
Clean and Green Campus Initiatives Green road technolgoies in National Institute of Rural Development and Panchayati Raj

Problem

- About 5 lakh plastic bottles used to be used and dumped in the backyard
- No system of SWM – all scrub under the carpet
- Lack of awareness
- How to create wealth from waste?

Initiatives

- Clean and Green initiatives - launched in May, 2016 in NIRDPR Campus.

Initiatives – Capacity Building

- Initially two months, Awareness Programmes on **Clean and Green Campus** were organised to Faculty, Staff including Group–IV, Campus residents, PGDRDM students, BVBV school teachers and students etc.,

- Time to time cleanliness programmes are being organised for sustainability

No use and throw water bottles

- The Institute has **stopped the usage of plastic water bottles.**

- Drinking water is being provided through water dispensers at the dining halls; conference halls; and office corridors.

Data on Stopped Usage of Plastic Water Bottles

- Total number of trainees attended: **102483**
- Total number of bottles were avoided by NIRDPR for coming into the Environment (102483 x 2 bottles per day x 5 days (on an average) = **1024830**
- **It can be said that more than 10 lakhs plastic bottles were avoided for two years**

(It does not include other meetings and supplies to PG students)

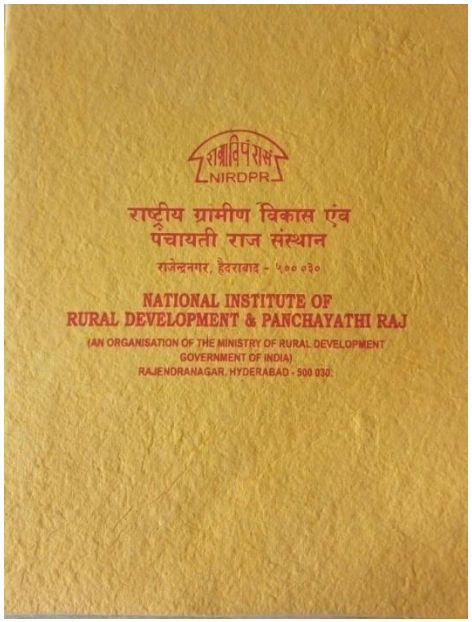
Reusable Glass Bottles

- Reusable **Glass** bottles with safe drinking water on the tables, and during field visits

Office Files and Folders

- Usage of plastic folders has been stopped.

- **NIRD&PR uses and promotes the usage of handmade paper files and folders.**



Usage of eco-friendly bags

- The Institute has stopped the **usage of plastic carry bags,** and promotes reusable cloth bags and eco-friendly nonwoven bags.

Flower Bouquets

- The Institute uses **only fresh flower bouquets** and makes sure no plastic wrapper is used in bouquets.

Waste Disposal – Past and the Present

PAST

- **A practice that existed in the past.**

PRESENT

Three bins for households

- The NIRD&PR has given **three waste bins for every family** that resides in the campus.
- Residents of NIRD&PR segregate waste at household level.
- Scientific Waste Management Practices are being followed in the campus.

Solid Waste Management

- NIRDPR has put in place scientific waste management practices in the campus.
- In-situ waste segregation is done by the residents in this campus.
- Solar battery operated mini vehicles are being used for door-to-door waste collection.
- Kitchen waste is being turned into composts.

...Initiatives

- There is a bio-methane plant that converts kitchen refuse, and food waste into cooking gas.
- Items such as bottles, plastics, papers, cardboards, etc. are passed on to recyclers. Recycling, in other words, is ‘resource recovery’.
- There is a series of Information, Education, and Communication (IEC) programmes conducted amongst the residents time to time for sustainability.
- Residents feel proud, and are cooperative.

Kitchen waste collected from the campus residents of NIRD&PR

Kitchen waste from the NIRD&PR Campus Residents being converted as vermi-compost at RTP

Kitchen waste from the NIRD&PR Campus Residents being converted as vermi-compost at RTP

Cooking gas from Kitchen Waste

Ours is a Clean & Green School

Bharatiya Vidya Bhavan's Vidyashram School, NIRDPR Campus

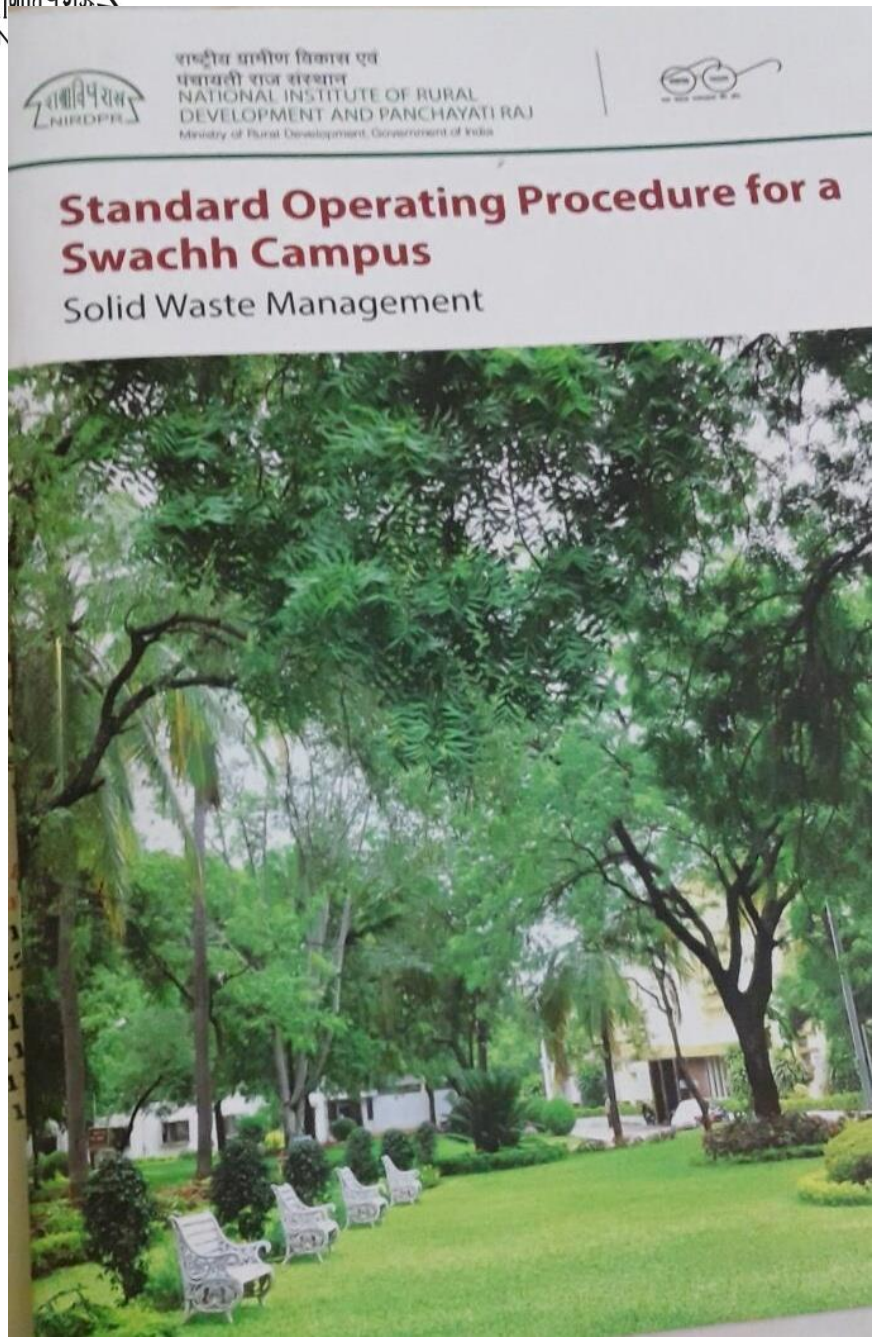
NIRDPR

National Institute of Rural Development & Panchayati Raj
Rajendranagar, Hyderabad - 500 030

Zero Waste Generation

BVBV School Children, NIRD&PR

NIRD&PR students (PGDRM)



NIRD&PR - SOP

- SOP for a Swachh Campus is prepared and shared with all the Governments, Institutions, Universities, Colleges, Schools etc., in India.
- SOP is also shared with National and International Participants.
- All trainees who come to NIRD&PR shall leave this campus as Swachh Ambassadors.

To sum up

- **Refuse:** We refuse use-and-throw carry bags; Use-and-throw tea cups; one-time use water bottles and such items.
- **Reduce:** We adopt e-office and Smart Meeting Minutes so that you reduce the use of paper; use rechargeable batteries, and printer cadrige etc.
- **Reuse:** We reuse kitchen / bath water for watering plants;
- **Recycle:** bottles, plastics, cardboards etc. collected from campus residents sent for recycling; used paper recycled at RTP
- **Re-create:** Kitchen waste is converted as vermi-compost; A bio-methane plant converts kitchen waste to provide cooking gas to the hostel.


Be the change you wish to see in the world.
Be a Swachh Citizen
NIRD&PR – Clean & Green Campus, Hyderabad, INDIA

GREEN ROAD TECHNOLOGIES

National Institute of Rural Development & Panchayati Raj (NIRDPR) Campus,

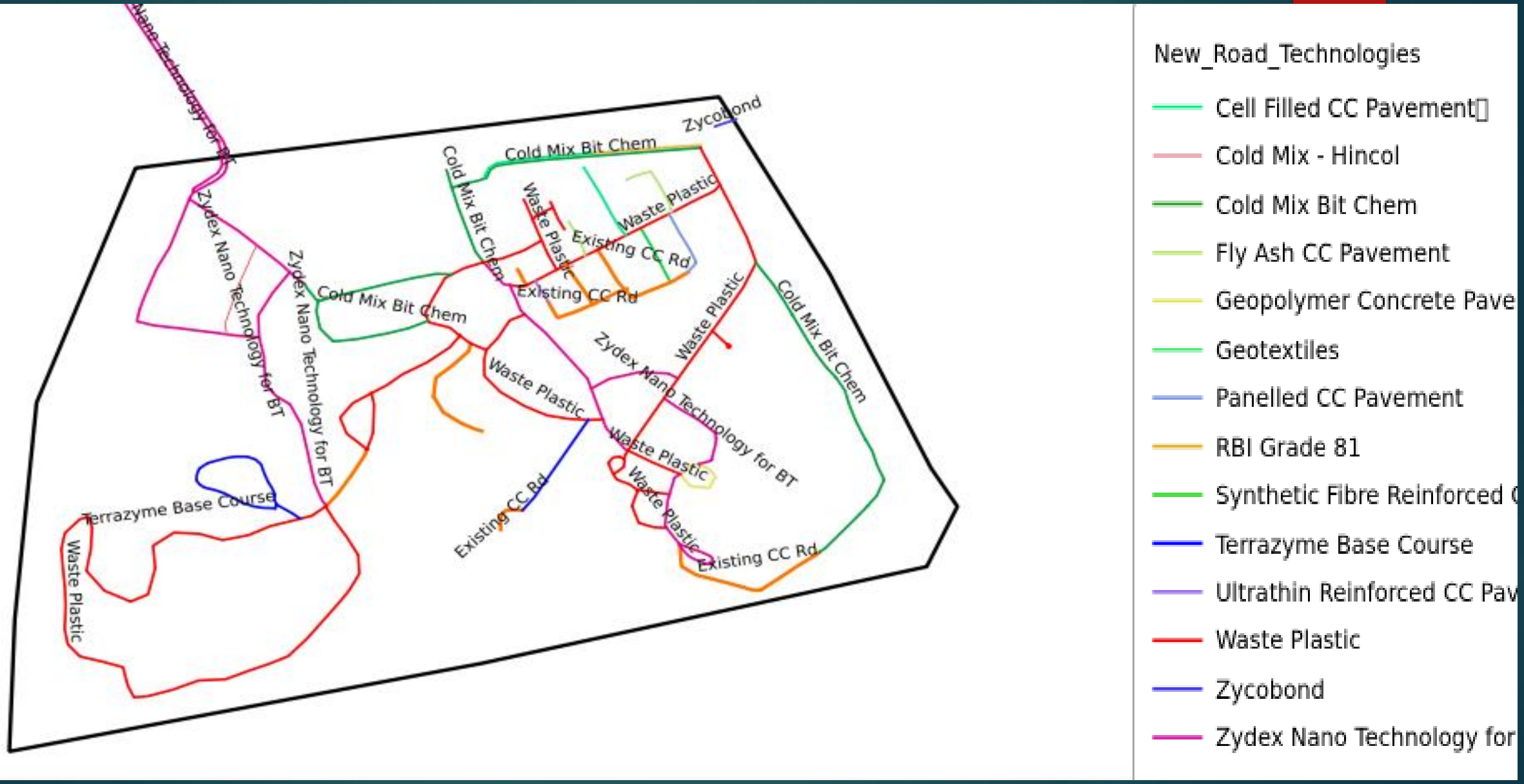
Ministry of Rural Development,

Hyderabad, India.

Different Green Road Technologies Adopted in NIRDPR, Hyderabad Campus

1. Cell Filled CC Pavement
2. Cold Mix – Hincol
3. Cold Mix Bit chem
4. Fly Ash CC pavement
5. Geopolymer Concrete pavement
6. Geo Textiles
7. Panelled CC Pavement
8. RBI Grade 81
9. Synthetic Fiber Reinforced CC Pavement
10. Terrazyme Base Course
11. Ultrathin Reinforced CC Pavement
12. Waste Plastic
13. Zycobond
14. Zydex Nano Technology for BT

A View of Roads adopted by NIRDPR



1. CELL FILLED CEMENT CONCRETE PAVEMENT

The Plastic Cell CC Pavement consists of spreading a formwork of cells of plastic sheet held under tension over a compacted base, filling the cells with single size aggregates and compaction of aggregates, grouting of aggregates with Cement.

FLOWCHART OF PROCESS

SPREADING PLASTIC SHEET

↓

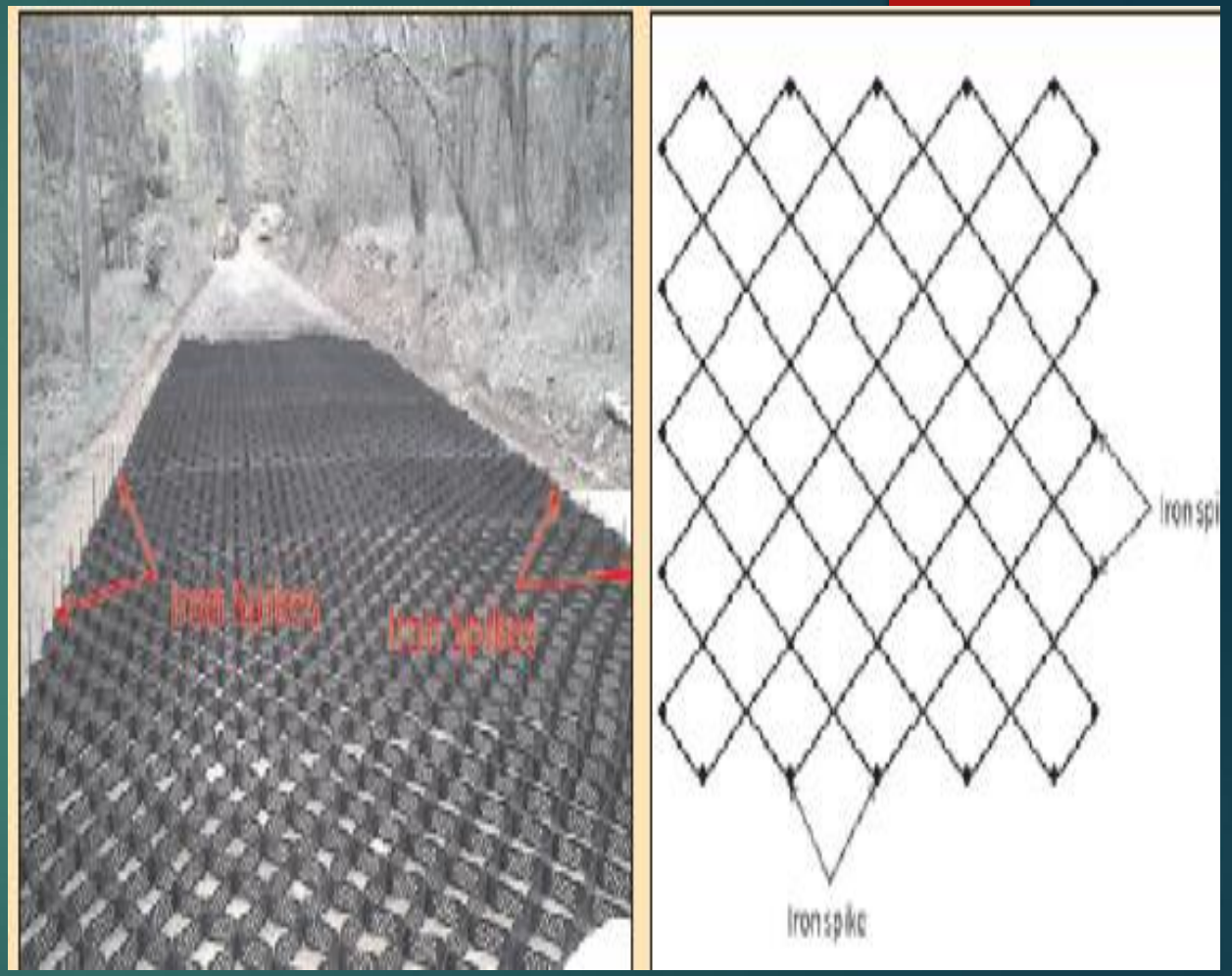
FILLING CELLS

↓

COMPACTION OF AGGREGATES

↓

GROUTING OF AGGREGATES



ARRANGING CELLS

CONCRETING

CURING

ADVANTAGES

Self-compacting concrete was used for making cell-filled concrete.

- Due to the flexibility of the cast-in-situ concrete block, cell walls deform providing interlocking vertical joints between adjacent blocks that of the conventional concrete pavement.

- The cost of the Cell Filled CC pavement is Rs. 28.69 lakhs per km, where as normal CC pavement cost is Rs. 43.89 lakhs per km.

2. COLD MIX HINCOL

Cold mixing is a simple process of mixing unheated mineral aggregates with suitable grade of cationic bitumen emulsion having suitable workability during mixing at plant or site and the roads that result are called Green Roads.

PRE MIXING AGGRTEGATES


LAYING BT


ROLLING
L&T 752
J-322

ADVANTAGES

- **ELIMINATES HEATING OF AGGREGATE AND BINDER**
- **RELATIVELY CHEAPER**

  (The cost of 20mm thickness Mix Seal Surface using Hincol is Rs 8.40 Lakhs per km, where as normal BT the cost is Rs. 6.25 Lakhs per km.)
- **CAN BE LAID DURING WET AND HUMID CONDITIONS**
- **CONSTRUCTION IN REMOTE AREAS**
- **NON HAZARDIOUS IN NATURE**
- **SIMPLE CONCRETE MIXERS**

3. COLD MIX BITCHEM

Cold Mix technology is field application of mix design based on tailor-made Bitchem cold mix binders with the available IRC recommended aggregates through modified HMP plant without need of any heating in an environment-friendly manner.

PROCESS OF COLD MIXING

UNHEATED MINERAL AGGREGATE

CATIONIC BITUMEN EMULSION

COLD MIXING

LAYING

ROLLING

Preparation of Cold mix

Rolling of Cold Mix

COLD MIX BT IN PLANT


2017-12-5 11:08

ADVANTAGES

- REDUCES CONSTRUCTION TIME AND COST

(The cost of 20mm thickness Mix Seal Surface using Bitchem Technology is Rs 8.45 Lakhs per km, where as normal BT the cost is Rs. 6.25 Lakhs per km.)

- PRODUCTIVITY SAVINGS
- LONG TERM BENEFITS
- NO HEATING REQUIRED
- POLLUTION FREE.
- LONGER DURABILITY WHICH REDUCES MAINTENANCE

4.CEMENT FLY ASH CONCRETE PAVEMENT

It is now used across the country. It consists mostly of silica, alumina and iron, fly ash is a "pozzolana" which is a substance containing aluminous and siliceous material that forms cement in the presence of water.

When mixed with lime and water it forms a compound similar to Portland cement.

ADDING FLY ASH


CUTTING
GROOVES

ADVANTAGES

- REDUCED HEAT OF HYDRATION
- WORKABILITY OF CONCRETE
- PERMEABILITY AND CORROSION PROTECTION
- REDUCED ALKALI – AGGREGATE REACTION
- REDUCED COST OF CONCRETE

(The cost of the Fly Ash CC pavement is Rs. 41.01 lakhs per km, where as normal CC pavement cost is Rs. 43.89 lakhs.)

5.GEO POLYMER CONCRETE PAVEMENT

Geo-polymer Concrete (GPCs) is a new class of concrete based on an inorganic alumina silicate binder system compared to the hydrated calcium silicate binder system of concrete are activated by alkaline liquids to produce the binder.

MIXING GEO POLYMER

LAYING

ADVANTAGES

- RAPID (early) STRENGTH GAIN
- ELIMINATING WATER CURING
- GOOD MECHANICAL PROPERTIES
- BETTER DURABILITY
- HEAT RESISTANT
- HIGH COMPRESSIVE STRENGTH (1.5 times higher than the normal cc)
- The cost of the Geo Polymer CC pavement is Rs. 31.95 lakhs per km, where as normal CC pavement cost is Rs. 43.89 lakhs.

6.GEO TEXTILES

Geotextiles for filtration and separation in road construction. Geotextiles are widely used for filtration and separation in road constructions, to prevent migration and mingling of materials, yet allowing free movement of water.


AP28 DC 7034
2018-4-17 15:57

ADVANTAGES

- **ABUNDANT AVAILABILITY**
- **SUPERIOR DRAPABILITY (**The drape attributes of fabrics, number of folds, depth of folds and evenness of folds were measured together with the drape coefficient.)
- **GREATER MOISTURE RETENTION CAPACITY**
- **LOWER COST COMPARED TO SYNTHETIC GEO TEXTILES**
- **EASE OF INSTALLATION**

7. PANELLED CEMENT CONCRETE PAVEMENYT

Short panelled concrete pavements develop much lower wheel load stresses than the conventional ones and require lower thickness.

CONCRETING


CUTTING
GROOVES

ADVANTAGES

- SUSTAINABILITY
- LOWER WHEEL LOAD STRESSES
- MORE DURABILITY
- LOW COST COMPARED TO CONVENTIONAL CC

(The cost of the Panneled CC pavement is Rs. 28.69 lakhs per km, where as conventional CC pavement cost is Rs. 43.89 lakhs.)

8. RBI Grade 81

RBI GRADE-81 is calcium driven, inorganic soil stabilizer patented worldwide. Its specific formulation allows for stabilization of a broad range of materials without compromising the quality of the result.


2018-4-17 16:13

Advantages

- Drastically increases Strength.
- Treated Layers are water Resistant.

9. SYNTHETIC FIBER CC PAVEMENT

The use of fiber reinforcement in concrete are increasingly being used and are exhibiting excellent performance. Synthetic fibers are manufactured from materials such as acrylic, aramid, carbon, nylon, polyester, polyethylene, or polypropylene.


CURING
GOODS CARRIER
ROAD KING
AP36 TB1192


CUTTING
GROOVES

ADVANTAGES

- **REDUCED PLASTIC SHRINKAGE**
- **INCREASES TOUGHNESS**
- **SUBSIDENCE CRACKING**
- **INCREASES POST – CRACK INTEGRITY**
- **MORE DURABLE**
- **LESS PERMEABLE**
- **SKID RESISTANT PAVEMENT**
- **LOW COST**

  (The cost of the Synthetic Fibre Recron 3s Reinforced CC pavement is Rs. 31.04 lakhs per km, where as normal CC pavement cost is Rs. 43.89 lakhs.)

10.TERRAZYME BASE COURSE

Construction of roads, using a bio-enzyme based liquid soil stabiliser, manufactured under ISO-9002 procedures, that is environmentally friendly and readily biodegradable and miscible in water.


SPRAYING TERRZYME MIXED
WITH WATER


PLOUGHING SOIL MIXED
WITH TERRAZYME
241 DI MASSEY


ROLLING OF SOIL LAYER
STABILISED WITH TERRAZYME


2017-12-5 11:12

ADVANTAGES

- ENVIRONMENTAL FRIENDLY
- MISCIBLE WITH WATER
- IMPROVES ENGINEERING CHARACTERISTICS OF LOCAL SOILS
- EFFICIENT COMPACTION
- LOW COST COMPARE TO WBM ROAD

(Total Cost of TerraZyme base coarse Rs. 13.75 laks per Km. whereas the cost of normal WBM base coarse is Rs. 21.91 lakhs)

11.ULTRA THIN STEEL REINFORCED CC

The Ultrathin Reinforced Concrete Pavement consists of a thin layer of standard concrete M30 lightly reinforced with nominal steel, constructed on top of the in-situ unsurfaced road with minimal preparation.


PREPARING BASE COURSE


CONCRETING


CURING


PROVIDING STEEL REINFORCEMENT

ADVANTAGES

- RESISTANCE TO IMPACT LOADING
- NO JOINTS FAILURE
- LIMITED INGRESS OF WATER AT THE CRACKS.
- POSSIBLE REDUCED LOADING/BETTER SPREADING OF THE WHEEL LOAD
- IMPROVED STRENGTH AND DURABILITY
- REDUCED MATERIAL VOLUME
- COST EFFECTIVENESS

  (The cost of the Ultra thin CC pavement is Rs. 20.52 lakhs per km, where as normal CC pavement cost is Rs. 43.89 lakhs.)

12. WASTE PLASTIC

Plastic roads mainly use carry bags, disposable cups and bottles are collected from garbage dumps as an construction material. When mixed with hot bitumen, plastics melt to form an oily coat over the mixture is laid on the road surface.

STEPS INVOLVED IN THE CONSTRUCTION

CUTTING PLASTIC → AGGREGATES → (165°c) HOT AGGREGATES

+

HOT AGGREGATES

↓

MIXING CHAMBER

(PLASTIC WASTE & HOT BITUMEN)

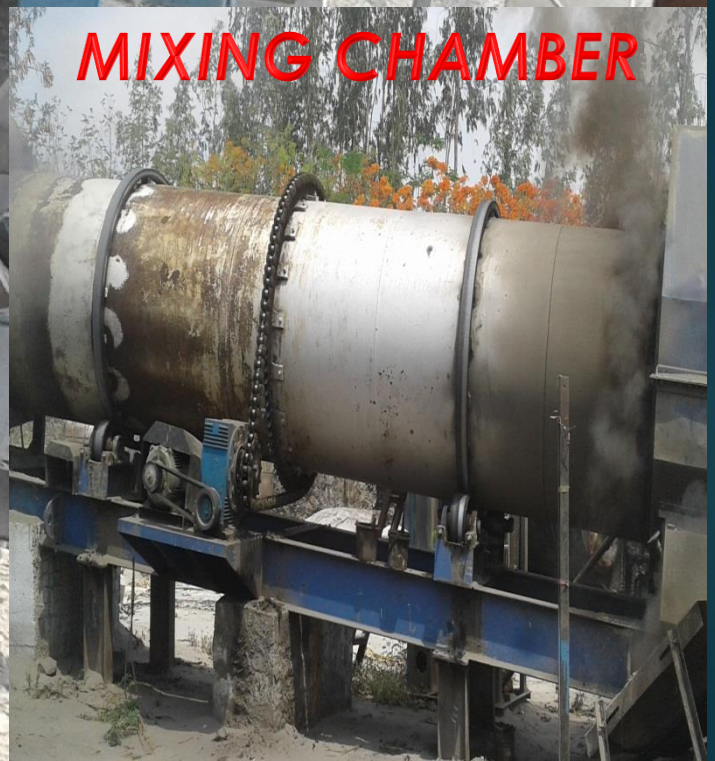
↓

LAYING THE MIXTURE

↓ (110°c)

ROLLING COMPACTION

ADDING WASTE PLASTIC



LAYING AND ROLLING


2017-12-5 11:00

ADVANTAGES

- MORE MARSHALL STABILITY
- BETTER RESISTANCE TOWARDS RAIN WATER AND WATER STAGNATION
- NO STRIPPING
- BINDING AND BONDING
- NO LEACHING OF PLASTICS
- NO RADIATION EFFECT
- Less cost compared to normal BT. (The cost of 20mm thickness Mix Seal Surface using waste plastic is around Rs 5.92 Lakhs per km, where as normal BT the cost is Rs. 6.25 Lakhs per km.)

13. ZYCOBOND

Zycobond is a sub micron acrylic co polymer emulsion with long life of more than 10 years for bonding of soil particles. It is recommended to mix with Terrasil solution for one step expansivity control and bonding to strengthen and stabilise the soil.


2017-12-5 11:11

ADVANTAGES

- **LONG LIFE > 10 YEARS**
- **ONE STEP EXPANSIVITY**
- **WATER PROOFING**
- **EROSION CONTROL**
- **COST EFFECTIVE**

(Total Cost of Zycobond base coarse Rs. 17.72 laks per Km. whereas the cost of normal WBM base coarse is Rs. 21.91 lakhs)

14. ZYDEX NANO TECHNOLOGY FOR BT

Mix Seal Surfacing (HMP) - Using modified bitumen binder with Nano technology based bitumen premixed with bituminous binder @ 4.5% of Mix & 0.1% Zycotherm or Equivalent

At Vindyachal Hostel

At School

At Bank

ADVANTAGES

- **MOISTURE RESISTANT**
- **LONG LASTING AND MAINTENANCE FREE ROADS**
- **100 % COATING OF BITUMEN ON AGGREGATE**
- **PAVEMENTS WITH EXTENDED LIFE**
- **WIDER TEMP ZONE FOR COMPACTION**

COST

(The cost of 20mm thickness Mix Seal Surface using Zydex Nano Technology is Rs 6.31 Lakhs per km, where as normal BT the cost is Rs. 6.25 Lakhs per km.)

THANK YOU