

A brief report of Sri B.C. Tripathy , Executive Engineer (World Bank Projects),
O/o the Engineer-in-Chief (Civil) on the 71st Annual Session of IRC, at Nagapur
11th to 14th November' 2010.

As per the Works Department Letter no. 14519/w dt. 9.11.2010, I attended the 71st Annual Session of Indian Roads Congress as an official delegate and attended the following technical presentations and participated in the discussions. Lessons learnt and important points are noted against

Paper No. 558 " Quantification of Benefits of Improved Pavement Performance Due to Good Drainage" Lt. Col. Shailendra Grover & A. Veeraragavan & Paper No. 562 " Forensic Investigations of Pavement Premature Failure of A National Highway Pavemnet Due to Poor Sub-surface Drainage". A. Veeraragavan & Lt. Col. Shailendra Grover.

1. Effective sub-surface drainage in roads is a critical requirement for ensuring stability and preventing the failure of pavement.
2. Gradation and properties of layer materials in the GSB above the subgrade need to be improved to meet the standards to enable the GSB effectively act as the drainage layer.
3. High percentage of fines in the GSB layers prevent efficient drainage; fines should be limited to 5%
4. The permeability of drainage layer of 30 m/day is an appropriate/rational recommendation of the IRC as against the US standard of 300 m/day.
5. The GSB in shoulder should be compacted and have the same permeability as the core to avoid the 'bathtub' effect.
6. The practice of opening DBM layer to traffic without BC must go as the pavement fails early due to fatigue rutting.
7. Longitudinal draw in the middle needs careful planning to prevent accidents:

Paper No. 561 " Warm Mix Asphalt Technoloties: An overview" Prithvi Singh Kandhal & Paper No. 564 " Guidelines ofr Long Lasting Bituminous Pavements in India"

Prithvi Singh Kandhal & A. Veeraragavan & R.K. Jin & Paper No. 560 " Landslides- Investigations and Mitigation in Eastern Himalayan Region"

A. Sengupta, S. Gupta & K. Anbarasu

WMA:

1. Hot mix asphalt at 160⁰ C as adopted in road construction in India now consumes more energy and causes emission detrimental to the environment/ air quality. Warm mix asphalt (WMA) at 120⁰ C saves energy, reduce emissions, fumes and odour, decrease binder aging enhancing pavement durability, extend paving season, and allow more time for compaction as the difference in mix temperature and ambient temperature is less.
2. Warm Mix Asphalt technology can earn carbon credits as it is soft on the environment.
3. Anti -stripping agent (1-2% hydrated lime) is required in WMA to control moisture damage.
4. Generic specification of WMA technology for Indian condition is required to be introduced so as to enable competitive bidding and promote its use in India.
5. Marginal aggregate can be used in WMA provided water absorption is less than 2%.
6. WMA is slightly expensive.

Long Lasting Bit-pavement.

1. Rationalisation of Mixes:

Three broad mixes: Wearing-BC- Grade-1

Binder-BC-Grade-2

Base-DBM-Grade-2

2. As VG 30 Bitumen is specified, the use of viscometer is a MUST. To ascertain the same .
3. Stone to stone contact:- SMA (Stone Matrix Asphalt) is 30% costlier than BC but guarantees no rut in overloading.
4. Fine aggregate :

Natural sand is not desirable in wearing and binding course and not more than 50% in base courses. Angularity in fine aggregate needs to be introduced.
5. No mineral filler is needed if it fails AASHTO test Portland cement is as good as stone dust for this purpose.
6. The use of vibratory roller is recommended.

Landslides

1. Geotechnical/Geological investigation : Investigation needs to be undertaken through the GSI, or in a small scale through IIT-Kharagpur to ascertain the vulnerability of hilly roads to land slide.

- 2. Adequate drainage alongwith prevention of migration of fines by using filter materials or geotextiles is required to minimize the occurrence of landslides.
- 3. Human interference should be minimized to avoid the "trigger".

C: Presentation on " Practical Case Studies"

- i. Reconstruction of Major High Level Bridge Across River Painaganga of Wadki- Wani Antargaon Gadchjandpur-Dewada State Highway No. 236 in Chandrapur District by M/s- Chaphekar & Co. Nagpur.
- ii. Road consturcion in Water Logged Highway Stretch-Nothing is impossible- A Case Study by Shri Nandanandan Das.
- iii. Use of Seismic Reaction Block as a Horizontal Load Transferring Member form Superstructure of Substructure by Shri A. Ghoshal
- iv. Rajasthan mega Highways Project by Shri K. Ramchand & Harish Mathur.

LL: By use of vertical filter combined with perforated RCC drain for collection of water, the problem of road construction in water logged areas can be tackled.

D: Technical Presentations

- 1. Breaking and Creating Boundaries- The key to Innovation and Excellence by Mr. Adesh Jain, M/s Project Management certification Instt.
- 2. Evolution of Mechanically Stabilized Earth (MSE) Technique & Technology- Historical Perspective & Global Scenario by Mr. Nicolas Freitag, M/s Reinforced Earth India Pvt. Ltd.
- 3. Sustainable Green Building Technique by Mr. Vinay Kothari, CEO M/s. Sri Venkateshwara Fibre Udyog
- 4. M/s Bitchem Asphalt Technologies.

Project Mangement:

- 1. The modern project management concept evolves on projection, visioning, generating abstract ideas and strategizing which are delivered by the process of management.
- 2. The process involves initiation, planning, implementation and optimization (evaluation/ lessons learnt).
- 3. 50% of Project Management involves risk management. Risks include clearances relating to health, environment, land acquisition etc.
- 4. In modern project management level playing field is required to be maintained in procurement and contract management . The craze for the lowest to be acceptable should not lead to compromise in quality. If the contractor does his work and the work is as per the quality specified . he/she is due for his dues on time. If the contractor is paid as time, this approach sends a strong positive message to all the contractors.

5. Projects should spend more time in planning and preconstruction activities to avoid delays and disputes in implementation.
6. Project Management certification can be compared like issuing “Driving Licences” to organized and qualified managers and strategic planners.

Mechanically Stabilised Earth (MSE)

1. Green slope is 25% cheaper than stone pitching .
2. Green slope is successful in steep slope and even in sand dune .
3. The technology uses geotextile cover eg. Coconut fibers and polymer which dissipate the energy of rainwater and allows vegetation.

E: Talk by Experts

- i. Ways to Reduce Energy Consumption in Road Construction by Dr. L. R. Kadiyali
- ii. Use of Automated Data Collections Systems for Road Maintenance by Mr. Richard Wix.
- iii. Mr. Chris Francis
- iv. Shir P.K. Katare, NRRDA

Energy Consumption.

1. The consumption of fuel for construction of a 2-lane 1 Km. stretch of highway in different specification/types:
 - I Flexible 130t
 - ii Concrete/ rigid 60 t
 - iii Composite 108 t
 - iv Soil cement instead of stone in case of iii) The consumption does not consider fuel used in production and transport of bitumen and cement.

Automated data collection

1. A good road maintenance management system is based on a reliable and quickly updatable database.
2. It takes, proportionately, Rs 45 to effectively maintain the road against Rs 315 to reconstruct the same length.
3. As we add new roads to our inventory, we must have the “quality data” to help us take “quality decisions” in terms of budget, technology, contracts, periodicity of road maintenance.
4. IRC-SP-19-2001 outlines use of digital images for tracking potholes/cracking.

5. Toll operators can be involved in the creation and maintenance of the database.

F: Discussion on " General Report on Road Research"

- i. Presentation of 1st Chapter of GR by Shri S.P. Pokhriyal
- ii. Presentation on 2nd Chapter of GR by Shri Binod Kumar
- iii. Presentation on 3rd Chapter of GR by Shri Sudhir Mthur
- iv. Presentation on 4th Chapter of GR by Dr. P. Kakshmy.

- 1. NHIS is based on the GIS
- 2. GIS is also applicable to management of traffic (travel time/speed).
- 3. In Plastic emulsion road, potholes are not seen.
- 4. Copper slag upto 80% has been used as fine aggregate along with soil.
- 5. Jarofix, waste product of Zinc industry has less density and is not suitable for s/g .
The combination of 50% Jarofix and 50% soil has been used as s/g/
- 6. C & D waste is not suitable; needs cutting, blending.
- 7. Oil well drill cuttings have been used in embankment.
- 8. Resource mapping- Inventorisation of materials and properties has been successfully completed in Kerala.

Construction of underpass under existing railway bridge approach:

(CRR)

- 1. 135 years old Jamuna bridge , Delhi- An underpass was constructed for CWG for creating by pass near Rajghat Road.
- 2. Trains continued to move (at slow speed) during construction of the underpass.
- 3. Boxpushing method (3 boxes) alongwith soil needle (Soil-nailing) method for stabilizing the embankment during pushing was adopted successfully.

Flyash in road Construction.

- 1. Use of steel fibers along with flyash contributes to better performance against fatigue.
- 2. Steel fibers enhance flexural strength by 13%.
- 3. Wear and tear due to steel fibers leading to puncture of tyres is reduced by overlays, wearing coat, open friction concrete courses. The latter also control noise pollution of concrete pavement.

Road Safety:

- 1. Accidents due to trucks parked on inadequate of berm of NHs. The recommendation is for 3 m berm on NHs.

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2. Roads should be user-friendly to the physically challenged.

Road Maintenance Contracts

1. Construction and maintenance contracts should be separated.
2. The present practice of input based contract should be replaced by performance, output indicator based contract.
3. Rehabilitation contract is not to be treated and not to be merged with maintenance contract.
4. Maintenance contract should include the corridor and the connecting corridors also .

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22/1/10

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