes and on two lane roads where important intersections are encountered or where additional lanes are to be provided later, knowledge of the hourly traffic

volume for each direction of travel is essential Directional traffic is used for multilane roads and streets.

Typically one direction contributes by 55-70 % in total traffic. although occasionally 80 % observed.

Direction Distribution - Direction design hourly volumes DDHV - ADTs are Converted to a Peak - hour volume in the peak direction of flow.

$$DDHV = AADT \times K(\text{Peak hr}) \times D(\text{Peak hr - flow})$$

Q NO! 05

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Classification of Surface distress modes :-

Surface distress modes can be broadly classified into following Three group.

i- 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.

ii- Distortion :- This is in the form of deformation (e.g. rutting, corrugation & shoving), which can result from such Things as excessive loading, creep, densification, consolidation Swelling, or frost acting.

iii - Disintegration :- This is the form of stripping. Raveling or Spalling, which can result from such things as loss of bonding, chemical reactivity. traffic abrasion aggregate a degradation, poor consolidation / compaction or binder aging.

Thus. Surface distress will be some what related to roughness (The more cracks. distortion and disintegration - the rougher the pavement will be) as well as structure integrity (Surface distress can be a sign of impending or current structural problems).

Q NO! 06

Alligator (Fatigue) cracking :-

Description : Series of interconnected cracks caused by fatigue of HMA surface (or stabilized base) under repeated traffic loading. In Thin pavements, cracking initiates of the bottom of the HMA layer where the tensile stress is the highest than propagates to the surface as one or more longitudinal cracks. This is commonly reffered to as "bottom-up" or classical Alligator cracking.

Problem : indicator of structural failure, cracks allow moisture infiltration, roughness, may further deteriorate to a pathole.

* Chicken-wire cracking : Spider web cracking, map cracking, etc.

indicative of fatigue faiture of pavement due to repeated traffic loads.

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

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

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

occurs in areas subjected to repeated traffic loadings.

Block Cracking:

This distress is a pattern of cracks that divides the pavement into approximately rectangular pieces.

The rectangular block's range in size from approximately 1 ft^2 to 100 ft^2 or 0.1 m^2 to 10 m^2.

Possible Cause : Shrinkage of asphalt.

Longitudinal Cracking :-

This distress's crack are predominanty parallel to the pavement centerline. The location with in lane (wheel path versus non-wheel path) is significant.

Possible Causes: Expansion and contraction of pavement material, roadbed settlement, Poorly Constructed paving joints.

Transverse Cracking :-

This distress has cracks that has predominantly perpenicular to the Pavement centre line.

Cracking across the center line, not due to reflection cracking.

Possible Causes : Expansion and contraction of pavement material, road bed settlement, Poorly constructed paving joints.