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Transportation Engineering - 1

Department of Civil Engineering

Faculty of Engineering & Technology

TRANSPORTATION ENGINEERING – I (Highway Engineering)
Lecture – 3 (Unit – 1)

Topics to be covered:

History of Road Development

- Jaykar Committee Recommendations
- Nagpur Road Plan
- Bombay Road Plan
- Lucknow Road Plan
- Comparison between 1st, 2nd and 3rd 20 Year Road Plans

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JAYAKAR COMMITTEE RECOMMENDATIONS

➢The first world war time frame and that promptly tailing it was conceived a quick development in vehicular transport. So requirement for better streets turned into a need.

➢For that, the Government of India selected a committee called Road Development Committee with Mr. M.R. Jayakar as the chairman. This committee came to be known as Jayakar committee.

➢ In 1927 Jayakar committee for Indian road development was appointed. The major recommendations were:

1. Committee found that the road development of the country has become beyond the capacity of local governments and suggested that Central government should take the proper charge considering it as a matter of national interest.
2. They gave more stress on long term planning program, for a period of 20 years (hence called twenty year plan) that is to formulate plans and implement those plans with in the next 20 years.
3 One of the recommendations was the holding of periodic road conferences to discuss about road construction and development.
4. The committee suggested imposition of additional taxation on motor transport which includes duty on motor spirit, vehicle taxation, license fees for vehicles plying for hire.
5. A dedicated research organization should be constituted to carry out research and development work.

Results of Jayakar Committee Recommendations:

1. A development fund called Central road fund was levied on fuels in 1929. This fund was intended for road development.
2. A semi-official technical body called Indian Road Congress (IRC) was established in 1934.
3. The 20 Year Road development plans were initiated.
4. Formation of Central Road Research Institute (CRRI) was done in 1950.

Central Road Fund (CRF): 1929

- The Union Government used to allocate funds for development of State Roads to the respective State Governments under Central Road Fund (CRF) Scheme.
- *Central Road Fund Scheme* was constituted on 1 March 1929 by setting apart an amount of 2.64 paise per litre out of the Custom & Central Excise Duty levied on petrol for the development of the State Roads.
- The cess was increased from time to time to meet the challenges of accelerated funding requirement for all categories of roads in the country.
- Central Road Fund (CRF) is a non-lapsable fund created under Section 6 of the Central Road Fund Act, 2000 out of a cess/tax imposed by the Union Government on the consumption of Petrol and High Speed Diesel
- The tax is leived to develop and maintain National Highways, State roads (particularly those of economic importance and which provides inter state connectivity), rural roads, railway under/over bridges etc.
- Around Rs. 20,000 crores get collected under CRF per annum (during the years 2012-14).

UTILISATION OF THE CENTRAL ROAD FUND:

- ✓ Development and maintenance of national highways;
- ✓ Development of the rural roads;
- ✓ Development and maintenance of other State roads including roads of inter-State and economic importance;
- ✓ Construction of roads under or over the railways by means of a bridge and safety works at unmanned rail-road crossings
- ✓ Disbursement in respect of such projects as may be prescribed by the Government.

The Indian Roads Congress (IRC) 1934

➢One of the recommendations of Jayakar Committee was holding of periodic Road Conference to discuss about road construction and development. The first such conference was held in 1930.

➢These conferences created great interest and paved the way for establishment of Indian Roads Congress in 1934. • IRC was registered as a society in 1937 under the Societies Registration Act of 1860.

➢The inaugural meeting of Indian Roads Congress was held in New Delhi in December, 1934. It was set up by Government of India in consultation with State Governments.

➢It is the premier body of Highways Engineers in India, to provide a national forum for regular pooling of experience and ideas on all matters concerned with planning, design construction and maintenance of highways.

➢ It recommends standard specifications & provides platform for expression of professional opinion on matters relating to roads.

➢IRC is a registered society under the Registration of Societies Act and is financed by contribution from Central Government, various State Governments and also contributions from its Members and sale of Publications.

FUNCTIONS OF IRC:

To promote and encourage the science and practice of building and maintenance of roads;

To provide a channel for the expression of collective opinion of its members regarding roads;

To promote the use of standard specifications and to propose specifications to achieve safety and mobility;

To advise regarding education, experiment and research connected with roads;

To hold periodical meetings, to discuss technical questions regarding roads;

To suggest legislation for the development, improvement and protection of roads;

To suggest improved methods of administration, planning, design, construction, operation, use and maintenance of roads.

To publish standard specifications regarding road and bridge works.

CENTRAL ROAD RESEARCH INSTITUTE (CRRI) : 1950

Central Road Research Institute or CRRI established in 1950 is a constituent laboratory of India's Council of Scientific and Industrial Research (CSIR).

The CRRI is located in New Delhi and conducts research and development in the areas of design, construction, maintenance and management of roads and airport runways.

It also works in area of traffic and surface transportation planning.

The institute provides technical and consultancy services to various user organizations in India and abroad.

NAGPUR ROAD PLAN or 1st 20 YEAR ROAD PLAN (1943-1963) [* completed in 1961]

➢After the First World War, the Road Development Fund was used for routine maintenance. But the fund was not used for the development project, because of the overall economic depression in the country.

➢The effect of heavy wartime traffic caused further deterioration of the highways. At this time, the Conference of Provincial Chief Engineers was held at Nagpur in 1943.

➢ There, a long-term road development plan was displayed for India and it was known as the Nagpur Plan.

FEATURES OF NAGPUR ROAD PLAN :

✓ In the Nagpur plan, they divided the roads into four classes as National Highway, State Highway, District Roads, Village Roads.

✓The national highway is the main roads which connect the capitals of states, importance ports, metro cities, industrial hubs, and foreign highways.

✓State Highways is the other main roads of a province or state. They connect mainly larger towns and district headquarters of the state.

✓District Roads are the main and important roads within a district. they connect importance markets and places with a state highway or with another higher category of roads. They also divided further as Major District Roads and Other District Roads.

✓ The roads which connect villages with each other or with the nearest road of a higher category are known as village roads.

✓ They proposed that road length should be increased so as to provide a density of 16 km per 100 sq.km.

✓ A hard, long-lasting crust would be provided for national and state highways and for major district roads.

✓ The committee suggested the development of roads as a star and grid pattern throughout the country.

✓ Within 20 years, the committee designed to construct 2 lakh km of road throughout the country.

BOMBAY ROAD PLAN or 2nd 20 YEAR ROAD PLAN (1961-81)

- The targets of Nagpur Road Plan were achieved in 1961, while this Road Plan was planned for duration up to 1963.
- By the end of the Nagpur road plan, the length of roads imagined under it was accomplished, however, the framework of the road was insufficient in numerous regards.
- The changed financial, industrial and agricultural conditions in the nation in that period required a review of the Nagpur design.
- A second plan of 20-year was drafted by the Roads wing of Government of India, which is popular as the Bombay Road Plan.

FEATURES OF THE BOMBAY ROAD PLAN:

- ✓ The aggregate street length focused to develop was around 10 lakh km
- ✓ The target road density was doubled as 32 km per 100 sq.km.
- ✓ Minimum of 40 percent of the length of Roads would be surfaced.
- ✓ The construction of 1600 km of expressways was also included in the plan.
- ✓ Funds for highway financing should come not only from direct beneficiaries (motor vehicles) but also from those on whom indirect benefits accrue.
- ✓ Sources which may be tapped are betterment levy, land revenue, toll projects and tax on diesel oil used for motor vehicles.
- ✓ The question of vesting authority with road engineers to remove encroachments needs to be examined.
- ✓ Traffic engineering cells should be established in each State.
- ✓ Maintenance of previously constructed roads were also included in this plan as a target.
- ✓ The total length of road laid during 2nd 20 Year Road Plan was 11.50 lakh Kms. which was much more than the target specified.

LUCKNOW ROAD PLANE OR 3rd 20 YEAR ROAD PLAN(1981-2001)

- Earlier two Road Development Plans led to two shortcomings:
  - (i) 1st two plans were not conceived to meet the needs of freight & passenger movement by road.
  - (ii) The plans were not part of the total transportation plan for the country.
- The Third Twenty year. (1981-2001) Road Development Plan (Lucknow Road Plan) was approved in the year 1984.

FEATURES OF LUCKNOW ROAD PLAN :

Roads should be classified for India as follow:

(a) Primary system : (i) Expressways (ii) National Highways.

(b) Secondary system : (i) State highways (ii) Major District Roads.

(c Tertiary system (Rural Roads :) Other District Roads (ii) Village Roads.

- ✓ Road length for the year 2001 should be 27,00,000 km giving a density of 82 km/100 sq.km.
- ✓ An all-weather road should connect all villages or groups of villages with a population of 500 and above by 2001.
- ✓ The road pattern for the construction according to Lucknow Road Plan was Square & Grid Pattern.
- ✓ Expressways of the length 5000km to be constructed on major traffic corridors to provide speedy travel.
- ✓ It aimed at constructing a road length of 12 lakh kilometres by the year 2001.
- ✓ The plan has set the target length of NH to be completed by the end of seventh, eighth and ninth five year plan periods.
- ✓ It aims at improving the transportation facilities in villages, towns etc. such that no part of country is farther than 50 km from NH.
- ✓ Energy conservation, environmental quality of roads and road safety measures were also given due importance in this plan.

CONTINUES……

Following formula give the lengths of various classes of roads as per the above guidelines:

1. Length of NH (in kin) = (area/10000) = (area in sq.Km/50)
2. Length of SH (in km) = (area in sq.Km/25)

or Length (in km) = 62.5 x Number of towns with population above 5,000 – (area in sq.km/50)

3. Length of MDR (in km) = (area in sq.km/12.5)

or Length (in km) = 90 x Number of towns with population above 5,000.

4. Total road length (in km) = 4.74 x Number of villages and town.
5. Rural Road Length (in km) = This can be calculated by finding the total road length and subtracting the other categories.

Selection of specifications should be done on the basis of :

(i) Their amenability to stage construction.

(ii) The need to adopt appropriate technology.

(iii) The use of local materials.

(iv) The use of soil-stabilization techniques.

(v) The use of alternative binders.

(vi) The use of cement concrete pavements wherever economically feasible and.

(vii) The need to conserve bitumen.

HISTORY OF ROAD TRANSPORTATION IN INDIA AT A GLANCE:

⇨ The first evidence of the construction of roads in India was found around 2800 BC. **History of road development in India are described below**:

⇨ Indian civilization is one of the oldest civilizations in the world. The excavations of **Mohenjo-Daro and Harappa** have discovered the existence of roads in India during the period 2500 to 3500 BC. The ancient scriptures refer to the existence of roads during **the Aryan period** (400 BC). The **Mauryan Kings** (200 – 400 BC) build very good roads.

⇨ **Chandragupta constructed 2400 Km long road** from Pataliputra (modern Patna) to Takshashila (now in Pakistan). **During the Gupta period**(300-500 AD)development of roads received a great momentum. **During the Pathan and Mughal periods,** the roads of India were greatly improved. **Sher Shah constructed the Grand Trunk road.**

⇨ At the **beginning of British rule,** a number of old Mughal roads were metalled and some new roads were constructed during the period of Lord William Bentinck. **In 1865 Lord Dalhousie formed the Central Public Works Department**. Immediately with the development of railways, the attention of the Government was shifted from road development.

⇨ **In 1927 Jayakar committee was formed** to examine and report on the question of road development in India. Most of the recommendations of the committee were accepted by the government and the major items were implemented subsequently. **The Central Road Fund was formed in 1929** for meeting up the expenses of the road development and researchworks.

⇨ As per the recommendation of Jayakar committee **Indian Roads Congress was established in 1934** for controlling standardization specifications and recommendations regarding the design and construction of roads and bridges but the economic depression at that time delayed the road development program.

⇨ **After the Second World War**, there was a revolution in respect of automobiles using the roads in India. The need for proper highway planning was urgently felt at that time. In 1939 the Motor Vehicles Act was passed to regulate the road traffic. In 1950 the Central Roar Research Institute was started at New Delhi for research in various aspect of highway engineering.

CONTINUES……

⇨ A conference of the Chief Engineers of all the states and provinces were convened **in 1943 at Nagpur** to finalize the first road development plan (Nagpur Road plan) for the country.

⇨ Subsequently, a twenty-year development program for the period 1943 -63 was finalized. The target road length at the end of this program was 16 KM per 100 square Km area of the country. The total target of the Nagpur plan was achieved about two years ahead in 1961.

⇨ **In 1961 a committee was appointed** to prepare the Second Twenty-year (1961-81) Road Development Plan **(Bombay road plan)**. The target road length at the end of this program was almost double that of the Nagpur plan. The construction of **1600 Km Expressways** was also included in the plan. The total length of all categories of roads achieved by the year 1974 was 11.45 lakhs Km which is higher than the target.

⇨ The **Highway Research Board** was set up in 1973 to give proper direction and guidance to road research activities in India. In 1978 the **National Transport Policy Committee**(Bombay road plan)was appointed by the government of India to prepare a comprehensive national transport policy for the country. The N.T.P.C report was made available in 1980 and many of the major recommendations of this report have been accepted by the government.

⇨ **The Third Twenty year. (1981-2001)** Road Development Plan **(Lucknow road plan)** was approved in the year 1984. Some of the important features of this plan are improvements of transport facilities in villages, towns and small cities conservation of energy, preservation of environment and improvement of road safety.

⇨ This twenty-year plan aims at increasing the **total road length 15 lakhs Km** in 1981 to 27 lakhs Km in 2001. The present road plan has set the target length of NH to be completed by the end of the ninth five year plan period.

COMPARISON BETWEEN 1ST, 2ND AND 3RD 20 YEAR ROAD PLAN :

FEATURES	1ST 20 YEAR ROAD PLAN	2ND 20 YEAR ROAD PLAN	3RD 20 YEAR ROAD PLAN
DURATION	1943-1963	1961-1981	1981-2001
OTHER NAME	NAGPUR ROAD PLAN	BOMBAY ROAD PLAN	LUCKNOW ROAD PLAN
TARGET DENSITY	16 km./100 sq. km.	32 km./100 sq. km.	82 km./100 sq. km.
ROAD PATTERN	STAR &GRID	NONE SPECIFIED	SQUARE & GRID
DEVELOPMENT ALLOWANCE	15%	5%	NIL
EXPRESSWAYS	NO PROVISION	1600 km.	3200 km. (*Total 5000 km.)
ROAD CLASSIFICATION	NH, SH, MDR, ODR, VR	EW, NH, SH, MDR, ODR, VR	PRIMARY ROADS- EW, NH SECONDARY ROAD- SH, MDR TERTIARY ROADS- ODR, VR
ROAD LENGTH LAID	6 Lakh km.	11.5 Lakh km.	27 Lakh km.

"Thank you"

Have Any Query ?

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