PROJECT VIJAYAK

PAVEMENT MARKING TYPES AND HOW THEY SUPPLEMENT ROAD SAFETY

PREVIEW

- What are Pavement Markings ?
- Necessity: Pavement markings ?
- Pavement Markings – Road Safety
- Classification of Pavement Marking
- Types of Material for Pavement Marking
- Actions & Recommendations

WHAT ARE PAVEMENT MARKINGS?

Definition. Pavement Marking is defined as lines, patterns, words except road signs which are applied or attached to the carriageway or kerbs or to objects within or adjacent to the carriageway for Controlling, Warning, Guiding and Informing the road users

Features: Road Marking

- **Guides & Controls traffic on a highway**
- **Delineation of traffic path and its lateral clearance from traffic hazards**
- **Facilitating safe movement**
- **Channelise pedestrians & cyclists movement into safe location**
- **Road markings normally incl longitudinal markings, transverse markings, text and symbols etc. on the road surfaces**
- **Applicable to all categories of roads even on rural roads, as well**

NECESSITY: PAVEMENT MARKINGS

- Bare pavements will lead to vehicular confusion
- Marking helps the road to Direct, Guide and Regulate the road user
- Road Markings incl all line patterns, words & colour applied on or attached to the road surface or kerb
- Road marking sometime are used to supplement message of road signs & other devices
- Marking promotes road safety & ensure smooth flow of traffic

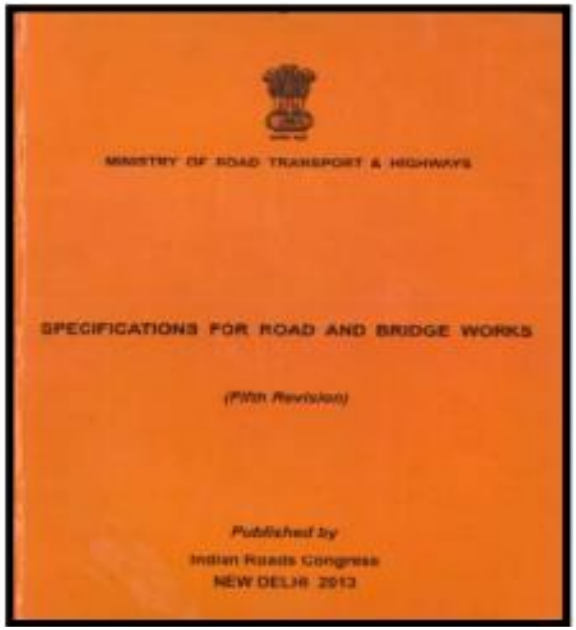
PAVEMENT MARKINGS – ROAD SAFETY

- Pavement markings are **an effective way of communicating information to drivers on the road**. They play an important role in road safety, guiding vehicles for short-range driving operations, as well as for long-range vehicle alignment on the road.

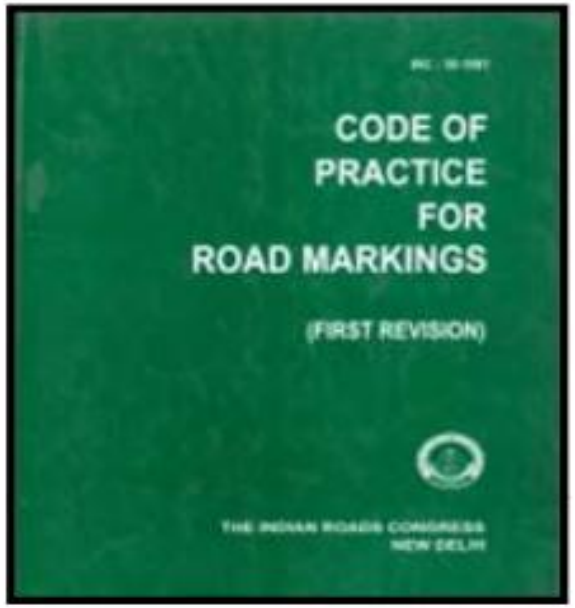
- Road safety is enhanced due to an **incr in the driver's sense of safety while driving on a road containing road markings**, since they provide information on the road trajectory, thus allowing early identification of road areas that may constitute a hazard for road safety, such as curves, intersections, etc.

REFERENCE MANUAL & CODES

Recipe based Specifications in Road and Bridge Works



Performance based Specifications of Practice for Road Markings (IRC-35:2014)



CLASSIFICATION OF PAVEMENT MARKINGS

- Longitudinal Marking (LM)
- Transverse Marking (TM)
- Hazard Marking (HM)
- Block Marking (BM)
- Arrow Marking (AM)
- Directional Marking (DM)
- Facility Marking (FM)

Details available in Reference Manuals

COLOUR CODES

- **White**. Most widely used colour for pavement marking because of its **visibility and good contrast** against the surface

- **Yellow**. Used to depict **parking restrictions**

- **Blue**. Colour of **public transportation** incl **three wheelers** scooter rickshaws (TSR) and **dedicated bus lanes**

- **Green**. Used to **depict bicycle lane** and **non motorized transportation** and is marked at the intersection and gives priority to the cyclists crossing the road

- **Red/Purple**. Red colour marking is recommended on **hazardous intersections** and place where **pedestrians meet motorized traffic**

CLASSIFICATION OF PAVEMENT MARKINGS

Numerous types of pavement markings (shape/size/colour/distance) - Details available in the Ref Manuals

Continuous Line – Single or Double with white or yellow means not to cross

Vehicles to stop before stop line (painted before pedestrian crossing)

Dotted line means it is safe to cross

Combination of solid and broken lines: traffic on side of dotted lines can cross and one from continuous line can't cross

TYPES OF MATERIAL FOR PAVEMENT MARKING

- Thermoplastic Markings (Hot applied thermoplastic compound)
- Solvent and Waterborne Road Marking Paint
- Cold Applied Plastics
- Preformed Adhesive Tapes

TYPES OF MATERIAL FOR PAVEMENT MARKING

Thermoplastic Markings

- Most commonly used pavement marking material roadways
- It is a **Mixture of plasticizer & resins** that serves to hold all of the other ingredients together. The thermoplastics hot applied in molten state adheres to pavement and get solidified immediately at the ambient temperature.
- Thermoplastic markings possess **fast drying time and are highly durable**
- It has **better retro reflective performance** than that of ordinary road marking paint.
- The **service life** of one application of thermoplastic generally ranges from **2 to 3 years** depending on traffic volumes

Solvent Borne & Waterborne Road Marking Paints

- Road marking paints are **oldest form** of pavement marking materials.
- Application in **temporary work zone markings** and for **very shorter period** and can be removed thereafter easily.
- **Two types of Road Marking Paints** :
  - (i) Solvent based
  - (ii) Water based
- **Water-based** paint is **environmentally friendly** and is easier to handle compared to **solvent-based paints** and pose less safety hazards to workers.
- The road surface painted with water-based paints can be **opened to traffic quicker** than the road surface painted with solvent-based paints.

Cold Applied Plastics

- For **coloured pavement marking**, the cold applied plastic is a better choice than **road marking paints & thermoplastic materials**.
- Cold applied plastics are the best means to provide **audible raised pavement marking for edge lines**.
- Cold applied plastic is **more durable than thermoplastic markings** in retaining the original colour and luminance values.
- It can be applied to the surface in a variety of ways with a superior finishing and has **no need of large application equipment** and can be easily carried in a medium sized van and a trailer

Pre-formed Adhesive Tapes

- Preformed tapes are available in **continuous rolls of various lengths** and widths.
- Unlike road marking with sprayed or extruded materials, the preformed tapes do not require **application equipment** or experienced operators for applications and do not require **drying or curing period**.
- The provision of preformed tapes would entail **high initial cost** than the other forms of road marking application, but would offer more service life in locations with high traffic volumes and are suitable for those locations that require frequent replacement of pavement markings.
- **Application** : They are used for **object markings** and **transverse lines** in high-traffic areas

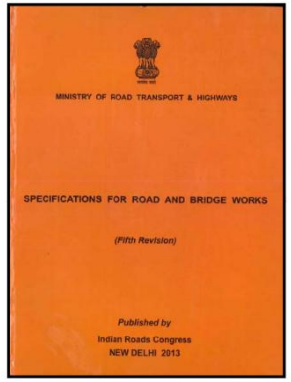
TYPES OF MATERIAL FOR PAVEMENT MARKING

Application of Road Studs

Edge Line

MoRTH Specs for Rd Studs

Material of Body : Plastic & no metal	Fixed by using adhesive - No Nails
Compressive Strength - Min 13,635 Kgs	Retro Reflective Area ≤ 13 Sqcm
Height - 20 mm & Width - 130mm	Marked with manufacturers' name



ACTIONS & RECOMMENDATIONS

- Ensuring marking of pavements concurrent with completion of pavement
- Ensuring pavement marking is as per relevant IRC code

Visibility related to speed (Drivers needs to detect guidance markings at a distance equivalent to a minimum of two seconds of travel time)

Minimum Preview Distance for a driver to React

Speed (kmph)	30	40	50	65	70	80	90	100	110	120
Preview Distance (m) 2 seconds of travel time	17	22	28	36	39	44	50	56	61	67

- Line markings (centre, warning, edge, no overtaking) as per standard conventions
- Object paintings astride the road (concrete structures) – black & white stripes
- Application of road studs/ chevron markings, as applicable
- Regular inspection & evaluation – measurements at random selected locations with sample size as per codal provisions mainly for retro reflectivity, wear, luminance coefficient and skid resistance

ACTIONS & RECOMMENDATIONS

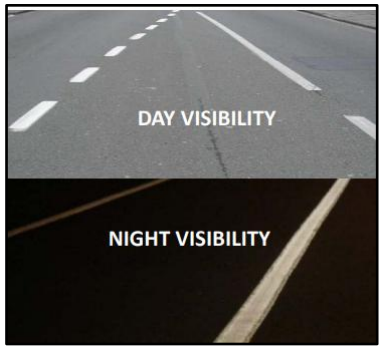
Ensuring periodic maintenance of pavement marking signs

Poor night visibility and road presence → Accident Danger at critical spots

Life of markings 2-3 Yrs

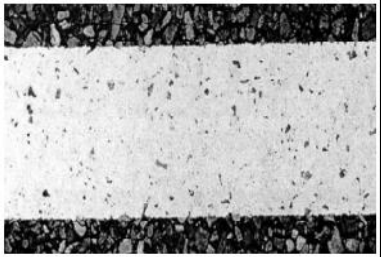
ACTIONS & RECOMMENDATIONS

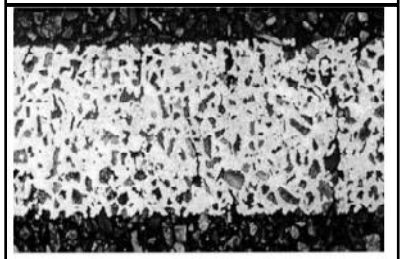
Ensuring correct quality of pavement marking signs (Visibility/Durability) & periodical testing



Performance Parameter – Day Visibility
Asphalt Rd -130 mcd/m2/lux
Cement Rd -100 mcd/m2/lux

Performance Parameter – Night Visibility
Asphalt Rd -120 mcd/m2/lux
(min upto 2 yrs - Design speed 65-100 km/hr)


Above 95% of area intact


Below 70% of area intact

Performance Parameter of Wear Durability is to ensure at least 70% of marking remains intact for the service life of the marking

- Portable handheld retro-reflectometer for determination of visibility
- One instrument for all types of rd markings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