SNS COLLEGE OF TECHNOLOGY
Accredited by NBA-AICTE
Sathy Main Road , Vazhiampalayam Pirivu,
Coimbatore-35 , Tamilnadu , India.
Department of Civil Engineering

UNIT- I

23CET204-

HIGHWAY

AND

RAILWAY ENGINEERING

Institutions for highway planning and implementation at different levels

Twenty-year Road Development Plans

Institutions for Highway Development at National level

Nagpur Road classification

In Nagpur road classification, all roads were classified into five categories as National highways, State highways, Major district roads, Other district roads and village roads.

National highways

They are main highways running through the length and breadth of India connecting major ports , foreign highways, capitals of large states and large industrial and tourist centers including roads required for strategic movements.

It was recommended by Jayakar committee that the National highways should be the frame on which the entire road communication should be based.

All the national highways are assigned the respective numbers.

For e.g. the highway connecting Delhi-Ambala-Amritsar is denoted as NH-1 (Delhi-Amritsar), where as a bifurcation of this highway beyond Fullundar to Srinagar and Uri is denoted as NH-1_A.

They are constructed and maintained by CPWD.

The total length of National highway in the country is 58,112 Kms, and constitute about 2% of total road networks of India and carry 40% of total traffic.

State highways

They are the arterial roads of a state, connecting up with the national highways of adjacent states, district head quarters and important cities within the state

They also serve as main arteries to and from district roads. Total length of all SH in the country is 1,37,119 Kms.

Major district roads

Important roads with in a district serving areas of production and markets , connecting those with each other or with the major highways.

India has a total of 4,70,000 kms of MDR.

Other district roads

Roads serving rural areas of production and providing them with outlet to market centers or other important roads like MDR or SH.

Village roads

They are roads connecting villages or group of villages with each other or to the nearest road of a higher category like ODR or MDR.

India has 26,50,000 kms of ODR+VR out of the total 33,15,231 kms of all type of roads.

Bombay Road Congress:

The length of roads envisaged under the Nagpur plan was achieved by the end of it, but the road system was deficient in many respects. The changed economic, industrial and agricultural conditions in the country warranted a review of the Nagpur plan. Accordingly a 20-year plan was drafted by the Roads wing of Government of India, which is popularly known as the Bombay plan. The highlights of the plan were:

- It was the second 20 year road plan (1961-1981).The total road length targeted to construct was about 10 lakhs.
- Rural roads were given specific attention. Scientific methods of construction was proposed for the rural roads. The necessary technical advice to the Panchayaths should be given by State PWD's.
- They suggested that the length of the road should be increased so as to give a road density of 32kms/100 sq.km.
- The construction of 1600 km of expressways was also then included in the plan.

+ Other District Roads + Village Roads

$$= \left[\frac{A}{4} + \frac{B}{8} + \frac{C}{12} + 48K + 24M + 11.2N + 9.6P + 12.8Q + 5.9R + 1.6S + 0.64T + 0.2V\right] \times \left(\frac{D+100}{100}\right)$$

where

A = Developed and Agricultural Area, km^2

B = Semideveloped Area, km^2

C = Undeveloped Area, km^2

K = Number of towns with population over 1 lakh

M = Number of towns with population between 50000 to 1 lakh

N = Number of towns with population between 20,000 to 50,000

P = Number of towns with population between 10000 to 20000

Q = Number of towns with population between 5000 to 10000

R = Number of towns with population between 2000 to 5000

S = Number of settlements with population between 1000 to 2000

T = Number of settlements with population between 500 to 1000

V = Number of towns with population less than 500

D = Development allowance generally taken as 5 % for the 20 year draft plan period.

Road Way Length Targets

The road lengths for different categories of roads were fixed in miles since km as a unit was not in vogue in 1959. Converted to km these formulas were

(a) National Highway (km)

$$= \left[\frac{A}{64} + \frac{B}{80} + \frac{C}{96}\right] + 32K + 8M + D\left[\frac{A}{64} + \frac{B}{80} + \frac{C}{96} + 32K + 8M\right]$$

(b) National Highways + State Highways (km)

$$= \left[\frac{A}{20} + \frac{B}{24} + \frac{C}{32} + 48K + 24M + 11.2N + 1.6P\right] \times \left(\frac{100+D}{100}\right)$$

(c) National Highways + State Highways + Major District Roads (km)

$$= \left[\frac{A}{8} + \frac{B}{16} + \frac{C}{24} + 48K + 24M + 11.2N + 9.5P + 6.4Q + 2.4R\right] \times \left(\frac{D+100}{100}\right)$$

(d) National Highway + State Highways + Major District Roads + Other District Roads (km)

$$= \left[\frac{3A}{16} + \frac{3B}{32} + \frac{C}{16} + 48K + 24M + 11.2N + 9.6P + 12.8Q + 4R + 0.8S + 0.32T\right] \times \left(\frac{D+100}{100}\right)$$

(e) National Highways + State Highways + Major District Roads

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The construction of 1600 km of expressways was also then included in the plan.

+ Other District Roads + Village Roads

$$= \left[\frac{A}{4} + \frac{B}{8} + \frac{C}{12} + 48\,K + 24\,M + 11.2\,N + 9.6\,P + 12.8\,Q + 5.9\,R + 1.6\,S + 0.64\,T + 0.2\,V\right] \times \left(\frac{D + 100}{100}\right)$$

where

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(a) National Highway (km)

$$= \left[\frac{A}{64} + \frac{B}{80} + \frac{C}{96}\right] + 32\,K + 8\,M + D\left[\frac{A}{64} + \frac{B}{80} + \frac{C}{96} + 32\,K + 8\,M\right]$$

(b) National Highways + State Highways (km)

$$= \left[\frac{A}{20} + \frac{B}{24} + \frac{C}{32} + 48\,K + 24\,M + 11.2\,N + 1.6\,P\right] \times \left(\frac{100 + D}{100}\right)$$

(c) National Highways + State Highways + Major District Roads (km)

$$= \left[\frac{A}{8} + \frac{B}{16} + \frac{C}{24} + 48K + 24M + 11.2N + 9.5\,P + 6.4\,Q + 2.4R\right] \times \left(\frac{D + 100}{100}\right)$$

(d) National Highway + State Highways + Major District Roads + Other District Roads (km)

$$= \left[\frac{3A}{16} + \frac{3B}{32} + \frac{C}{16} + 48\,K + 24\,M + 11.2\,N + 9.6\,P + 12.8\,Q + 4\,R + 0.8\,S + 0.32\,T\right] \times \left(\frac{D + 100}{100}\right)$$

(e) National Highways + State Highways + Major District Roads

Lucknow road congress 1984

This plan has been prepared keeping in view the growth pattern envisaged in various fields by the turn of the century. Some of the salient features of this plan are as given below:

- This was the third 20 year road plan (1981-2001). It is also called *Lucknow road plan*.

  It aimed at constructing a road length of 12 lakh kilometres by the year 1981 resulting in a road density of 82kms/100 sq.km
- 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.
- One of the goals contained in the plan was that expressways should be constructed on major traffic corridors to provide speedy travel.
- Energy conservation, environmental quality of roads and road safety measures were also given due importance in this plan.

Institutions for Highway Development at National level

- Indian Roads Congress
- Highway Research Board
- National Highway Authority of India
- Ministry of Road transport and Highways (MORTH)
- Central Road Research Institute