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Thin White Topping (TWT)

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Significant increase in the number of automobiles observed in the recent years has created a need not only for the construction of new highways but also for the maintenance and rehabilitation of existing highway networks.

Pavements are prone to damage due to the repeated wheel loads as well as temperature and other environmental effects.

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Types of Roads In India

Asphalt Roads

Thin(TWT) & Ultra Thin White Topping (UTWT) Roads

Conventional Concrete Roads

Advantages & disadvantages

Asphalt road

* **Advantages**
* Fast construction
* less construction cost
* **Disadvantages**
* Less life
* Frequent potholes

Concrete road

* **Advantages**
* More life 30 to 40 years
* Pothole free
* Good riding quality
* **Disadvantages**
* Require more construction cost &time
* At the time of construction more inconvenience for public

Disadvantages of Conventional Concrete Road

- Conventional White topping Required 1 To 1.5 Meter
- Excavation of Existing Asphalt Road
- Road remains closed for at least 2 months.
- Existing road crust doesn't get utilized.
- Problem for dumping of excavated material.
- Chances of accidents during construction are more.
- High initial cost

Condition of the Bituminous roads during monsoon

Think for Alternative Technology

* Laying of Paver block
* Strengthening of road by Thin White Topping (TWT) method
* Construction of BT road by using CRMB/PMB/SMA
* Construction of road by mastic asphalt

Limitations of Alternative Technology

* **Laying of Paver block-**

1) It is recommended for footpath and not for Roads pavement.
2) If used in Road Pavement, in course of time and weathering effect pavers blocks get undulated.
3) Bumpy riding quality
4) If one of the paver blocks is dislocated for any reason other blocks in its vicinity also starts coming out of their position . If such blocks come under tyre of any vehicle accident is very likely to occur.

Continue…..

Construction of BT road by using CRMB/PMB-

1) after every 5 to 6years it requires maintenance.
2) Pothole may occur if not mentioned after shelf life.
3) Life 12 to 15 years.

Construction of road by mastic asphalt:-

1)Due to high content of bitumen its expensive.
2) Surface becomes slippery during monsoon, may occur severe accidents.
3) If Mix prepared in cooker at site it creates nuisances to public and high pollution in city.
4) Nation Green Tribunal has banned cooking at road sites.
5) Life 5 to 6 years.

What is permanent solution for these roads?

Right answer will be Rigid Pavement

Type of Rigid Pavements

- Conventional white topping (CWT)
  – thickness more than 200mm
- **Thin white topping (TWT)**
  – thickness 100mm to 200mm
- Ultra –thin white topping (UTWT)
  thickness upto 100mm

What is -Thin White Topping?

* Thin White topping (TWT) is a process where a thin layer of concrete usually with fibers and often of high strength concrete, is placed over a prepared surface of distressed asphalt pavement.

* Factors that differentiate TWT from conventional concrete overlays of existing asphalt pavement are :

* Substantial degree of bond between the concrete overlay and the prepared asphalt/pcc surface.

* Much closer joint spacing

TWT -Benefits

* Low Construction Cost as compared to Conventional Concreting
* Long Life, Low Maintenance
* Low Life Cycle Cost
* Improved Safety
* Environmental Benefits minimize air & noise pollution
* Light Traffic may be open within 72 Hrs. after construction, minimize inconvenience to public
* Better option for roads where traffic density is low
* Good Aesthetic Look.

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TWT – IRC SP 76-2015

* **Thin White Topping is a relatively new rehabilitation technology.**
* **It is a technique which involves placement of thinner (than Normal) thickness ranging from 4 to 8 inches with closely spaced joints and bonded to an existing asphalt pavement/PCC.**
* **TWT was first experimented in TMC in 2007, which has proved successful and till date TMC has constructed 125km of city roads which are pothole free.**

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* **The application of TWT has been targeted to rehabilitate deteriorated asphalt pavements with fatigue and/or rutting distress.**
* **Actual depth of TWT depends on nature of traffic and axil load & the grade of concrete & Intensity of Traffic.**
* **After milling the existing BT road surface minimum thickness of BM should not be less than 75MM.**
* **In Metropolis city, city roads are dugged for various reasons due to this crust gets disturbed creates potholes.in such situations before laying TWT we have to rectify/develop sound crust.**
* **Practically below TWT, 150mm PCC and 150mm WBM layer with proper drainage layer is sufficient for city traffic.**

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Contd…

* **Bonding allows the concrete overlay and the under laying asphalt/PCC to act as a composite section, reducing critical stresses caused by wheel loads and temperature changes.**

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Material used

* **Cement –** 43 grade conforming to– IS:8112

  53 grade conforming to IS:12269
* **Admixtures**- conforming to IS:6925 & SP:9103 may (upto 2% by weight of cement as per IS:456) be used to improve workability of the concrete or extensions of setting time. Recommended PC(polycarboxylate) base admixtures.

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Material Used Contd..

* **Fibres** – These shall be of 100 % virgin frabilated polypropylene fibres and is uniformly dispersed in the concrete mass. These shall be added at the time of preparation of concrete.

a. The polypropylene fibres - 0.20 % to 0.40 % of the weight of cement.

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Material Used Contd…

* **Aggregates** – As per the specifications
* **Portable Water**
* **Mineral Admixtures** – a)Fly ash- upto 20% by weight of Cement

  b) Micro Silica – upto 5 to 10% by weight of cement.

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Tentative Mix Design

Sl.No	Ingredients	Weight in Kg
1	Ordinary Portland Cement 43 or 53 Grade	440
2	Course Aggregate	947
3	Fine Aggregate (Natural)	596
4	Polymeric Fibres	0.9
5	Water/Cement Ratio	Between 0.28 - 0.3
6	Water	130 to 140 L
7	Fly Ash	90 to 100 Kg
8	Silica Fume	40 to 45 Kg
9	Chemical Admixture	Between 0.5 % - 2 %

City Road

Roads with New Technology TWT (Process)

Roads with New Technology UTWT


Thane
Maharashtra
India
2018-03-03(Sat) 17:30
36°C
97°F


Thane
Maharashtra
India
2018-03-03(Sat) 17:30
36°C
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THANK YOU

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