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# **Highway Engineering**

5<sup>th</sup> Semester, Civil Engineering

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# Classification of roads

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Roads are classified into different categories as under:

- According to location
- According to importance
- According to traffic
- According to tonnage

Classification of roads according to location:

- National Highways (NH)
- State Highways (SH)
- Major District Roads (MDR's)
- Other District Roads (ODR's)
- Village Roads (VR's)

# Classification of roads

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## **National Highways:**

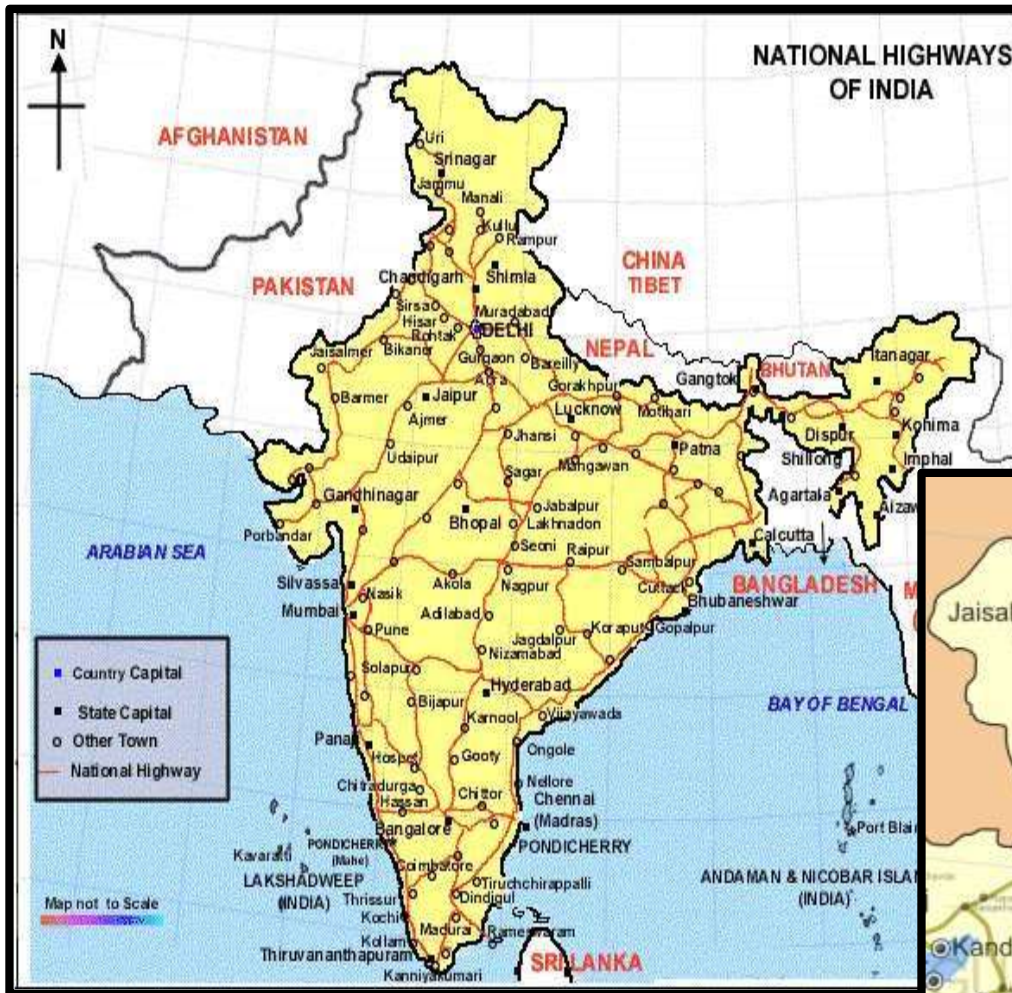
The main highways running through the length and breadth of the country connecting major parts, foreign highways and capitals of states etc. are known as National Highways (NH's).

## **State Highways:**

The highways linking the district headquarters and important cities within the state or connecting them with National highways or with highways of the neighboring states are known as state highways (SH's).

## **Major District Roads:**

The important roads within a district serving areas of production and markets and connecting these places with each other or with the main highways are known as Major District Roads (MDR's).



## Classification of Roads

# Classification of roads

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## **Other District Roads:**

The roads serving rural areas of production and providing them with outlet to market centers, Tehsil head quarters, block development headquarters, railway stations etc. are known as Other District Roads (ODR's).

## **Village Roads:**

The roads connecting villages or group of villages with each other or with the nearest road of higher category are known as Village roads.

# CROSS-SECTION OF ROAD



# ELEMENTS OF ROAD

## Cross-section of Road

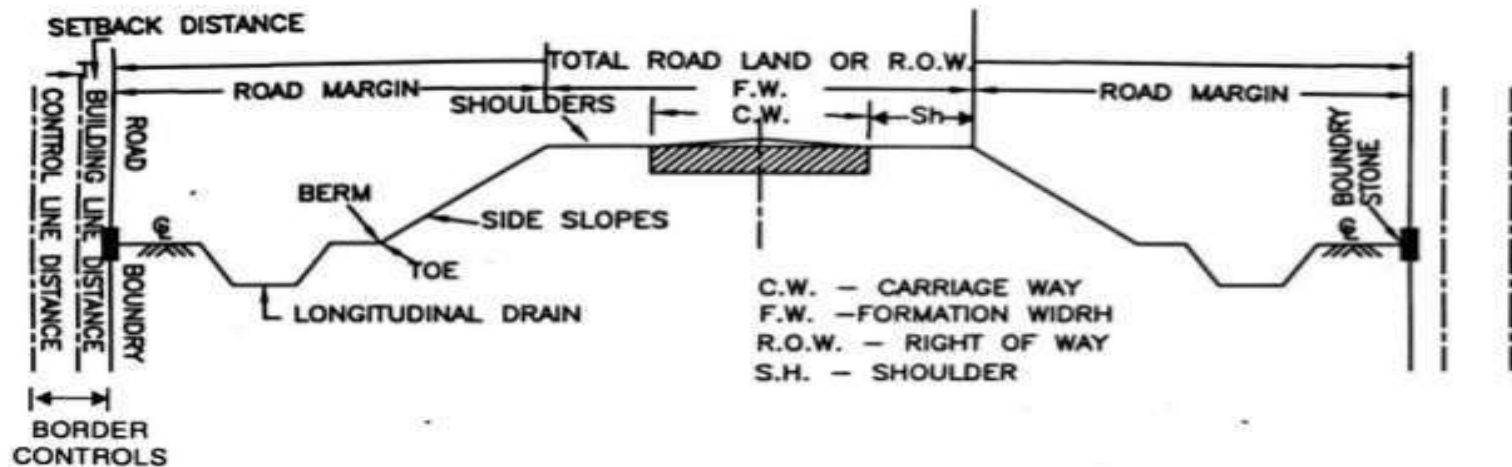


FIG. 3.1 CROSS-SECTION OF ROAD IN EMBANKMENT

# Elements of Road

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## 1. Carriage way:-

- The width of pavement way on which vehicles travel is called **Carriage way** or **pavement width**.

Sr. no.	Class of road	Width
1	Single lane	3.75m
2	Two lanes(without raised kerbs)	7.00m
3	Two lanes(with raised kerbs)	7.50m
4	Multi-lane pavements	3.50m per lane



## 2. Formation width:-

- ❑ **Formation width** is the top of width of the highway embankment excluding the side drains.

Sr. No.	Road classification	Width of Formation in m	
		Plain&Rolling Terrain	Mountainous Terrain
1	NH & SH		
	(a) Single Lane	12.0	6.25
	(b)Two Lanes	12.0	8.80
2	MDR		
	(a) Single Lane	9.0	4.75
	(b)Two Lanes	9.0	-
3	ODR		
	(a) Single Lane	7.5	4.75
	(b)Two Lanes	9.0	-
4	VR-Single Lane	7.5	4.0

### **3. Right of way:-**

- ❑ Right of way is the area of land acquired for the road, along its alignment. It is the distance between the boundary stones on either side of the road.

### **4. Road shoulders:-**

- ❑ Shoulders are provided along the road edge to serve as emergency lane for vehicles. As per IRC, the minimum width of shoulders should be 2.5m.

## 5. Side slope:-

- The slope of earthwork in filling or in cutting is called **Side slope**. It imparts stability to the earthwork.
- **For Filling:**  
Normally, 1:2
- **For cutting:**

Type of soil	Slope
Ordinary soil	1:1 to 1:1/2
Broken Rock	1:1/2 to 1:1/4
Soft Rock	1:1/4 to 1:1/8
Hard Rock	Approx. Perpendicular

## 6. Berm:-

- ❑ The distance between the road toe and the inner edge of borrow pit is called **berm**.
- ❑ It prevents the erosion of embankment soil.

## 7. Boundary stone :-

- ❑ To indicate the boundary of land acquired for road, stones are driven in to the ground at about 30m distance on either side from the center line of the road. These stones are known as **boundary stone**.

## 8. Side drain:-

- ❑ For the drainage of rainwater, drains are provided on either side of the road. Normally, side drains are required for the road in cutting. For road in embankment, side drain is not necessary.

## 9. Building line:-

- ❑ The distance from the center line of road on either side, within which construction of buildings is not permitted is called **Building line**.

## 10. Control line:-

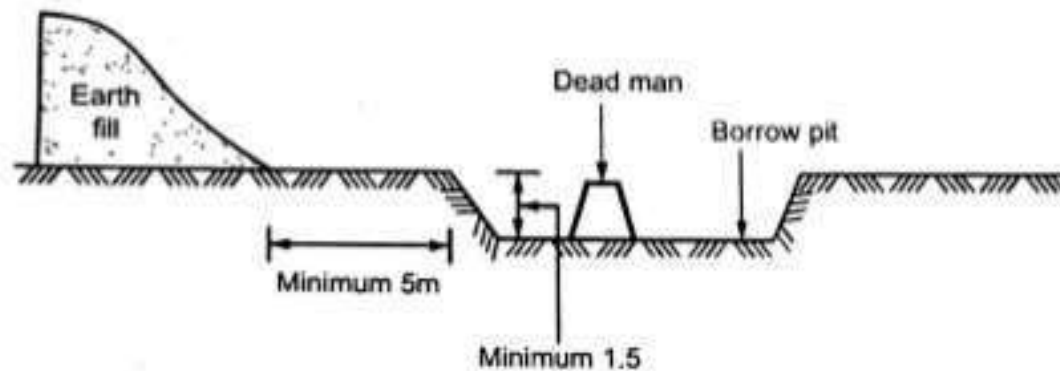
- ❑ At the locations like bank, hospital, factory, theatre, etc. on the road, where more people gather disturbance to the traffic will be more.

## 11. Spoil bank:-

- ❑ The banks constructed from surplus excavated earth on the side of road cutting parallel to its alignment, are known as **Spoil banks**.
- ❑ The soil from spoil bank can be used for the repair of shoulders.

## 12. Borrow pits:-

- ❑ The pits dug along the road alignment for using excavated earth in the construction of embankment, are known as **borrow pits**.
- ❑ The small portion of earth left undug in a borrow pit to measure depth of excavation is known as **deadman**.



### 13. Kerbs:-

- the boundaries between pavement and shoulders or footpaths are known as **kerbs**.

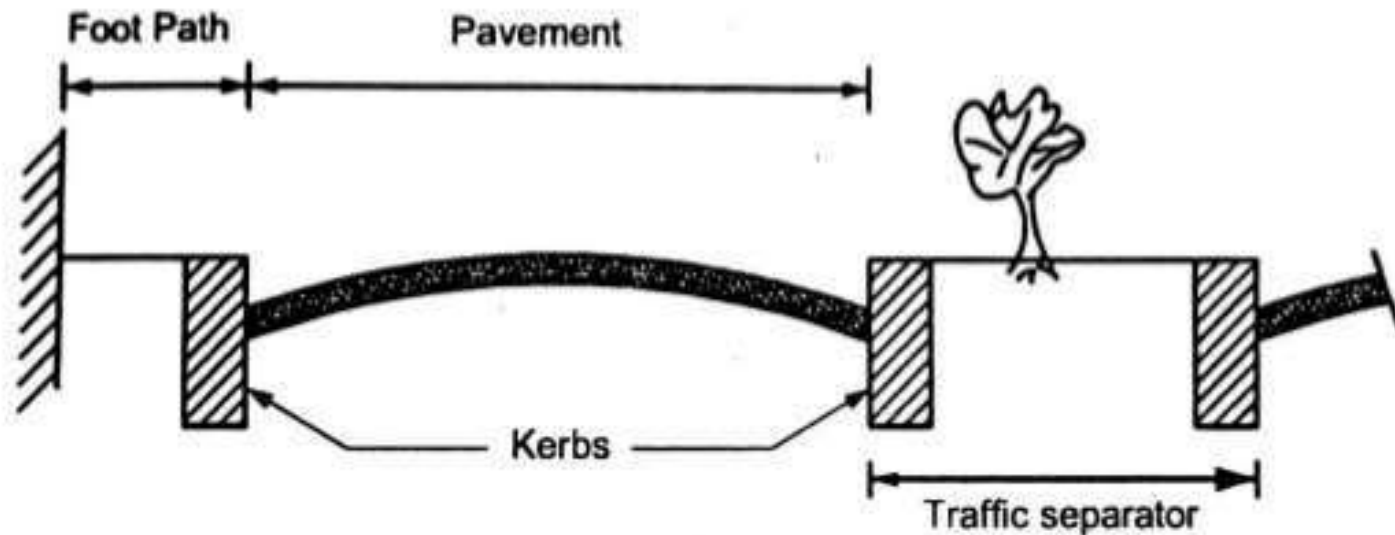


FIG., 3.3 KERB AND TRAFFIC SEPARATOR.



# DIFFERENT TYPE OF ROAD MATERIALS

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- 1. soil
- 2. Aggregates
- 3. Binders



**Binder :-** The material used in road construction for binding together the road aggregates for providing a smooth surface for movement of vehicle traffic

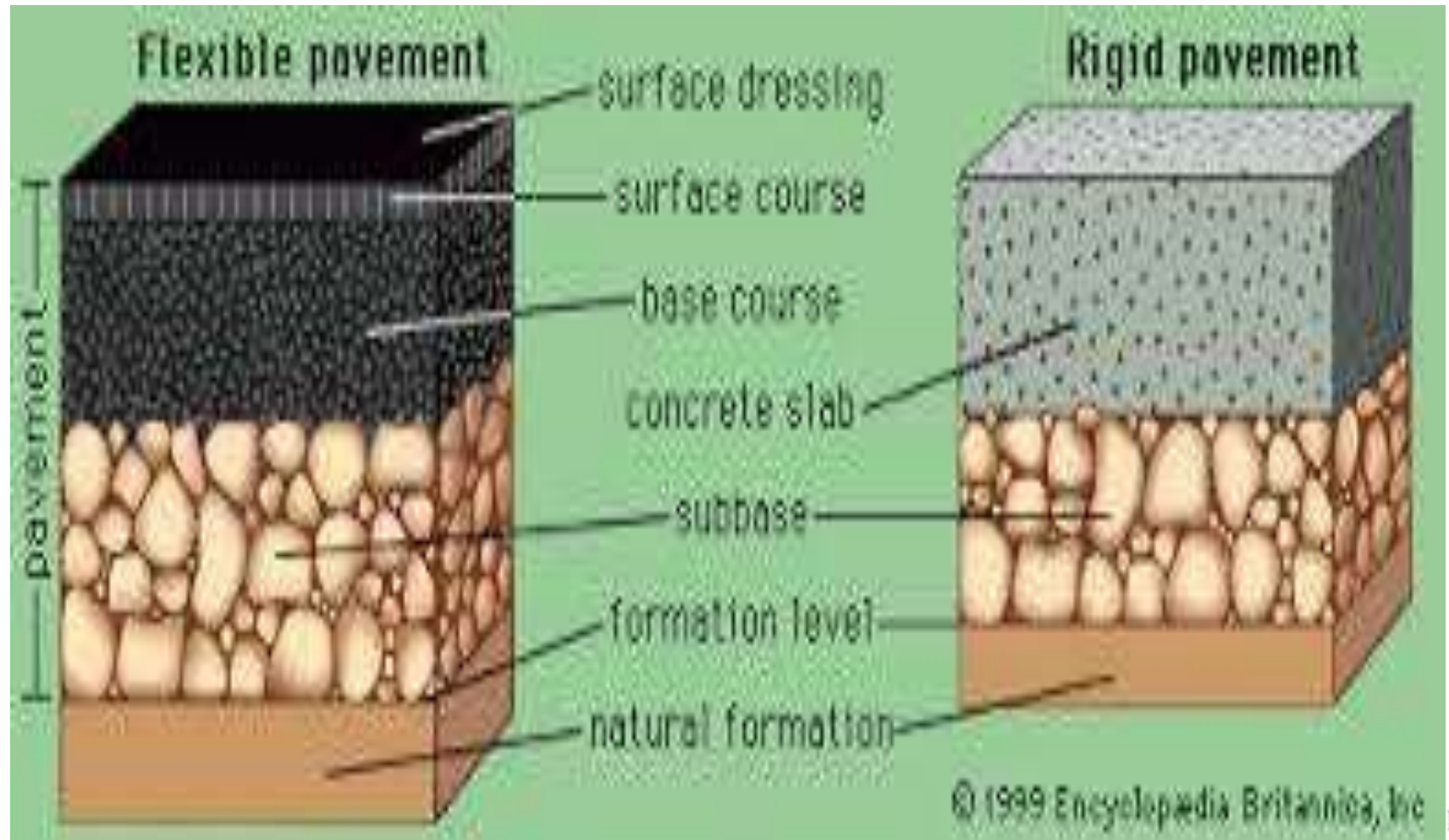
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- SOME COMMON BINDERS
  - 1. CEMENT
  - 2. BITUMEN
  - 3. TAR

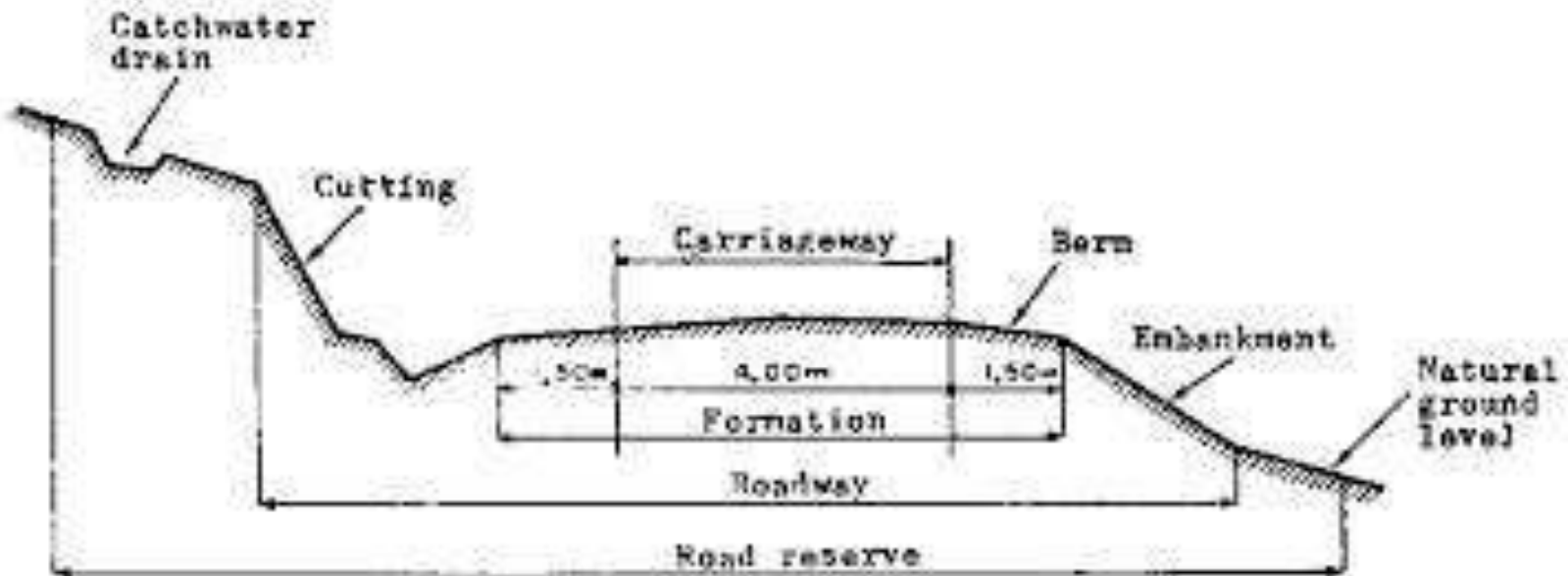




# ROAD PAVEMENT



# CROSS-SECTION OF HILL ROADS



# CONSTRUCTION EQUIPMENTS

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*THANKES*



CAIN PROJECT

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