

LECTURE NOTES
HIGHWAY ENGINEERING
4TH SEMESTER
DIPLOMA(CIVIL ENGINEERING)



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HIGHWAY ENGINEERING

Chapter 1

INTRODUCTION

1 Introduction

1.1 Importance of Highway transportation: importance organizations like Indian roads congress, Ministry of Surface Transport, Central Road Research Institute.

1.2 Functions of Indian Roads Congress

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❖ **Highway Engineering** is a branch of transportation engineering which deals with the design, construction and maintenance of different types of roads. It is also called as road engineering.

it involves the study of the following :

- 1) Planning, location and development of roads.
- 2) Materials required for their construction.
- 3) Highway traffic performance and its control.
- 4) Drainage of roads etc

❖ **Importance of Roads or Highway Engineering :**

Following are the importance of roads or highway transportation.

- ❖ They provide conveyance to the people, goods, raw materials, etc., to reach different parts of the country.
- ❖ They are the only source of communication in hilly regions.
- ❖ Helps in agricultural development.
- ❖ Helps in dairy development.

- ❖ Helps in tourism development.
- ❖ Helps in fisheries development.
- ❖ Helps in maintaining law and orders in a country.
- ❖ Forestry development.
- ❖ They improve the medical facilities.
- ❖ They improve the land value.
- ❖ They generate the more employment opportunities.
- ❖ They play important role in defence activities.
- ❖ They become the symbol of country's progress and development.

1.1 IMPORTANCE OF HIGHWAY TRANSPORTATION



1.1 Indian Roads Congress (I.R.C.):

- ❖ The Indian Roads Congress was established by the Central Government in 1934 as per the recommendations of the Jayakar Committee.
- ❖ The I.R.C. was constituted to provide a forum for the regular pooling the technical ideas, experiences and know-how for the planning of the development of the roads throughout the country.
- ❖ I.R.C. provides the recommended specifications regarding the design and construction of the roads in the country.
- ❖ IRC has collaborated with the road wing of the ministry of the surface transportation of Govt. of India. It publishes journals, standard specifications and guidelines on various aspects of highway engineering.

1.2 Functions of Indian Roads Congress (IRC)

IRC a body of professional highway engineers provides the following services:

- ❖ It provides a forum for the expression of the collective opinion of its members for all matters affecting the construction and maintenance of roads in India.
- ❖ It promotes the use of standard specifications and practices.
- ❖ It provided with the suggestions for the better methods of planning, designing, construction, administration and maintenance of roads.
- ❖ It conducts periodical meetings to discuss technical problems regarding roads.
- ❖ It makes the laws for the development, improvement and protection of the roads.
- ❖ It furnishes and maintains libraries and museums for encouraging the science of road-making.

Central Road Research Institute (CRRI)

❖ CRRI was started by the Central Government in 1950, for the research work in highway engineering. CRRI is a series of laboratories under the council of scientific and industrial research in India.

It offers the following services.

- ❖ Carries basic and applied research for the design, construction and maintenance of the highways.
- ❖ Carries research on traffic safety and transport economics.
- ❖ Carries research on economical utilization of locally available materials for construction and maintenance of roads.
- ❖ Research for the development of the new machinery, tools equipment and instruments for highway engineering.
- ❖ To provide technical advice and consultancy services to various organizations.

Roads wing of the ministry of surface transport

- ❖ The roads wing of the Ministry of Surface Transport handles the road matters of the Central Govt. It is headed by a Director-General.
The Director-General is assisted by two Additional Director Generals (one for roads and one for bridges), a number of Chief Engineers, Superintending Engineers, Executive Engineers and Asst. Executive Engineers. The roads wing has a Chief Engineer for the North-East region posted at Guwahati and a Liaison-cum-Inspectorate organization consisting of S.E's and E.E's in the various states.

The functions of the roads wing of Surface Transport are as follows.

- ❖ To control funds approved by the Central Government for the development of National Highways.
- ❖ To control the central road fund (CRF.)
- ❖ To prepare plans for the development and maintenance of National Highways in consultation with state PWDs.
- ❖ To oversee technically the quality of works executed by the agencies.
- ❖ Administer matters regarding road research.
- ❖ Examine technically the projects and bridges prepared by the PWDs.
- ❖ To administer the central road program other than National Highways in the Union Territories.

1.3 IRC CLASSIFICATION OF ROADS



❖ According to IRC, roads are classified as

- 1) National Highways (NH)
- 2) State Highways (SH)
- 3) Major District Roads (MDR)
- 4) Other District Roads (ODR)
- 5) Village Roads (VR)



1. National highways

National highways are the main highways running through the length and breadth of India. It connects many roads like major ports, foreign highways, capitals of large states and large industrialtourist centres.

It carries about 30 to 50 percent of total traffic of our country. National highways are the main roadson which the entire road communication is based.

They are assigned the respective number for the sake of convenience such as **NH-1**, **NH-2**, **NH-3** and so on ; as is clear from below ;

NH-1 stands for Amritsar - Ambala - Delhi Road

NH-3 stands for Agra - Bombay Road

To meet with the present day fast moving traffic, the **express highways or expressways** have been constructed recently for connecting important places.

The responsibility of construction and maintenance of these roads lies with the Central Government.

2) State Highways (SH)

- ❖ State arterial roads of a state, connecting up with the National highways of adjoining states, district head quarters and important cities within the state. These are also known as **Provincial Highways**.
- ❖ The responsibility of construction and maintenance of these roads lies with State Governments. However, the Central Government gives grant for the development of these roads.



3) Major District Roads (MDR)

- ❖ Major district roads are important roads within a district serving areas of production and markets and connecting those with each other or with the main highways.
- ❖ MDR is used for only low speed. The responsibility of construction and maintenance of these roads lies with the District Authorities. However, the state Government gives grant for development of these roads.



4) Other District Roads (ODR)

- Other district roads are the roads serving rural areas of production and providing them with outlet to market centres, taluk head quarters, block development head quarters and other main roads. ODR is also used for low speed.

5) Village Roads (VR)

- Village roads connect villages to other villages and also connects villages to the nearest road of highways.



▪ EXPRESS WAYS

- Expressways are a separate class of highways with superior facilities and design standards.
- These expressways have controlled access and grade separation at all roads and rail crossings. It is the routes having very high volume of traffic.
- These highways should allow only fast moving vehicles. These roads are of higher class than National highway.



1.4 Organisation of state highway department

- Works department (PWD)

State Highways play major role in economic development of the people as it connects major & important places of the State as well as neighboring States. Also, development of these roads will improve tourism activities in the State as it connects major tourist places.