

**CSIR - CENTRAL ROAD RESEARCH INSTITUTE, NEW DELHI**  
**MINUTES OF 128<sup>th</sup> MEETING OF CSIR-CRRI RESEARCH COUNCIL**

Date : 4<sup>th</sup> & 5<sup>th</sup> November, 2022  
Time : 10 AM -5.30 PM  
Venue: Council Hall

The 128<sup>th</sup> Research Council Meeting was held on 4<sup>th</sup> and 5<sup>th</sup> of November 2022 in the Council Hall of the Institute.

The following attended the meeting:

**Chairman**

Prof. P. K. Sikdar, Former Professor IIT Bombay and Director, CSIR-CRRI, Advisor -IRF and President, M/s. ICT, Pvt. Ltd.

**Members**

Prof. K. Sudhakar Reddy, Department of Civil Engineering, IIT Kharagpur  
Prof. Sanjay Gupta, Department of Transport Planning, School of Planning and Architecture, New Delhi  
Prof. Swagata Basu, Department of Civil Engineering, IIT Mumbai.  
Dr.(Mrs) Esther Malini, GM, L&T infrastructure Development Projects Ltd., Chennai  
Sh. S. K. Nirmal, Secretary General IRC, New Delhi.  
Dr. D. T. Thube, Secretary, Mukhya Mantri Gram Sadak Yojana, Rural Development Department, Government of Maharashtra.  
Prof. R. Pradeep Kumar, Director, CSIR-Central Building Research Institute, Roorkee.  
Sh. Mayank Mathur, Sr. Principal Scientist, CSIR-Central Planning Directorate (CPD)  
Prof. Manoranjan Parida, Director, CSIR-Central Road Research Institute, New Delhi.

**Secretary**

Dr Vasant G. Havanagi, Chief Scientist, CSIR-Central Road Research Institute, New Delhi

**Regret**

Prof (Mrs) G. Madhavi Latha, Department of Civil Engineering, IISc Bangalore could not attend the meeting due to some urgent engagements.

**Invitees**

All Scientists of CSIR-CRRI

## **Item 1 – Welcome Address by the Director CSIR-CRRI**

**Prof. Manoranjan Parida**, Director CSIR-CRRI welcomed the Chairman RC, Members of RC and the scientists to the 128<sup>th</sup> Research Council meeting of the Institute. He expressed his happiness for the first physical meeting of the newly constituted RC committee after the long period of Covid pandemic. He felicitated all the RC members with a bouquet of flowers and a shawl. He then requested the Chairman RC to start the proceedings of the meeting and for his opening remarks.

## **Item 2 – Opening Remarks by the Chairman**

**Prof. P. K. Sikdar**, Chairman RC, welcomed Prof. Manoranjan .Parida, for his first meeting of RC as Director CRRI, and welcomed all the other members of RC. He requested all the members, to guide the different R&D activities of CSIR-CRRI, and motivate the scientists to carry out research in new innovative research areas. The Institute shall focus on R&D areas which results in digital and fossil fuel free solutions for the benefit of the society. Scientists shall take up projects based on Artificial intelligence/Machine learning/Cloud computing/ using of 5G technologies. To facilitate this global transition/transformation, human resources of CSIR-CRRI shall also reorient their research activities in different R&D areas to achieve the sustainability goals and social needs. Scientists shall focus on development of products/processes as per “Atmanirbhar Bharat’ program of Government of India.

## **Item 3 – Confirmation of the Minutes of the 127<sup>th</sup> RC Meeting**

**Dr. Vasant G. Havanagi**, Secretary RC, informed that the minutes of the 127<sup>th</sup> RC meeting held during 27<sup>th</sup> and 28<sup>th</sup> August 2021 were circulated to all RC members. As there were no comments from the members, the minutes were taken as approved.

## **Item 4 – Presentation of Action Taken Report**

**Dr. Vasant G. Havanagi**, Secretary RC, presented the “Action Taken Report” prepared based on the comments and suggestions made by RC members during 127<sup>th</sup> Meeting. This included general suggestions from RC members and specific comments on some R&D projects which were presented in 127<sup>th</sup> RC meeting, but not included in the agenda for presentation in this meeting. It was assured that efforts shall be made by the Institute to comply with the comments and suggestions of RC members.

## **Item 5 – Director’s Report**

**Prof. M. Parida** presented the progress report of the Institute, since last RC meeting. The presentation included major achievements of the Institute, viz. Technology transferred; MoU signed with Industry/Academia; Patents granted/filed; Research publications of the scientists and ECF generated during the period; Significant contribution to Science and Technology in terms of Projects taken up/Ongoing and

completed projects. Prof. Parida briefly explained some specific projects under “Waste to Wealth” program of CSIR (Steel Slag; Municipal Solid Wastes; Red Mud, Waste Plastics, etc); Structural safety audit and rehabilitation of bridges; Strengthening and Rehabilitation of Airport Pavement; Noise and vibration studies; Intelligent Traffic Management Systems etc. He also informed the RC members about the indigenous development of “Mobile cold mixer cum paver; Pothole repair machine; and a recent ceremony wherein the railway racks were flagged off with processed steel slag aggregates by Dr. Jitender Singh, Hon’ble Minister of State (I/C) Ministry of Science & Technology for construction of roads in border areas.

RC members were also informed about the visit of different dignitaries to the Institute; Workshops organized; Lectures delivered by the scientists; Honours and awards; Hindi language activities carried out at CRRRI, etc. Director’s report also highlighted different training programs conducted in the Institute, media coverages on R&D activities of CRRRI, etc.

#### **Item 6 – Remarks by Research Council members**

**Prof. P. K. Sikdar** appreciated the exhaustive presentation and expressed his satisfaction about the progress made since last RC, however cited the impact of pandemic on ECF. He suggested that 70% of R&D research shall be translational with 30% of R&D shall be basic research. He emphasized that even in consultancy projects there should be research elements inherent in the objectives.

**Prof. Sudhakar Reddy** appreciated the R&D progress and other activities of the Institute. He also reiterated that there should be an R&D component in every consultancy project undertaken by the Institute. Even consultancy projects should lead to publications. He suggested that there should be integrated skill development program for training the scientists. They should develop additional analysis skills in FEM modeling, in depth statistical analysis, etc. Training programs shall be arranged for capacity building of all the scientists. He asked to strengthen the existing MOUs for more collaborative research and also suggested to have more collaborations with academic Institutes for quality research. **Prof. M. Parida** assured that, efforts would be made to develop MOUs with academic Institutes.

**Prof. R. Pradeep Kumar** indicated that, CRRRI has plenty of data in different R&D areas, which can be converted to meaningful information, otherwise, the data becomes obsolete.

**Sh. Mayank Mathur** welcomed the Chairman and members of RC on behalf of CSIR-Headquarters. He was of the opinion that the Institute shall offer multidisciplinary AcSIR-Ph.D. programs on different thrust areas, viz. Artificial Intelligence (AI), Decarbonization of transport, Waste to Wealth mission, etc. He also suggested that each scientist can plan for 2 research publications per year. He also emphasized that CRRRI shall increase its brand value by way of social media dissemination and other forums.

**Prof. Swagata Basu** appreciated different types of projects carried out by CRRRI. She was of the view that in recent past number of field projects on bridges are carried out by CRRRI, especially with regards to Instrumentation, Monitoring and Maintenance of bridges. She emphasized the need to generate data base. Sh. J. K. Goyal indicated that there is a need to upgrade the instrumentation techniques as per the latest novel methods. Sh. S. S. Gaharwar suggested that there can be collaborative M.Tech./Ph.D. programs for efficient utilisation of collected data.

**Sh. Sanjay Nirmal** complimented the CRRRI staff for their active participation and contribution in the development of IRC Codes/Guidelines. He emphasized the need of focused research. He pointed out that scientists shall look into the priority areas identified by IRC; IMRA committee recommendations on new technologies, etc. Efforts shall be made by scientists for publication in IRC journals for larger dissemination of developed technologies. He also emphasized the need for timely completion of R&D projects and cited the delay in Expansion Joint project carried out by the Institute. He also emphasized the need for compilation of data on bridge failures. **Prof. P. K. Sikdar** agreed with the view of Sh. Sanjay Nirmal, and asked the scientists for timely completion of projects and also indicated the importance of academic/industrial collaborations and along with the urgent need to replenish the staff. **Prof. M. Parida** assured that scientists would be encouraged for more publications in IRC journals and also indicated that with the support of nodal Ministries, scientists would definitely focus on thrust research areas. Action will also be taken for recruitment of scientists and other staff in the Institute.

**Dr. Esther Malini** emphasized to the scientists for timely completion of projects. **Prof. M. Parida** indicated that sometimes delay could be field related; non availability of funds, etc. However, he assured that efforts would be made for timely completion of projects. Dr Malini asked about any policy in the Institute for monitoring of the bridges in collaboration with other Institutes. Prof. Sikdar also cited the shortage of staff in the Institute and suggested to increase the collaborations.

**Prof. Sanjay Gupta** also reiterated that there is a need for timely completion of research projects; to establish KPI's for successful completion of research projects; identifying appropriate research areas addressing the societal needs, as well as considering the goals of GOI mission programmes. Prof. Sikdar, Chairman RC, agreed with the view of Prof.Gupta and asked the scientists to comply.

**Item 7 – Presentation of Research Projects- Pavement Engineering Area (FP/RP/PED)**

S. No.	Project Details	Comments/Suggestions of the RC members
7.1	Application of cold bituminous	➤ Statistical significance of resilient

	<p>based eco-friendly road building technology for the special featured Himalayan regions.</p> <p>Presentation by Dr Siksha S Kar</p>	<p>modulus results, needs to be checked.</p> <ul style="list-style-type: none"> <li>➤ What is the R&amp;D work carried out specific for Himalayan region?</li> <li>➤ Feasibility of developed technology in plain areas?</li> <li>➤ Long term performance evaluation of laid section needs to be undertaken through in-house research project.</li> </ul>
7.2	<p>Development of pre-fabricated plastic panels for road construction.</p> <p>Presentation by Sh. Gagandeep Singh.</p>	<ul style="list-style-type: none"> <li>➤ Mode of failure shall be considered while designing the panel for low and high volume traffic conditions.</li> <li>➤ During FEM modeling, various types of failure shall be suitably modeled.</li> </ul>
7.3	<p>Development of design guidelines and specification for utilization of steel slag in road construction.</p> <p>Presentation by Sh. Satish Pandey</p>	<ul style="list-style-type: none"> <li>➤ Elastic modulus of different pavement layers shall be evaluated as a field performance parameter.</li> <li>➤ Steel slag utilization guidelines needs to be brought out for the benefit of all stakeholders.</li> <li>➤ The Institute shall re-approach M/s TATA Steel for transfer of technology arrangement via MoU to enable to realize possible royalty on commercial sale of the processed steel slag aggregate. Parallely, CSIR-CRRI can also have MoU's with the other partnering Steel Industries for the same.</li> <li>➤ The Technology Transfer Agreement with AMNS India and filing of patent may be pursued parallely.</li> </ul>
7.4	<p>Development of framework for categorization of RAP from different sources by Dr.Deepa</p>	<ul style="list-style-type: none"> <li>➤ How different is the categorization of RAP proposed in the project from the work carried out at IIT Kharagpur?</li> <li>➤ How many sources of RAP will be</li> </ul>

		considered in the work and how many rejuvenators can be used considering the project duration?
7.5	<p>Development of high strength fast curing cementitious stabilized base layer.</p> <p>Presentation by Sh. Manoj Kumar Shukla</p>	<ul style="list-style-type: none"> <li>➤ The developed stabilizer shall be tried for stabilization of Soil Aggregate mixes also.</li> <li>➤ Based on findings of fatigue test results in the laboratory, there is a need to develop fatigue equations for stabilized mixes.</li> <li>➤ Laying of trial section and long term pavement performance observations needs to be expedited.</li> </ul>
7.6	<p>Development of High Strength Pervious Concrete for Low Volume Roads.</p> <p>Presentation By Sh. Yatin Chaudhary</p>	<ul style="list-style-type: none"> <li>➤ Is coefficient of thermal expansion test included in the scope of work?.</li> <li>➤ Methods/process adopted to achieve the target strength?</li> <li>➤ Permeability targeted in R&amp;D study?.</li> <li>➤ Stress-strain behavior of pervious concrete needs to be studied.</li> <li>➤ What would be the final outcome/claim of the project?</li> </ul>
7.7	<p>Development of Pavement Structural Health Index for Network-level Evaluation of Flexible Pavements.</p> <p>Presentation by Dr Aakash Gupta</p>	<ul style="list-style-type: none"> <li>➤ The developed pavement structural health index should be validated and its validation should be with respect to Modified Structural Number (MSN).</li> <li>➤ CBRI has developed an index for earthquakes; the report can be looked into for developing a pavement structural index on a scale of 0-100.</li> <li>➤ Literature used in the study should be included and referenced.</li> </ul>

## Item 8. Presentation on Research Projects – Bridge Engineering and Structures

Sl. No.	Project details	Remarks of RC Members
8.1	<p>Development of Remotely piloted Aerial vehicle Bridge monitoring system.</p> <p>Presentation by Dr Naveet Kaur.</p>	<ul style="list-style-type: none"> <li>➤ How will the validation of results be carried out?.</li> <li>➤ What is the difference between Aerial and drone photography?</li> <li>➤ What technique is used in this process? Feasibility of adoption of this technique under moving traffic?</li> <li>➤ What were the boundary conditions used in the FEM model?</li> </ul>
8.2	<p>Instrumentation of ROB along a railway line between Bandikui junction and Biwai junction, Rajasthan under Bharatmala Pariyojna of NHAI.</p> <p>Presentation by Sh.J.K.Goyal</p>	<ul style="list-style-type: none"> <li>➤ What was the skew angle of the ROB, speed of the vehicle used for dynamic measurements.</li> <li>➤ What was the need for continuous monitoring of the bridge through instrumentation?.</li> <li>➤ There is a need to continuously monitor the bridge 24x7 online.</li> </ul>
8.3	<p>Investigation using NDT of the 2 lane ROB in lieu of level crossing on Subhana Kosli Nahar Kanina Road near Kosli Railway station on Hissar Bhatinda Railway line</p> <p>Presentation by Sh. S. S. Gaharwar</p>	<ul style="list-style-type: none"> <li>➤ What is the age of bridge, and whether separate contractors were deployed for the construction of superstructure and sub structure?</li> <li>➤ Whether any probable damage was caused to the bridge during the load test?</li> <li>➤ Is there any revision of IRC-51?</li> </ul>

**Item 9. Presentation on Research Projects – Geotechnical Engineering Area**

Sl. No.	Project details	Remarks of RC Members
9.1	Utilization of Redmud for Road and Structural fill applications Presentation by Dr A. K. Sinha	<ul style="list-style-type: none"> <li>➤ Economical viability of Red Mud for Road embankment construction.</li> <li>➤ The proposed field construction /performance evaluation shall come out with conclusions, regarding the suitability of Redmud for use in embankment/subgrade/sub base layers.</li> </ul>
9.2	Hill Road widening using Light weight Geofam Block - An alternative to earth cutting and filling  Presentation by Ms Parvathi G S	<ul style="list-style-type: none"> <li>➤ The reasons for reduction in homogeneity with the increase in density.</li> <li>➤ How can the fascia panels be held in vertical position?.</li> <li>➤ Cost comparison with the conventional techniques shall also be included.</li> </ul>
9.3	Development of apparatus for assessing the connection strength between MSE wall concrete panel fascia and polymeric straps  Presentation by Dr P. S. Prasad	<ul style="list-style-type: none"> <li>➤ After discussion of new R&amp;D proposal, RC approved to take up the proposal as an In-house research project.</li> </ul>

**Item 10. Presentation of Research Projects - Traffic Engineering and Safety & Transport Planning and Environment Area**

Sl. No.	Project details	Remarks of RC Members
10.1	Artificial Intelligence (AI) for Road Safety in Nagpur City  Presentation by Dr S. Velmurugan	<ul style="list-style-type: none"> <li>➤ An unique approach made by CSIR - CRRRI team by using ADAS data along with road geometry data to identify the grey spots.</li> <li>➤ The team shall explore on understanding the effectiveness of the ADAS system towards the possible</li> </ul>



		<p>reduction in the road crashes involving buses, based on the critical examination of FIR data.</p> <ul style="list-style-type: none"> <li>➤ Reasons for installation of ADAS system only in buses?.Share of accidents involving buses?</li> <li>➤ Evaluation of impact on change in speed for the ADAS installed buses.</li> <li>➤ The level of compliances of the drivers for the various types of alerts.</li> <li>➤ How the alerts are generated when two wheelers/pedestrians are moving near the buses?</li> </ul>
10.2	<p>AI enabled Technologies &amp; Systems (AITS) for Drowsiness</p> <p>Presentation by Dr A. Mohan Rao</p>	<ul style="list-style-type: none"> <li>➤ How the system will classify the drowsiness due to intoxication?.</li> <li>➤ How the ECG helps in finding the Drowsiness of the Driver?</li> <li>➤ Why the duration of the study is three years, why can't we reduce the study duration?</li> <li>➤ Is a medical doctor is part of the study?</li> </ul>
10.3	<p>Assessment and Evaluation of Implementation Methodology of Intelligent Traffic Management Systems (ITMS) for Delhi</p> <p>Presentation by Dr E. Madhu</p>	<ul style="list-style-type: none"> <li>➤ The project was well appreciated by RC members and they emphasized the importance of simulation.</li> <li>➤ It was suggested to consider bus movements at intersection and also suggested for involvement of IAHE/Australian University in the project as they have recently conducted a study in Delhi.</li> <li>➤ How the VMS dissemination is utilized during the VIP movement (green corridor).</li> </ul>

		<ul style="list-style-type: none"> <li>➤ CRRI should get involved in the main project of ITMS, planned for implementation by Delhi Police.</li> </ul>
10.4	<p>Development of Trip Generation Manual for Indian Cities (TripGen).</p> <p>Presentation by Dr Ravi Sekhar</p>	<ul style="list-style-type: none"> <li>➤ The cross classification analysis is to be carried out for trip estimation. The validation of trip rates needs to be carried out by considering the codon points. A complete analysis for any one city is essential.</li> <li>➤ How the trip rates will generate based on the emerging mix land use (ex. Multi Level Parking Area and Co-working spaces)</li> <li>➤ Possibility of trip estimation for green field development needs to be addressed.</li> <li>➤ Classification of templates for trip generation based on topology shall be looked into.</li> <li>➤ Prof P. K. Sikdar, was of the view that, a letter needs to be sent to CSIR for rephrasing of the fund release. Also suggested to arrange a workshop in the month of January along with Prof. Sanjay Gupta and all regional coordinators and project members.</li> </ul>
10.5	<p>Trip Patterns and their Implications on Intermediate Public Transport Services in Imphal, Manipur.</p> <p>Presentation by Dr. S. Padma.</p>	<ul style="list-style-type: none"> <li>➤ Four stage models adopted for the R&amp;D study may be relooked.</li> <li>➤ Mode choice while introducing EV buses.</li> <li>➤ Willingness to shift to EV buses is from the operators or users?</li> <li>➤ Assessment of the existing infrastructure facilities for the shared Autos shall be addressed in the study.</li> </ul>

		<ul style="list-style-type: none"> <li>➤ Key Performance Indicators (KPI) needs to be studied from the Auto users point of view (Existing as well as after shifting.)</li> </ul>
10.6	<p>Software development for optimum location of charging infrastructure of electric vehicles in Indian cities (Charge EV).</p> <p>Presentation by Dr Ravi Sekhar</p>	<ul style="list-style-type: none"> <li>➤ Consumer behaviour and E-Vehicle adoption and penetration rate shall be reviewed.</li> <li>➤ The E-vehicle demand usage patterns needs to be studied.</li> <li>➤ Preferred charging stations and design of facilities shall be reviewed.</li> <li>➤ The location of charging station for the usage, decision of facilities (size) parameters shall be considered.</li> <li>➤ Location input of charging for the users shall be carried out by considering the safety features such as merging and diverging conflicts.</li> <li>➤ The locational impact component shall be included in the study.</li> <li>➤ The demand supply arrangements needs to be discussed in the study.</li> </ul>
10.7	<p>Development of Automatic vehicle counting and classification software using deep learning techniques for motorized and non motorized vehicles</p> <p>Presentation by Dr Ravi Sekhar</p>	<ul style="list-style-type: none"> <li>➤ For the proposed pilot study for low volume roads (Typology and Category), data near any toll plaza needs to be considered.</li> <li>➤ From the Image based to Axle based (existing hypothesis and cost effectiveness) possibility, needs to be addressed.</li> <li>➤ Different AVCC systems and their accuracy needs to be compared considering different traffic conditions.</li> </ul>

## **Item 11. Presentation of Vision document and RC Meeting with Scientists**

Dr. E. Madhu made a presentation on the vision document of CSIR-Central Road Research Institute titled as “Vision and Strategy 2032”.

**Prof. Manoranjan Parida** requested the Chairman and other members of the RC to give their guidance and suggestions to the scientists in their R&D efforts.

**Prof. P. K. Sikdar** asserted that sincere efforts shall be done by all the scientists to achieve the R&D vision of the Institute. He asked all the scientists to develop multiple analysis skills based on R&D requirement. Regarding the Agenda & Memorandum, he was very happy to see different varieties of R&D projects carried out by CRRI scientists, other than that are presented. He was of the opinion that, different R&D projects in the Agenda shall be indicated R&D Area wise, and also the list of research papers cited shall be with complete references. He asked all the scientists to own the vision document and do their R&D research accordingly. He then invited RC members for their comments/suggestions.

**Ms. (Dr.) Esther Malini** indicated her satisfaction on two day exhaustive presentations made and appreciated the vision document presented. However, she reiterated that scientists shall focus on time targeted implementation of R&D projects. She suggested that Institute shall focus on business development also. She commented that the vision document of the Institute is very aspirational and asked the scientists to achieve the targeted goals with team spirit.

**Dr D. T. Thube** responded to the vision document and had the opinion that, it covers all important R&D areas especially the area on “Sustainability”. He indicated that, health monitoring and assessment of bridges is a very important topic of research and suggested that the Institute shall organize training programs in this area for the benefit of all stake holders. He was of the view that more work has to be done in the area of road safety.

**Prof. P. K. Sikdar** then invited the scientists for their comments on the vision document presented.

**Dr. Rajeev Garg** emphasized that sufficient in house funds shall be earmarked for projects related to “Sustainability” and “Climate resilient road infrastructure”. **Sh. J. K. Goyal** appreciated the vision document, however suggested to include area on ‘Tunnel Engineering’ and on “Long span bridges”. **Prof. P. K. Sikdar** suggested to do more R&D on “Waste to wealth” mission. **Dr Neeraj Sharma** appreciated the vision document, and indicated that projects shall lead to decarbonization; climate resilient road infrastructures; and shall meet the Sustainable Development Goals (SDG’s). **Dr Kanwar Singh**, mentioned that CRRI has novel technology on underpass construction, which shall have mention in the vision document; **Sh. S. S. Gaharwar** suggested that

R&D topic on ultra high performance concrete shall also be included in the vision document. **Dr. Nasim Akhtar**, emphasized that product development for noise control shall also be mentioned in the vision document. **Sh. Subhash Chand and Dr S. Velmurugan** suggested that all traffic related projects shall deal with environmental issues. **Sh. A.K.Jain**, indicated that to achieve the objectives of the vision document, there is a need to continuously upgrade the R&D laboratories and the facilities, and also should be NABL accredited. Prof. Sikdar then suggested all scientists to go through the Vision Document carefully, and then suggest the important areas, which might have been missed in the document.

**Prof. Manoranjan Parida** informed the RC members that Institute is committed to contribute more to “Waste to wealth” mission. “AI mission” and other thrust areas of the country. He expressed commitment to encourage scientists to undergo short term training programs; attend International conferences; more collaboration with experts in different areas; shall encourage scientists for more SCI publications; academic interactions with joint Ph.D. programs etc. **Prof. Parida** also assured RC that Administration, PME, ILT and Purchase section would be taken on board to support the R&D activities.

#### **Item 12 : RC Meeting with Director**

The committee approved the In-house research Project proposal titled “Application of Fly ash based fiber reinforced Geo-polymer Rubcrete (FFRGPR) for crash barrier, which was presented by Sh. Kumar Shashi Bhushan in the 127th RC meeting.

The committee also approved the other In-house research project proposal titled “Study of flexural behavior of RC Beams strengthened using CFRP strand sheet under cyclic loading” which was presented by Dr Rajeev Goel in the 127th RC meeting, subject to revision of proposal as per the comments received from RC members and also authorized director CRRRI to take the decision for approval thereafter.

