

Q:- Difference between Highway and Railway?

Highway

It is any public or private road used to connect cities and towns

Roads are used by various types of vehicles i.e buses, truck, cars etc

It requires less investment from government for construction

It saves time

Higher degree of accident occur due to flexible movement

It consist of lanes and roads

The only mode of transportation which is connected to railway, Airport and seaport for transferring and collecting goods and people.

Railway

A permanent track composed of line of parallel metal rails used for transporting goods & passengers

Railway track are used only by rail locomotives

It requires great investment from government for construction

It doesnot save us time

No or less accident occur due to uniform movement

It is made of rail track

It's only connect one station to another

Q:- You are a transportation engineer - - - ?

Ans) For designing of new roads or highway we have to study the following things

Office study of existing information:-

The first step is to study the pre existing data of area where highway is to be constructed. This data includes Engineering, Social and demographic and Economic. All the available data are called and examined. i.e traffic volume, climate geology, land use, zoning pattern, unit cost for construction

Reconnaissance Survey:- The object of this survey is to study several feasible routes each within limit width of few km. Aerial photography is used to find out information such as terrain and Soil Condition crossing of other transport facilities.

Preliminary Location Survey:-

During this phase of survey the position of the road are kept as near as possible to original route i.e. establishing control points, Determining vertical and horizontal alignment.

Final Location Survey:-

The final location Survey is the complete layout of selected route. final horizontal and vertical alignment final position of structures and drainage channels and data required for locating of highway.

CONCLUSION:-

For designing of new highway we should have to study the old data of the area where highway is to be constructed.

- * We have to study its zoning pattern
- * We have to study traffic volume and climate geology
- * We have to extract data for construction of highway.
- * We have to identify the routes of the highway.
- * We have to study about terrain and soil
- * Crossing of other vehicles.
- * We have to study about ancient buildings in the area and also about canals, channels and drainage.

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Section A.

Q,

What is importance of vehicle in highway design?

Vehicle performance plays an important role in designing highway. It helps us in construction lanes, alignment of roads, signal timing, sign placement, curves and other roads designing.

IMPORTANCE:-

Performance of vehicle helps us in

- => Passing Sight distances
- => Setting Speed limit
- => Maximum grades
- => Turnout bays for buses
- => Acceleration and deceleration lanes
- => Timing of signalised intersection
- => Highway Alignment
- => Freeway Ramps
- => Length of Acceleration.

Principle of Braking :-

For highway design and traffic analysis braking characteristics are most important aspect of vehicle performance.

Braking behaviour influences geometric design, signal timing, sign placement, accident avoidance systems, roadway surface design.

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Q4) write a short note on Directional distrib-
ution in design of highway?

Directional Distribution:-

The directional distribution also known as D factor is an important traffic parameter that is used for designing and operational performance. Directional distribution is the predominant one-way traffic volume expressed as percentage of two way traffic. For measuring traffic we use two methods basically

- i) Manual Observation
- ii) Automatic Recording

Direction Design Factor:-

Factor reflecting the proportion of peak-hour traffic traveling in peak direction. often there is much more traffic in one direction than other.

Designing of Highway:-

Highway must be design to adequately serve the peak hour traffic volume in peak direction of flow. Total hourly traffic in both direction is used to design two lane roads.

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

$$DDHV = AADT \times K \times D$$

From the above equation we can find or design Direction design hourly volume.

Q. 5) Write broad classification of surface distress modes

Surface distress :-

It's an indication of poor or unfavourable pavement performance or signs of impending failure or we can say that any unsatisfactory performance of surface. Surface distress can be classified into three groups.

i) Cracking :-

It may be in the form of cracking, cracking may be longitudinal and transverse, Fatigue or Block cracking.

Causes :-

- i) Shrinkage or contraction of bituminous concrete surface.
- ii) Excessive deflection of asphalt surface over weak foundation
- iii) Changes in temperature changes the stress/strain cycle.

ii) Distortion :-

The deformation occur in the surface is called distortion. It may cause due to following factors.

Causes :-

- i) foundation settlement, swelling soil, frost action
- ii) Insufficient compaction of the pavement courses
- iii) lack of stability in bituminous mix.
- iv) Poor bond between surface and layer of pavement.

iii) Disintegration :- This is in the form of stripping or removing of materials.

Causes :-

- i) Insufficient compaction of surface, improper mixing of asphalt
- ii) The most common ^{cause} type of disintegration is raveling
- iii) Over heating of the mix
- iv) Loss of adhesion between the asphalt coating and aggregate particles.

Q Explain types of cracking?

ALLIGATOR CRACKING:-

It is also known as fatigue failure since it appears similar as alligator skin so it is called as alligator cracking.

Causes:-

The failure can be caused due to weakness of surface base or subgrade.

The surface is too thin or poor drainage.

The main reason is repetitive movement of heavy weight

Block CRACKING:-

Block cracks look like large interconnected rectangles

Causes:-

=> Caused by shrinkage of the asphalt pavement during binder to expand and contract with temperature cycle

=> Not mixed properly and placed too dry.

=> It spread over large area of ground.

Longitudinal Cracking:-

These are cracks parallel to pavement centerline

Causes:-

=> Poor joint construction or location

=> A reflective crack from underlying layer

=> Top down cracking.

Traverse Cracking :-

Cracks perpendicular to the pavement's centerline usually a type of thermal cracking.

Causes:-

=> Shrinkage of the surface due to temperature or asphalt binder hardening

=> Reflective crack caused by cracks

=> top down cracking