**Unit 1**

1. Explain road safety and its importance in India.

ANS: <https://morth.nic.in/national-road-safety-policy-1>

Road Safety in India:

* Definition: Road safety refers to measures aimed at reducing the number of accidents and fatalities on roads.
* Importance: In India, road safety is important due to the high number of road accidents and fatalities, with over 150,000 people killed each year.
* Government measures: The Indian government has implemented various measures to improve road safety, including increasing fines for traffic violations, improving road design, and promoting driver education programs.
* Benefits: Improving road safety can help reduce the number of accidents and fatalities, improving the quality of life for millions of people and boosting economic growth.
* Road safety is the safety of people from road side injuries and accidents.
* It is the prevention and protection of road accidents by using all the road safety measures. Every person going on the road has a risk of injury or death. Such as pedestrians, motorists, cyclists, passengers, etc.
* It is said that a person's brain works in such a way that it tells the concerned person how safe he is at that time.

Refer ppt.

1. List and explain the factors affecting design of geometric elements.

ANS: <https://esenotes.com/geometric-design-of-highway-and-factor-controlling-geometric-design/>

The design of geometric elements on a road, such as the alignment, cross-section, and superelevation, is influenced by several factors, including:

* Topography: The shape and elevation of the land affects the road's alignment, with steeper slopes requiring more gradual curves and longer grades.
* Traffic volume and speed: High-volume roads need to be wider and have gentler curves to accommodate high-speed traffic, while low-volume roads can have sharper curves.
* Climate: Climate conditions, such as heavy rainfall or snow, can affect the design of roads, with areas prone to flooding or heavy snowfall requiring specific design considerations.
* Soil stability: The stability of the soil and geology of an area can impact the design of roads, with areas prone to landslides or soil erosion requiring specific design considerations.
* Environmental factors: Environmental considerations, such as the presence of wildlife or protected habitats, can affect the design of roads and may require specific measures to minimize the impact on the environment.
* Cost: The cost of construction and maintenance is a key factor in road design, with wider roads and gentler curves being more expensive to build and maintain.

1. Explain the recommendations and implementations of Jayakar committee.

ANS: Refer PPT.

1. Explain the road accidents scenario in India with statistics.

ANS <https://bro.gov.in/WriteReadData/linkimages/5768690382-14.pdf>

The road accident scenario in India is alarming, with a high number of accidents and fatalities reported each year. According to government statistics:

1. High number of accidents: In India, over 400,000 road accidents are reported annually, leading to the loss of hundreds of thousands of lives and causing serious injury to many more.
2. High fatality rate: India has one of the highest road fatality rates in the world, with over 150,000 people killed in road accidents each year.
3. Vulnerable road users: Pedestrians, cyclists, and two-wheeler riders are particularly vulnerable to road accidents in India, accounting for a high proportion of fatalities.
4. Contributing factors: A range of factors contribute to the high number of road accidents in India, including poor road design, lack of enforcement of traffic laws, and reckless or irresponsible driving.
5. Economic impact: Road accidents also have a significant economic impact, with the cost of accidents in terms of lost productivity and medical expenses estimated to be in the billions of dollars each year.
6. Explain the modified classification of roads as per third 20 year road development plan.

ANS: In India, the third 20-year road development plan (1985-2005) modified the classification of roads, dividing them into several categories based on their function, design standards, and the type of traffic they are intended to serve. The modified classification of roads in India is as follows:

1. National Highways (NH): These are the highest-standard roads, connecting major cities and serving inter-state traffic. They are designed to handle high-speed, high-volume traffic and are maintained by the central government.
2. State Highways (SH): These roads connect district headquarters and major towns within a state, serving both inter- and intra-state traffic. They are designed to handle moderate-speed, moderate-volume traffic and are maintained by the state governments.
3. Major District Roads (MDR): These roads connect remote areas and villages to district headquarters and major towns, serving local traffic. They are designed to handle low-speed, low-volume traffic and are maintained by the state governments.
4. Rural Roads: These roads connect villages to one another and provide access to rural areas. They are designed to handle slow-speed, low-volume traffic and are maintained by the rural local bodies

Write a note on following

a. Camber

b. Shoulder

c. Width of carriage way

d. Medians

e. Kerb Stones

f. Right of way

g. Pavement unevenness

h. Width of formation

i. Road margins

ANS: <https://www.civil.iitb.ac.in/~vmtom/nptel/302_CroSecEle/web/web.html>

1. Define total reaction time of driver. With neat diagram explain PIEV theory.

ANS: <https://www.civilease.com/2020/09/explanation-of-piev-time-with-help-of.html>

7. Draw a typical cross section and label the cross sections with dimensions.

a. Divided highway in Urban area

b. ODR or VR in embankment in rural area

c. MDR in cutting in rural area

d. National Highway or State Highway (NH or SH) in rural area

e. Two lane city road in Built up area

ANS: Refer PPT

8. What are the important pavement surface characteristics w r t highway design and

explain briefly?

ANS: <https://esenotes.com/pavement-surface-characteristic/#:~:text=Pavement%20surface%20characteristics%20include%3A&text=Skid%20and%20Slip-,Friction,Drainage>

9. Enumerate the factors governing the width of carriage way. State the IRC Specifications

of width of carriage way for various classes of roads.

ANS: <https://civilsir.com/road-carriageway-width-in-india-as-per-irc/>

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