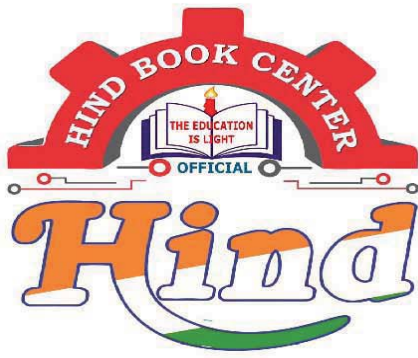




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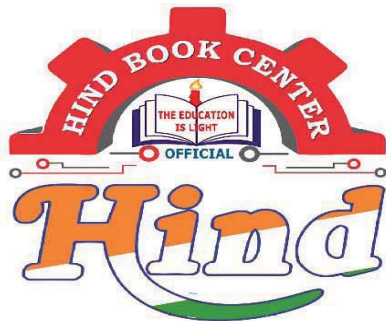
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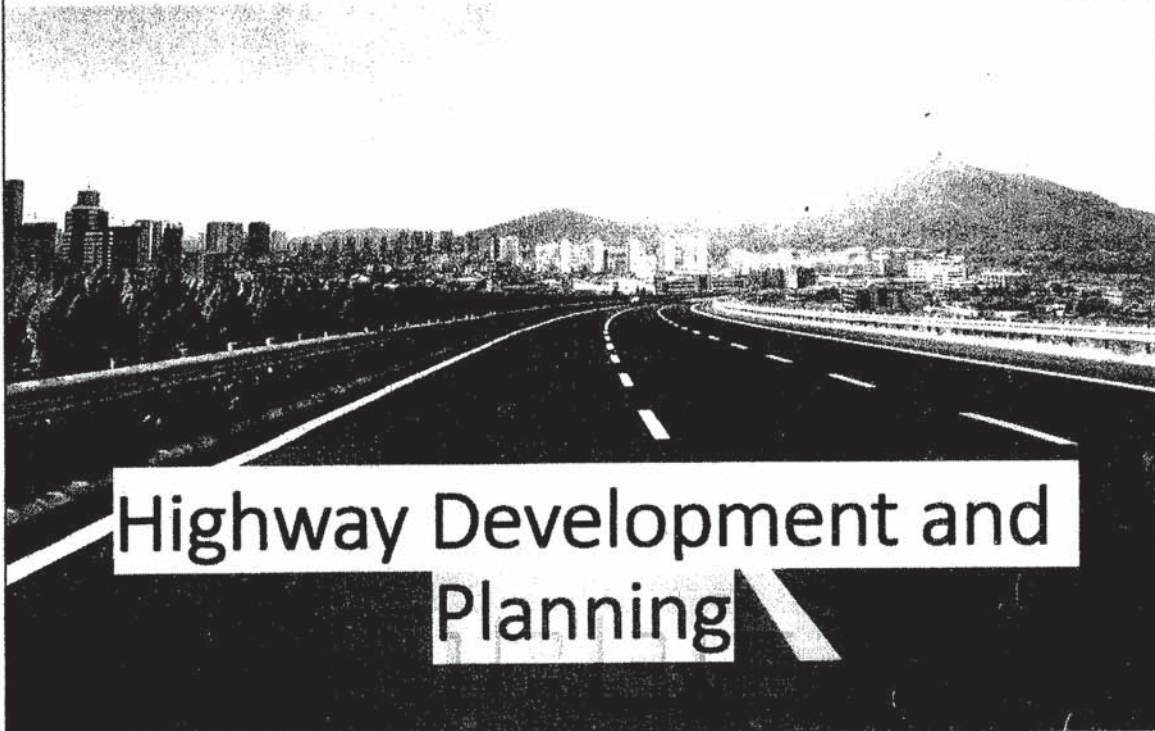
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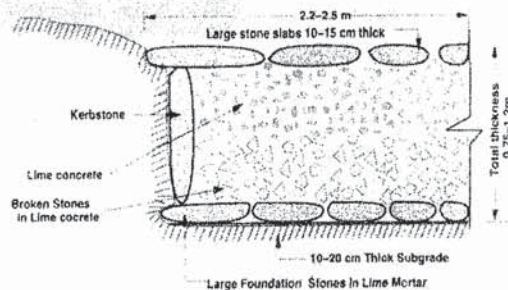
Highway Development and Planning

1

A. Development of Road Construction

1. Roman Roads

- *Constructed by removing soft strata.*
- *Large stones at bottom.*
- *No cross-slope (Camber)*
- *No drainage system.*
- *Thickness 0.75m to 1.2m*
- *Wearing course consists of large stones with lime.*

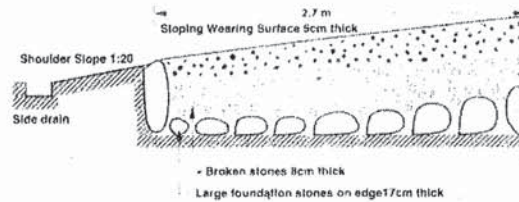


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2. French Roads(Tresaguet)

- The main feature of this road is thickness is in order of 30cm.
- Large stones at bottom.
- Tresaguet gave much importance to drainage.
- Side drains were provided.
- Due consideration was to subgrade moisture.



3. Telford Construction

- Provided level subgrade of width 9m.
- A binding layer of wearing course 4cm thick was provided.
- Thickness of foundation stones increases towards Center

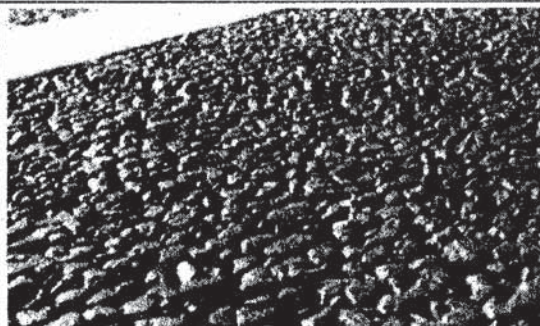
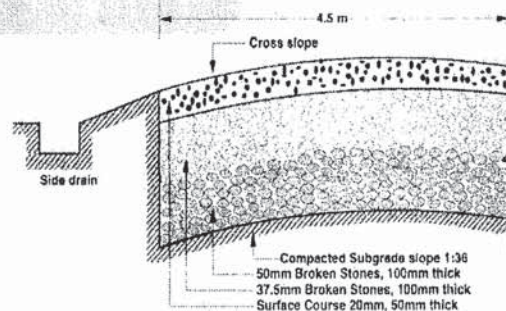
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4. Modern Construction (Mecadam)

- John Mecadam was the first person who suggested that large foundations are not at all required to be placed at bottom layer.
- Broken stones provided in layers for stability to support animal drawn vehicle.
- Cross slope " 1 in 36"
- Uniform thickness of 25cm



B. Highway Planning in India



After first World war, there was a rapid growth in motor transport, so govt. appointed a Road Development Committee headed by "Mr. M. R. Jaykar"

Recommendation of Jaykar Committee;

- ✓ 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. 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.

RESULT : Central Road Fund (CRF) established in 1929.

Current rate of CRF: ₹6/- per litre of petrol/ Diesel

5

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- ✓ 3. Committee suggested to have a periodic road conferences to discuss about road construction and development.

RESULT : Indian Road Congress (IRC) established in 1934.

4. A dedicated research organization should be constituted to carry out research and development work.

RESULT : Central Road Research Institute (CRRI) established in 1950.

5. They gave more stress on long term planning programme, for a period of 20 years.

RESULT : Various 20yr Road Plan.

C. Comparison between various 20 yr Plan



Description	1 st 20 Yr Road Plan	2 nd 20 yr Road Plan	3 rd 20 yr Road Plan
Name	Nagpur	Bombay	Lucknow
period	1943-1963	1961-1981	1981-2001
Road Density	16 km per 100 km ²	32 km per 100 km ²	82 km per 100 km ²
Target Length	2 Lakh Km	10 Lakh Km	12 lakh km
Express Highway	NIL	1600 Km	2000 Km
Classification	1. National Highway 2. State Highway 3. Major District Road 4. Other District Road 5. Village Road	1. National Highway 2. State Highway 3. Major District Road 4. Other District Road 5. Village Road	1. Primary Roads (EH+NH) 2. Secondary Roads (SH+MDR) 3. Rural Roads (ODR+VR)

NOTE: as per MORTH Annual report 2018-19
Currently total length of NH is 132500km
which is approximately 2.5% of total road
length but it carries 40% of total Traffic

National Highways / Expressway	1,32,500 km
State Highways	1,56,694 km
Other Roads	56,08,477 km
Total	58,97,671 km

7

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Shorter
than NH

Shortest

EH	EXPRESS HIGHWAY	- These are superior type facilities, generally with a divided carriageway, <u>grade separation at cross sections and fencing.</u> <u>They permits only high speed vehicle.</u>
NH	NATIONAL HIGHWAY	- These are the main highways running thought the country <u>connecting major ports, foreign highway and capital of state.</u> <u>Provides state to state/union territories connectivity.</u>
SH	STATE HIGHWAY	- SH provides connectivity to the district headquarters and important cities within the state. - It also provides connectivity between two different NH.
MDR	MAJOR DISTRICT ROAD	- These are important roads within a district serving area's of production and markets. - Also provides connectivity with SH or NH
ODR	OTHER DISTRICT ROAD	ODR provides connectivity between rural area production, market centers, block development and other main roads.
VR	VILLAGE ROAD	These are roads connecting villages or group of villages with each other or to the nearest main road of high category.

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INDIAN HIGHWAYS - MILESTONE COLOUR CODES

Yellow &
White

Green &
White

Black & White/
White

Orange &
White

Mumbai
245

Ambala
47

Kilad
65

Suguna
40

**NATIONAL
HIGHWAYS**

**STATE
HIGHWAYS**

**CITY/
DISTRICT
ROADS**
MDR / ODR

RURAL ROADS
(PRADHAN MANTRI
GRAM SADAK YOJANA ROADS)

9

D. Length of road as per 3rd 20 yr Road Plan



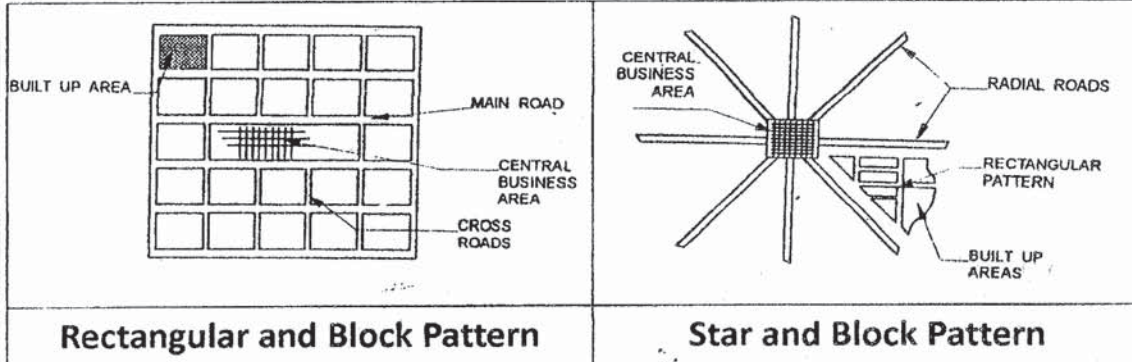
$$1. \text{ Total length of road (Km)} = \begin{cases} 4.74 * \text{No of villages and Towns} \\ \text{Road Density} * \text{Area (Km}^2\text{)} \end{cases}$$

$$2. \text{ Length of NH (km)} = \left[\frac{\text{Area (km}^2\text{)}}{50} \right]$$

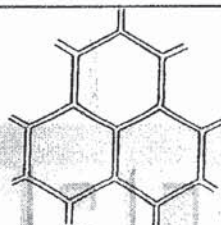
$$3. \text{ Length of SH (km)} = \begin{cases} \left[\frac{\text{Area (km}^2\text{)}}{25} \right] \\ 62.5 * \text{no of towns} - \text{length of NH} \end{cases}$$

$$4. \text{ Length of MDR (Km)} = \begin{cases} \left[\frac{\text{Area (km}^2\text{)}}{12.5} \right] \\ 90 * \text{no of towns} \end{cases}$$

E. Road Pattern



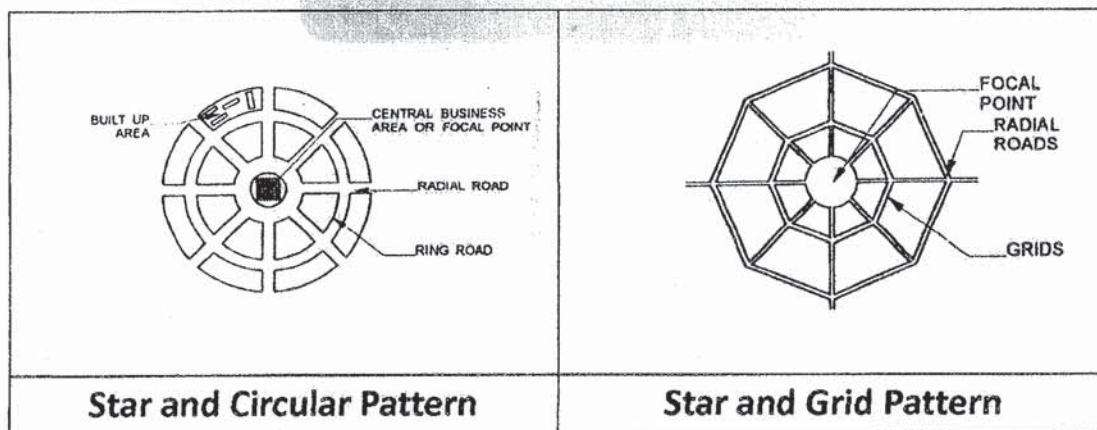
Hexagonal Pattern



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12