



CSIR - Central Road Research Institute
सीएसआईआर - केन्द्रीय सड़क अनुसंधान संस्थान

CSIR CRRI Newsletter

सीएसआईआर-सीआरआरआई समाचार पत्रिका



ISSUE No. 49 & 50

January - June 2016

NEW DIRECTOR

Prof. (Dr.) Satish Chandra
Joins as Director, CSIR-CRRI



Dr. Satish Chandra, Professor, Department of Civil Engineering, IIT, Roorkee took over the office of Director, CSIR-Central Road Research Institute (CRRI) on 18th January, 2016. After completing his post graduation (M.E.) in Transportation Engineering (Civil Engineering) in 1985, he joined the University of Roorkee (now IIT Roorkee) as Lecturer in 1985. He completed his doctorate (Ph.D) in 1994 from the University of Roorkee and became Professor in May 2006. He has more than 30 years of experience in the field of Civil Engineering through teaching, research and consultancy and has contributed significantly in the core areas of Highway Capacity and Bituminous materials characterization. He has published 45 research papers in international journals, 90 papers in national journals, and 73 papers in conference proceedings. Many of his research papers are referred widely both in India and abroad. He has developed the original concept of Dynamic Passenger Car Unit (DPCU) for converting heterogeneous traffic stream into a homogeneous stream of passenger cars, while retaining the impact of individual vehicle type in the traffic flow analysis. This concept has been well received by various researchers both in India and abroad and has been used in several studies related to highway capacity taken up in India and in other developing countries like Egypt, Vietnam, Cambodia, China and Thailand. He has delivered several lectures and keynote addresses/ speeches on the concept of DPCU in many institutes and conferences. He is the key member of a research team responsible for preparing

the Indian Highway Capacity Manual, a major research project sponsored by the Planning Commission through CSIR, New Delhi.

He has completed several major research projects, guided 16 Ph.D. theses and over 100 M.Tech. dissertations. He has authored three books viz. Engineering Graphics; Air Transportation Planning and Design; and Railway Engineering. He was invited as adjunct faculty in May 2014 by IIT Bhubaneswar for guiding their M.Tech and Ph.D. students.

Dr. Chandra has been the recipient of INSA visiting fellowship (in 1994). He has also received several awards for his outstanding research papers from the Institution of Engineers and Indian Roads Congress. He was conferred with the outstanding teacher award by IIT, Roorkee in the year 2006 and then again in 2014. He has been a member of the Traffic Engineering Committee of the Indian Roads Congress for a long time and has contributed immensely to the development of different standards, codes and specifications. He was also a member of the Technical Evaluation Committee for World Bank aided projects in the state of Uttar Pradesh. He is member of the Research Council of National Transportation Planning & Research Centre (NATPAC), Thiruvananthapuram. He has trained more than 800 field engineers through various training courses on rural roads construction. He has also completed several consultancy assignments for a number of department/ organizations towards solving their problems.

Evaluation of GUJCON - CRF Nylon-6 Fibre Reinforced M40 Concrete for Roads

Gujarat State Fertilizers & Chemicals Limited (GSFC), Vadodara, has developed Nylon based synthetic fibre named "GUJCON - CRF Nylon-6 Fibre" for its possible use in the construction of concrete roads. GSFC requested CSIR-CRRI to evaluate the influences of the addition of 18 mm length Nylon-6 fibre on the properties of M40 concrete to be used in the construction of roads. The prescribed dosage of fibre was 100 gm per 50 kg of cement.

The study was conducted to evaluate the influence of addition of fibre on different properties and hardened state concrete i.e. of fresh concrete Compressive strength, Flexural strength, Drying shrinkage, Modulus of elasticity and Abrasion resistance with and without incorporating GUJCON – CRF Nylon-6 fibre. The physical and chemical properties of GUJCON-CRF Nylon-6 fibre are presented in Table 1. Figure 1 and Figure 2 show the Fibre in water before mixing and

after mixing respectively.

The study found a slight reduction in slump and insignificant effect on density of fresh concrete. It further reveals a reduction in drying shrinkage, notably higher resistance to abrasion, but similar strengths (both compressive and flexural strength) for M40 concrete mix reinforced with GUJCON-CRF Nylon-6 fibre to that of controlled concrete without GUJCON-CRF Nylon-6 fibre. Further, delayed separation of cracked beam under flexural testing at ultimate load, due to incorporation of GUJCON-CRF Nylon-6 fibre, indicated an improvement in post failure behaviour of concrete. The study concluded that GUJCON-CRF Nylon-6 fibre may be used in concrete roads construction and in similar construction works in order to improve specific properties of concrete over and above the conventional concrete.

Table 1. Physical and chemical properties of GUJCON-CRF Nylon-6 Fibre (As per GSFC)

Properties	Values
Fibre cross-section	Trilobal
Fibre length	18 mm
Nature of fibre with respect to water	Hydrophilic
Water absorption	4-4.5%
Denier/Filament	3
Color	Brilliant White
Melting Point	220°C
Specific gravity	1.13-1.14
Chemical Resistance	Very good against alkali, hydrocarbons
Surface treatment if any	None



Figure 1: Nylon-6 fibre in water before mixing



Figure 2 : Nylon-6 fibre in water after mixing

Development of Technology for Compensating Strength Loss in Paving Concrete due to Use of Aggregate from C&D Debris

Construction and Demolition (C&D) waste is generated every time a building, road, bridge, industrial structure or a manufacturing facility is constructed, repaired, rehabilitated or demolished. The majority of such material comes from building renovation and its demolition. As per an estimate, India would need a landfill of the size of West Bengal in order to dump about 21,630 million tonnes of construction and demolition (C&D) debris which is expected to be generated from repair, rehabilitation, and demolition of old buildings as well as from new ones between 2015 and 2030. C&D waste is typically composed of wood, plaster, concrete, asphalt cement, roofing materials, glass, plastics, metal, insulating materials, carpeting and other similar materials depending on the locality of its origin (Figure 3).

As is clear, Recycled Concrete Aggregate (RCA) derived from C&D waste is not homogeneous like natural/virgin aggregate (NA) derived from a crushed rock. On

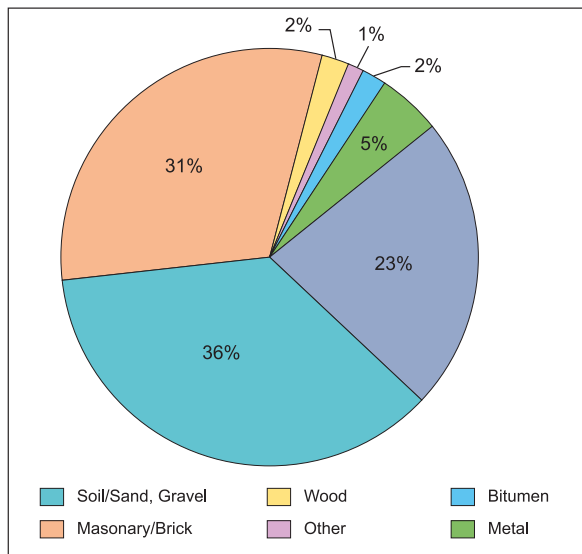


Figure 3 : Typical Composition of C&D waste

the other hand, there is a huge gap between demand and supply of good quality concrete aggregate. Hence, it is very important to determine different components present in RCA i.e. mortar shell, brick, stones like sand stone, marble etc. Therefore, in order to explore alternate /perpetual source of aggregate derived from C&D debris. On the basis of results obtained through evaluation of size distribution of coarse aggregate, it was decided to use aggregate available in maximum size range of 10-25 mm. A comparison of some of the physical and mechanical properties of recycled aggregate with virgin/ natural crushed aggregate showed a significant reduction in the value of specific gravity, bulk density and abrasion resistance of recycled aggregate, etc. (Table 2). As can be seen from table 2, the water absorption of RCA was found 9 times to that of natural crushed aggregate.

The study has concluded that mortar content in RCA has lower density, higher water absorption, higher porosity and lower specific gravity than the virgin aggregate.

The physical properties of RCA, indicated in table 2, result in reduction of compression strength, modulus of elasticity, density etc. as well as durability aspect of concrete. The reduced durability is due to the increase in porosity which is rendered by mortar attached to RCA. Since, the concrete made up of recycled aggregate consists of two Interfacial Transition Zone (one between recycled aggregate and mortar attached to it and the other one between recycled aggregate and new cement matrix from concrete made up of RCA), use of RCA results into 10-30% loss in strength of concrete. To compensate the strength loss in concrete made with recycled concrete aggregate, the study suggests 50% replacement of coarse aggregate in the size range of 10-25 mm.

Table 2: Physical properties of recycled concrete aggregate vis-à-vis natural/virgin aggregate

Physical Properties	Value		% Reduction wrt NA
	RCA	NA	
Specific gravity	2.24	2.71	20.9
Aggregate impact value (%)	27.94	23.10	20.9
Aggregate crushing value (%)	28.16	23.25	21.1
Abrasion value (%)	66	28	135.7
Bulk density (kg/m ³)	1470	1650	12.2
Moisture absorption (%)	5.00	0.48	941.6

Evaluation for Rehabilitation of Road from Jhatikra More to Jhatikra Village

The project aims at the evaluation of road from Jhatikra More to Jhatikra Village for its rehabilitation/strengthening by determining overlay thickness with Falling Weight Deflectometer. The project road has been upgraded /improved as a Flexible Pavement. The project road is 8 kms long, in entirely flexible pavement and is a 2 lane road with single carriageway.

Falling Weight Deflectometer (FWD) (Figure 4), a modern and fully microprocessor based system, was used for Non Destructive Testing/ Evaluation of the project road . It is a trailer mounted device and is equipped with a standard 300 mm diameter rigid (base) plate with a rubberized pad to help in distributing the load evenly. Test method allows for a force amplitude and duration approximating the effect of a heavy moving wheel load so as to get very accurate deflection measurements, especially at large distances from the centre of the load. The output of FWD is in terms of pavement surface deflections for an applied load. Deflection measurements were undertaken for a pre-determined load (impulse load) along the wheel paths, staggered at suitable intervals, depending on the length of road section. The deflection measurements were made on at least 11



Figure 4 : Falling Weight Deflectometer in use

points on each section, staggered at 100m. Through the use of software which also involves back calculation of Resilient Modulus of existing pavement layers, the overlay thickness is determined for anticipated traffic on the road.

60 mm DBM with 40 mm Bituminous Concrete (BC) or 40 mm Stone Mastic Asphalt (SMA) as the wearing course has been recommended so as provide proper evenness to the pavement surface and to provide better riding quality to the traveling public.

Development of Mobile Bridge Inspection Unit

Under a DST sponsored project jointly undertaken by the two CSIR laboratories i.e. CSIR-CRRI, New Delhi and CSIR-CMERI-CoEFM, Ludhiana, a Prototype of Mobile Bridge Inspection Unit was developed for commercial manufacturing. This technology has already been successfully developed and transferred to Indian industry.

The vehicle mounted Mobile Bridge Inspection Unit (MBIU) (Figure-5) is a mechanical device mounted on a truck to cater to the need of carrying out close inspection and repair work of the two/three lane bridge components' below the deck. A copyright of the unit has been filed. The working prototype is being used by CSIR-CRRI, New Delhi for its R&D activities. The process of technology transfer to industry has been realized so that full benefits to the society can be achieved.

The major activities undertaken the development of MBIU were (a) Designing and detailing the mechanical joints, (b) Fabricating the frame and the joints, (c) Procuring a mounting vehicle and its modification for the suspension system including the chassis, (d) Testing of various components and fitting of the frames and joints on the truck, (e) Installing the control sub-systems and integrating various components as a system, (f) Demonstrating the functioning of MBIU.



Figure 5 : MBIU under Operation on a Bridge on NH24

The Unit is considered as a lattice frame mounted over the truck. The mounted support at the truck consists of a lowering/ lifting mechanism for the lattice frame to put in position around the bridge deck. Unfolding and folding of the unit is automatic with proper controls. Square or rectangular hollow sections (SHS or RHS) of high strength are used. The length of the working

platform is 10 m. This is the horizontal platform on which the inspection team stands to carry out the inspection. A payload comprising a weight of 3 persons and equipment weight of 100 kg has been considered while doing design of the Unit. The allowable stress in the material and the functional design conforms to IS and ANSI-SIA codes.

The Unit has the following mechanisms to facilitate the movement of working platform in a particular direction or plane:

- i. The launching mechanism along with the support system which is fixed on the truck,
- ii. Vertical and translatory motion of the vertical frame (mast),
- iii. A mechanism facilitating the lower arm (working platform) to rotate in a horizontal plane for wider coverage of inspection area underneath the bridge,

- iv. The folding and providing variable length of the working platform.

CSIR-CRRI has given licenses to two companies for manufacturing of MBIU based on the technology so developed in India.

- 1) M/S Gujarat Apollo Industries, Ahmedabad - 380009, Email : info@apollo.co.in, Website : www.apollo.co.in.
- 2) M/S Gemini Power Hydraulics Private Limited, Mumbai-400088, Website: www.geminiindia.com Email: rajiv@geminiindia.com

Presently, the MBIU is being utilized in a MoRTH sponsored project entitled "Condition monitoring of bridges" in Jharkhand under a joint venture between CSIR-CRRI, New Delhi and M/s Intercontinental Consultants & Technocrats Pvt. Ltd. (ICT), New Delhi.

Evaluation of Integrated Transport System

Mass Rapid Transport System (MRTS), widely known as Delhi Metro in Delhi, is becoming the main public transport that presently comprises of six lines with a total route length of 189.63 kms and 143 metro stations. Apart from the metro rail system, buses continue to be other mode of public transport system in Delhi. Auto rickshaws and cycle rickshaws act as Para-transit/ Intermediate Public transport modes and play a huge role in commuting people for smaller distances. Metro services, when integrated with more extensive surface transportation system, would pave way to more direct and convenient trips and thus more riders will be attracted to use the public transit. The trip profiles of private and public modes to identify the probability of modal shift from private cars to metro by the introduction of feeder modes were analyzed. This variant takes into account the principles of sustainable development. To enable integration in the present study, an attempt is made to introduce a combination of metro and feeder mode thereby revising the existing modal split and mode choice O-D matrices. The following assumptions were made in view of this approach:

- Feeder transit modes are available at a radius of 500m from the metro station
- Feeders ply and operate for a maximum distance of 6km from the metro station.
- Zones falling under 6km radius from each metro station are only considered for integration.

The existing mode choice is revised using three influential input variables, namely in-vehicle travel time (IVTT), out-vehicle travel time (OVTT) and metro travel cost (TC). A scenario is considered here that if a passenger considers to use the Metro and Feeder combined trip, the IVTT (in vehicle travel times of metro and feeder) is bound to increase while the OVTT

(access and egress times) is intended to decrease due to better connectivity. The trip cost is also expected to rise than the usual cost due to the extra mode and increase in IVTT. It was observed that the modal split for metro has increased from 3.2% in existing case to 11.4% in case of metro with feeder mode. This observation implied that around 8.2% of passengers would prefer to shift to metro if feeder connectivity is provided (Figure 6). The overall ridership in metro has increased from 2.65 million passengers to 4 million passengers. Such increase of metro ridership results in the noticeable decrease of the ridership shares of the major private modes. At the network level, there is a drop of 6.2% in private mode trips at the introduction of feeder mode. It was also observed that changes in the modal split impact the average passenger speed positively. The average passenger speed is improved from 27.35 km/hr to 28.48 km/hr in the Blue line of Delhi metro. Similarly, it has increased from 26.25km/hr to 27.04km/hr in the Yellow line of Delhi metro

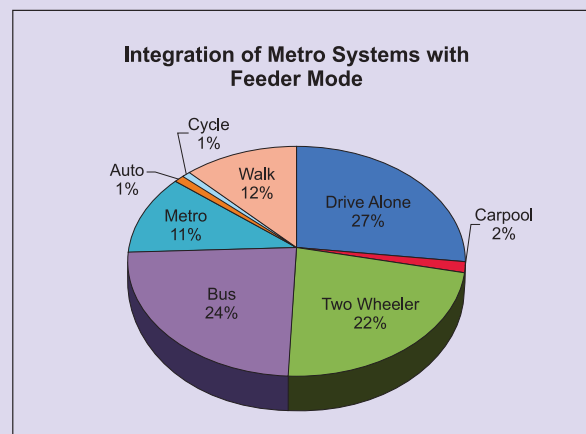


Figure 6 : Modal Split Obtained After the Introduction of Feeder Mode Scenario



Development and Evaluation of Integrated Transportation System for NCT of Delhi

The National Capital Territory (NCT) of Delhi, with an estimated population of about 16.8 million in 2013 has been considered as study area. A total of 360 Traffic Analysis Zones/ Wards (TAZs) along with 8 external zones of surrounding region are considered to study the trends of external trips as well. Travel behaviour data was collected through an extensive household survey carried out by CRRRI by utilizing a pre-designed questionnaire. The questionnaire consisted of four sections namely household information, person's information, trip information and vehicle information. Individual responses were collected through personalized interviews to avoid biasness in the data collection. The collected raw data was pre-processed and the incomplete responses were eliminated. A cleaned data sample of 7098 individual responses was finally considered for the development of four stage travel demand model.

From the analysis of household travel behaviour data, it was observed that the largest commuter share is coming from the age group of 31 to 50 years. This age group of commuters preferred private vehicle for their mobility with approximately 20% of Car, 15% of Two-Wheelers and 12% of Bus. A majority of 28% households were observed to fall under the income category of Rs. 20,000 to Rs. 30000 per month. It was also observed from the data that families with household incomes of less than Rs.30000 preferred to use two-wheelers, cycles and walk as their mode of travel. From the analysis of vehicle ownership, single vehicle ownership was notably high (61%) while 19% have no vehicle ownership thus implying that these are wholly dependent on public transport.

Travel demand modeling is an essential tool that involves prediction of travel decisions that people would like to make, given the generalized travel cost of each travel alternatives. To implement four stage travel demand model (Trip Generation, Trip Distribution, Mode Choice and Traffic Assignment) for the study road network, macroscopic simulation software namely PTV-VISUM has been considered. Link Flows were obtained for Private and Public Trips for base year 2013 (Figure 7 (a)) and horizon year 2021 (Figure 7 (b)). The red labels indicate the User Equilibrium assignment of private vehicles (in terms of PCU/day) on a particular link. The blue labels indicate (PuT) specific All-or-Nothing (AON) assignment performed for bus and walk trips wherein the passenger does not suffer any impedance caused by public transport line routes or time tables.

The metro assignment was carried out using time table based assignment. The arrival and departure times, run times and stop times at stops were obtained from the DMRC and input in VISUM using the time table editor

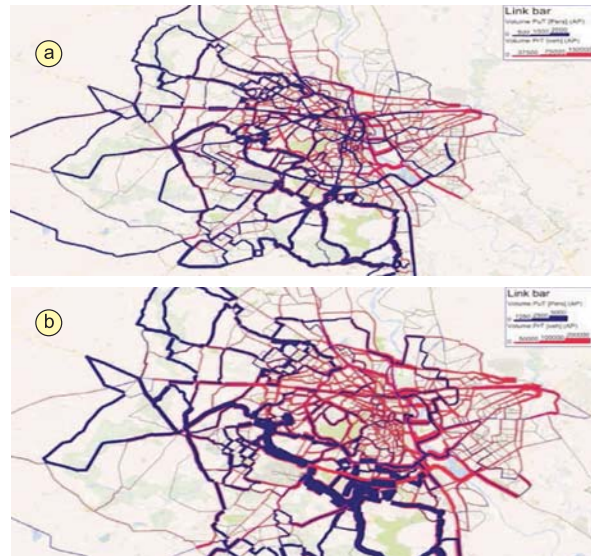


Figure 7 : Flow Diagram of Link Flows Obtained for Private and Public Trips for (a) Base Year 2013 (b) Horizon Year 2021

to perform simulation. Figure 5 indicates the time-table based assignment performed for metro trips in terms of passengers/day for (a) base year 2013 and (b) horizon year 2021. At the network level, the total daily ridership in metro was observed to be 2.65 million passengers. An average passenger speed of 27.86 km/hr in metro was observed. It was also observed that maximum number of passengers boarded at busy metro terminals and interchanges like Rajiv Chowk, Central Secretariat, and Mandi House attracted the largest passengers.

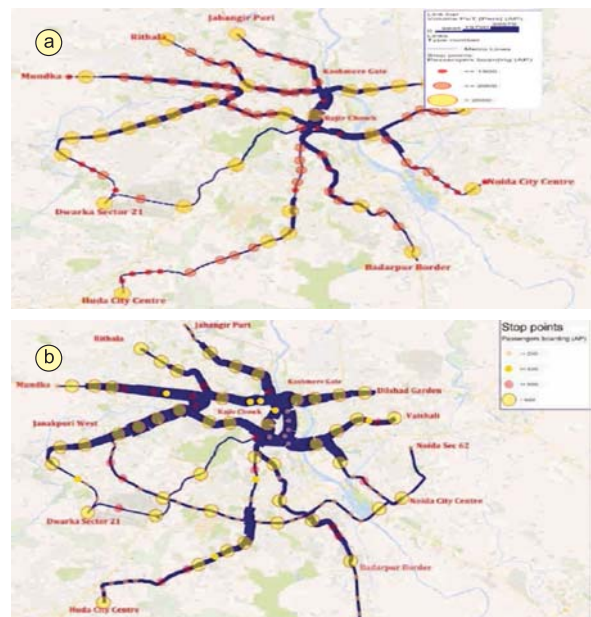


Figure 8 : Metro trip Assignment for (a) Base Year 2013 (Passengers/day) (b) Horizon Year 2021 (Passengers/day)

A Preliminary Analysis of Odd-Even Scheme in Delhi and way Forward

CSIR-CRRI carried out a traffic study on NH-2 for 48 hours during odd and even scheme, the scheme implemented by the Govt. of Delhi between January 1-15, 2016. This study on the odd-even scheme could serve as a guide map for the next phase. The study, which compares road traffic volume on pre odd-even days with that during the period of scheme (fortnight), throws up valid facts. While on overall basis, traffic volume went down during the fortnight, the number of buses went up by only 14%. In absolute numbers, the number of Para-transit, or auto rickshaws, also went down.



Figure 9 : Delhi-Mathura Road on 1st January 2016 (File Photo)

The study was conducted on Delhi-Mathura Road, the stretch which is one of the busiest stretch in the city, and sees a tremendous volume of traffic—over two lakh vehicles per day. The traffic load on this stretch has been continuously increasing in the past few years.

The study compared the volume of traffic on a regular day -September 9, 2015- with a day during the vehicle rationing scheme. The findings were interesting and can help in managing volume of traffic in the city.

The data shows that traffic volume was affected positively during the odd-even Scheme. The study reveals that there is a significant reduction in overall traffic volume viz.19.4% on odd days and 16.6% on

even days- was recorded on Delhi-Mathura Road during the course of the study. However, the proportion of buses on the road registered only a minor increase, a meager 14%. The study observed that there are not enough buses looking at Delhi's public transport infrastructure.

The study also finds that travel time went down, by 30-50% in many cases. The findings are important as the Mathura Road is one of the trunk roads in Delhi, connecting it with UP. Studies by CRRI have shown that traffic load on this road has consistently been increasing at the rate of 7.5% per annum since 2011. "Reducing private car use not only requires improvements in public transit, cycling and walking facilities but also better management of private automobile use.

CRRI study also finds little reduction in air pollution levels during the odd-even exercise. Data showed that average level of PM 2.5 particles was 421 micrograms per cubic meter, marginally less as compared to the same days previous years (Figure-10).

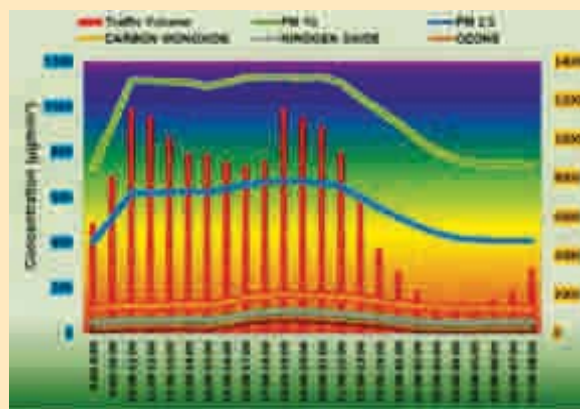


Figure 10 : Air Quality Measurements on Delhi-Mathura Road (Source: CSIR CRRI and IMD Data, 6th January 2016)

CONFERENCE / TECHNICAL EXHIBITION / WORKSHOPS

National Workshop on “Climate Changes and Landslide”

A National Workshop on “Climate Change and Landslide” was organized at CSIR-CRRI, New Delhi from May 5-6, 2016, under the Network project “Vulnerability Assessment and Development of Adaptation Strategies for Climate Change Impact (VACCIN)”. The workshop was inaugurated by Prof. Satish Chandra, Director, CRRI. Dr. Sudharshan Pillai, Principal Scientist, NISCAIR and Nodal Officer of VACCIN Project gave an introduction to the whole project. The workshop was attended by more than 78 participants.



Conference on Sustainable Asphalt Pavement for Developing Countries (CONSAP-2016)

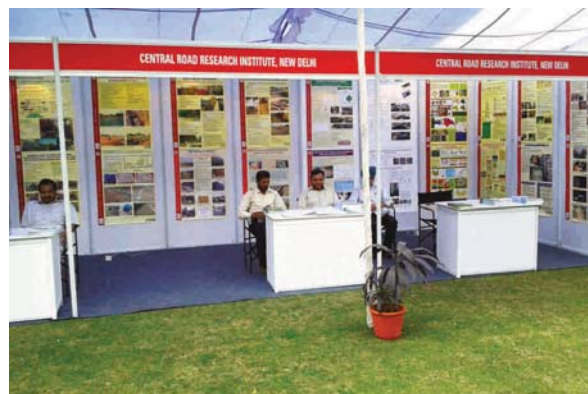
CSIR-CRRI organized a Conference on Sustainable Asphalt Pavement for Developing Countries (CONSAP-2016) on 11th & 12th March 2016, which was attended by about 250 delegates. Sh. R.K. Pandey, Member (Technical), NHAI, was the Chief Guest while Dr. P.K. Garg, Vice Chancellor, Uttarakhand University, was the Guest of Honour.

The CONSAP-2016 aims to discuss the State-of-Art technologies in the areas of design, maintenance, and rehabilitation, use of marginal materials in road construction and management systems for highway pavements in developing countries. CONSAP-2016 focused on sustainable pavement materials and sustainable pavement design, testing and evaluation, and management of pavement infrastructure.

CSIR-CRRI also put up its stall, showcasing its latest technologies and R&D outputs, in the technical



exhibition organized during the conference, in which, a total of 30 agencies/ departments comprising R&D organizations, Consulting firms, Manufacturers, Equipment suppliers, etc participated.



Summer Internship on “Evaluation of Causative Factors of Landslide Hazard in Munnar Area, Kerala”

One month summer internship on “Evaluation of Causative Factors for Landslide Hazard Zonation in Munnar Area, Kerala” was organized at CSIR-CRRI in May 2016 under the 12th Five Year Plan Project entitled “Assessment and Development of Adaptation Strategies for Climate Change Impact (VACCIN)”. Internship includes the series of lectures, demonstration of lab test, & various equipments. This training also includes the 15 days field training at Munnar, Kerala. Finally complete work was summarized in the form of report and presented in the valedictory function held at Department of Marine Geology and Geophysics, Cochin University, Kochi, Kerala. This summer course was attended by 13 post graduate students (7 M.Sc. Marine Geology students from Department of Marine Geology and Geophysics,

Cochin University Kochi, Kerala and 6 M.Sc. geology students from Government College of Kottayam, Idkki District, Kerala).



Field work at Munnar, Kerala during summer training

EVENTS

CSIR-CRRI Welcomes New Year -2016

A get-together was organised at CSIR-CRRI on January 1, 2016 on the occasion of arrival of New Year Day. The Acting Director, Sh. Sudhir Mathur, addressed the staff members and highlighted the achievements of the institute during the preceding year-2015 and exerted Scientists of CRRI, especially the Young Scientists, to

focus more on R&D work in the coming years. He also extended his best wishes to the staff members and their families. Prof. Satish Chandra, Director, CRRI met all the regular staff of CRRI on 21/01/2016 in the front lawn of CRRI, after taking over the charge of Director, CRRI on 18/01/2016.



National Technology Day

National Technology Day was celebrated at CSIR-CRRI on 11th May, 2016. On this occasion, a lecture on “Technology: A Nation's Priority for Prosperity”, was delivered by Dr N.S. Raman, Deputy General Manager – Bitumen, Extraction & Distillation, IOC R&D Centre, Faridabad, who was invited as the Chief Guest for the Function.



Celebration of National Science Day

To commemorate the discovery of Raman Effects made by Sir C.V. Raman, the Institute celebrated National Science Day on February 29, 2016. Prof. Rao Tataverti, Sr.Prof. & Director (Research & Consultancy), GVP-SIRC, GVP College of Engineering Madhurawada, Visakhapatnam (AP) was the Chief Guest and delivered National Science Day Lecture on "Scattering of Light: Rayleigh, Raman and Recent Research". On this occasion, Prof Satish Chandra, Director, CSIR-CRRI, highlighted the background of celebrating National Science Day while Shri T.K. Amla, proposed the Vote of Thanks and conveyed gratefulness to the Chief Guest for sparing his valuable time.



Celebration of International Yoga Day at CSIR-CRRI

CSIR-CRRI celebrated International Yoga Day in its premise from 21-24 June 2016. During this period, Yoga exercise session for the Institute's staff, for duration of one hour in the morning was conducted by Dr. Neelam J. Gupta, Principal Scientist. More than 100 staff member attended the Yoga session.



VISITORS

Visit of Hon'ble Minister of Science & Technology at CRRI

Hon'ble Dr. Harsh Vardhan, Union Minister of Science & Technology, Govt. of India, visited CRRI on 27/02/2016. The Hon'ble Minister addressed all the Senior Scientists. A meeting was also held between the Minister and all Area Advisors/ Group Coordinators/ HODs, Heads of Administration, Finance & Purchase which was followed by his visit to various R&D Labs of the Institute. The Minister visited to the APTF site as well as other major facilities available in the Institute. Dr. Harsh Vardhan also met the young Scientists and Students and encouraged them to do R&D for the common man of the Society and for the national benefit as a whole.



Visits by Experts and High Level Officials

1. A U.S. delegation led by Dr. Abraham Daniel visited CRRI to discuss with CRRI officials the establishment of an "Indo-U.S. clean energy centre for grid/transportation energy storage".
2. Dr. M.I. Pinard & Dr. P. Paige Green from South Africa visited CRRI along with World Bank Official and had discussions with CRRI scientists to explore the possibility of using new materials and technologies for its use in low volume roads in India, based on the experience gained in South Africa. The World Bank desired that CRRI along with South African experts should evolve and suggest some technologies which can be used for construction of some of the proposed roads in the state of Bihar (which is funded by World Bank).
3. A technical presentation on "Electric Vehicles to Combat Environmental Pollution and Potential Market in Delhi", was made on 27th Jan.2016 at CRRI, by Prof. Wafaa Saleh of Transport Research Institute, Edinburgh Napier University, Edinburgh, Scotland UK.
4. USIEF has announced its annual competition for the " Fullbright-Nehru and Fullbright Fellowship" for Indian citizens for the academic year 2017-18. To appraise CRRI Scientists about these fellowships, the USIEF representative made a presentation at CRRI on 8th April, 2016

AGREEMENT SIGNED

- An Agreement between CSIR-CRRI and Tata Steel Limited, Jamshedpur was signed on January 14th, 2016 on Feasibility study on utilization of Ferro chrome slag in road making (phase I & II).
- A Technology Management Agreement was signed on 29th January, 2016 between CSIR-CRRI and Jharkhand State Rural Road Development Authority.

MEETINGS

Special Meeting of CRRI'S Research Council

A special meeting of CRRI's Research Council was held on 4th February 2016. The purpose of this special RC meeting was to prepare a document containing the roadmap and plans for research of the Institute; both short term (next 2-3 years) as well as long term (8-10 years).

Prof Satish Chandra, Director CSIR-CRRI informed that this special meeting has been convened to identify the research activities and their translational outcomes in the short, medium as well as long term. He presented



his Vision and Roadmap for the CRRI, which was appreciated by all. He emphasized on undertaking research in frontal areas which would provide not only indigenous solutions to native problems but would also help India to develop and build cheaper, long lasting and durable roads. During the meeting, about 30 R&D topics were identified for undertaking research in near future. He also added that the recruitment of Young scientists is very important as there is now an accumulation of scientists at senior levels.

IP FILED

An Application for getting Trademark for "SETUCARE and Bridge Care Unit" developed jointly by CSIR-CRRI and CSIR-CMERI-CoEFM, was sent to Intellectual Property Unit of CSIR for its further processing to get an intellectual property rights. The know how of this device has been licensed to two parties for commercial manufacturing.



PATENTS FILED

CSIR-CRRI has developed a device for Road Condition Evaluation based on the in-house research and development. The main investigators are Shri Y. C. Tewari, Sr. Principle Scientist, Ms. Renu Chadha, Principle Scientist, Shri R. P. Saini, Technical Officer and Shri V. P. Sharma, Scientist.

A patent application has been filed by the Institute in February 2016 to get protection for intellectual property rights.



A device for Road Condition Evaluation developed by CSIR-CRRI

TRAINING PROGRAMMES / COURSES CONDUCTED

Regular Training Programmes organised at CSIR-CRRI, New Delhi

Training Programme on "Geo-Spatial Technology (GIS,GPS,RS etc.) for Road Transportation" organised during January 18-22, 2016



- Training Programme on "Bridge Diagnostics, Performance Evaluation and Rehabilitation" was organised during 20-24 June, 2016.



Customized Training Programme Organised

- Certification Course for "Road Safety Auditors", jointly by IRF (India chapter) with ARRB and CRRI, was organized for the officers of Rajasthan PWD in two batches at CRRI, i.e. during February 8-12, 2016 & February 15-19, 2016



- Workshop on "Road Asset Management" for the Engineers of UPPWD was organised on February 17, 2016 jointly by UPPWD, Lucknow and CSIR-CRRI.
- Customized Training Programme on "Contract Management and Quality Control Aspects" was organised during February 24-26, 2016 for the Engineers of RED, Lucknow, UP.
- Customized Training Programme on "Concrete Roads and B T Roads" was organised during April 4-6, 2016 for the Engineers of UADD, Raipur in 3 batches.



- Customized Training Programme on "Road Safety Issue & Audit" was organized during June 13-16, 2016 for the Engineers of RCD, Bihar at Patna.



- Customized Training Programme on "Planning, Design, Construction and Maintenance Management of Bituminous and Rigid Pavements" was organised at CRRI during April 20 - May 2, 2016 for the engineers of Department of Roads, Nepal at CRRI, New Delhi.



STAFF NEWS

Awards

1. Dr. Errampalli Madhu, Principal Scientist and Head, Transportation Planning Division received Construction Industry Development Council's Vishwakarma Award 2016 on 7th March 2016.



2. Dr. Mukti Advani and Dr. Purnima Parida, Scientists, received Best Research Paper Award (Urban Mobility of India 2015).
3. Dr. Purnima Parida received Best paper award for her paper entitled "Gender Appraisal of Mobility Pattern and Instances of Exclusion for working population in Delhi", which was also presented by her on 14-16 April, 2014 in USA at 5th International Conference on Women & Issues in Transportation (TRB).
4. Dr. Purnima Parida received Highly Commended Paper Award for her paper entitled "Effect of type of lead vehicle on following head way behaviour in mixed traffic" which was also presented by her in December, 2015 in 8th UMI Conference & Expo.

Retirements / Transfers / Joining / Promotions

WELCOME ON JOINING CRRI

- Prof. Satish Chandra, joined as Director CSIR-CRRI on 18/01/2016 (F/N)
- Ms. Minal, joined as a Scientist on 15.06.2016
- Sh. Gottamkkala Bhrath joined as Scientist on 16.06.2016
- Sh. Sampath Kumar Pasupunari joined as Scientist 15.06.2016

New Heads of Divisions/Sections with effect from April 18, 2016

Dr. S. S. Gaharwar	Bridge Engineering & Structures Division (BES)
Mr. P. V. Pradeep Kumar	Environmental Science Division (ES)
Mr. Manoj Kumar Shukla	Flexible Pavement Division (FP)
Mr. U. K. Guruvittal	Geotechnical Engineering Division (GE)
Mr. Sunil Jain	Pavement Evaluation Division (PE)
Mr. Binod Kumar	Rigid Pavement Division (RP)
Dr. Neelima Chakrabarty	Traffic Engineering and Safety Division (TES)
Dr. E. Madhu	Transportation Planning Division (TP)
Mr. R. S. Bhardwaj	Mech, Elect and Instrumentation (MELIN)/(TSS)/(TSD)
Dr. Niraj Sharma	Civil
Dr. R. N. Dutta	Computer Center & Networking (CCN)
Mrs. Pawan Chhabra	Library
Dr. B. K. Durai	Planning Monitoring & Evaluation (PME)
Mr. T. K. Amla	Information, Liaison and Training (ILT)
Mr. B. M. Sharma	Coordinating Officer, MBSQ, and Horticulture (till December 31, 2016)

INTERNAL TRANSFER

Shri Bhajan Singh Jr. Stenographer	E-II to Office of CPIO w.e.f. 16/02/2016
Shri D.C. Sharma Sr. Pr. Scientist	INS to BAS Division w.e.f. 02/05/2016
Shri A. Saurikha Pr. Scientist	TMBD to GTE Division w.e.f. 04/04/2016
Ms. Farhat Azad Pr. Scientist	TMBD to TP Division w.e.f. 04/04/2016
Ms. Nidhi Aggarwal Tech. Officer	TMBD to PME Division w.e.f. 04/04/2016

PROMOTION

Shri J.K. Goyal, Principal Scientist to Sr. Principal Scientist.

RETIREMENTS

Dr. P.K. Jain, Chief Scientist 31/01/2016



Shri S.K. Gupta, Sr. Tech. Officer (3) 29/02/2016



Shri Babban Singh, Sr. Technician 29/02/2016



Shrimati Uma Arun, Sr. Tech. Officer (3) 29/02/2016



Shrimati Aruna Dhamija, Assistant (G) 31/03/2016



Shri Ashok Sharma, Sr. Technician 31/03/2016



Shri Sri Lal, Sr. Technician 30/04/2016



Shri Narender Kumar Sakkarwal
Sr. Technician 31/05/2016



Shri Bhupender Singh Batra, Sr. Steno 30/06/2016



CSIR-CRRI TRAINING PROGRAMMES FOR THE YEAR 2016-17

TITLE OF THE COURSE	DURATION WITH DATES	COURSE FEE + 14.50 % S.T.	COURSE COORDINATOR
A. PAVEMENT ENGINEERING & MATERIALS			
• Design, Construction and Maintenance of Flexible Pavements	08-12 August, 2016	Rs. 12,000/-	Sh. M.N. Nagabushana
• Rigid Pavements: Design, Construction & Quality Control Aspects	17-21 Oct., 2016	Rs. 12,000/-	Sh. Binod Kumar
• Pavement Evaluation Techniques and their applications for Maintenance and Rehabilitation	19-23 Dec., 2016	Rs. 12,000/-	Sh. Pradeep Kumar
B. ROAD DEVELOPMENT PLANNING & MANAGEMENT			
• International Course on Dissemination of HDM-4	19-30 Sep., 2016	Rs. 30,000/-	Dr. Devesh Tiwari
• Geo-Spatial Technology (GIS, GPS, RS etc) for Road and Transportation	06-09 Feb., 2017	Rs. 12,000/-	Dr. B. Kanaga Durai Dr. A. Mohan Rao
C. GEOTECHNICAL ENGINEERING			
• Geotechnical and Landslide Investigations for Highway Projects	29 Aug-2 Sep., 2016	Rs. 12,000/-	Sh. Kanwar Singh
D. BRIDGES & STRUCTURES			
• Bridge Design and Construction	07-11 Nov., 2016	Rs. 12,000/-	Dr. Lakshmy P.
E. TRAFFIC & TRANSPORTATION PLANNING			
• Noise and Vibration Study	21-23 Nov., 2016	Rs. 12,000/-	Dr. Nasim Akhtar

Customized Tailor Made Programmes

In addition to the above CRRI also organises customized tailor made programmes as per the clients requirements.

Course Fee: The course fee as indicated above is payable in advance by crossed bank draft in favour of "Director, Central Road Research Institute" payable New Delhi.

FOR FURTHER INFORMATION & SENDING NOMINATION CONTACT:

Shri T.K. Amla,
Head & Course Organiser,
Information, Liaison & Training,
CSIR - Central Road Research Institute,
P.O.CRRI, Delhi-Mathura Road,
New Delhi – 110 025

Phone: 91-11-26921939,
Fax: 91-11-26845943, 26830480
Telefax: 91-11-26921939
E-mail: tkamla.crri@nic.in,
tkamla.crri@gmail.com, headilt.crri@nic.in
Website: crriidom.gov.in

सम्पादक मंडल

संरक्षक : प्रो. सतीश चंद्र, निदेशक

सम्पादक :

श्री टी.के. आमला, मुख्य वैज्ञानिक एवं प्रमुख, सूचना, सम्पर्क एवं प्रशिक्षण, श्री बी.एम. शर्मा, मुख्य वैज्ञानिक, एफपीडी
श्री आर.सी. अग्रवाल, प्रधान तकनीकी अधिकारी, सुश्री कविता जैन, तकनीकी अधिकारी, श्री मुकेश कुमार मीना, वैज्ञानिक, श्री आर.सी. परदेसी, पूर्व तकनीकी अधिकारी
फोटोग्राफी :

श्री अशोक कुमार, तकनीकी अधिकारी