



## Repair, Rehabilitation and Strengthening of Concrete Structures Using High Performance Cement-Based Materials

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### Overview

In many cases repair and strengthening of concrete structures must be performed only a few years after their execution, sometimes immediately thereafter. Over the last three decades there is intense growth in the repair, rehabilitation and strengthening of structures. The repair and rehabilitation of deteriorated concrete structures are essential not only to use them for their intended service life but also to assure the safety and serviceability of the associated components so that they meet the same requirements of the structures built today and in future. This results a need for improvements in materials quality, design practices, installation procedures, etc. The specialized repair materials such as High Performance Concrete, Shotcrete, Fiber Reinforced Concrete; Polymer Modified Concrete may play an important role in solving these existing problems. However the expertise available on utilisation of these materials and their mechanism at micro and macro level are scarce particularly in India. Further the condition assessment of structures using advanced techniques such as Low Frequency Electromagnetic Methods, High Frequency Electromagnetic Methods (Radioactive/Nuclear Methods), Electro-Chemical Methods for Corrosion Detection are limited.

### Objectives

The primary objectives of the course are as follows:

- Participants are exposed to know the reasons for deterioration of structures and necessity of repair and rehabilitation of structures
- Participants should be able to understand the types of mineral and chemical admixtures, their chemistry and influence on mechanical and physical properties of concrete
- Participants are exposed to know various types of specialized repair materials and their mechanisms
- To expose the various techniques of condition of assessment of structures
- Participants should be able to understand the basic of repair and rehabilitation techniques using cement-based repairs
- Providing experience on Condition Assessment of existing old structure (Building) using Visual Inspection and Surface Methods
- Experiencing on structural health monitoring of existing bridge in Bilaspur

Course participants will learn these topics through lectures and hands-on experiments.

<b>Schedule</b>	<p style="text-align: center;"><b>Repair, Rehabilitation and Strengthening of Concrete Structures Using High Performance Cement-Based Materials</b>  <b>22<sup>nd</sup> January – 26<sup>th</sup> January 2018</b>  <b>Number of participants for the course will be limited to thirty</b></p>
<b>Modules</b>	<p>A: High Performance Cement-Based Materials  B: Sustainable Construction Materials  B: Repair Basics  C: Repairs and Strengthening Techniques  D: Case Studies and Independent Project  E: Fracture Parameters in Concrete Design</p>
<b>Who Should Attend?</b>	<ul style="list-style-type: none"> <li>▪ Civil Engineering Students at all levels (BTech/MTech/PhD)</li> <li>▪ Civil Engineering Faculty from reputed academic Institutions and Technical Institutions/Universities</li> <li>▪ Civil Engineers from Industry and government/Private organizations</li> </ul>
<b>Fees</b>	<p><b>The participation fees for attending the course is as follows:</b></p> <ul style="list-style-type: none"> <li>• Participants from abroad : US \$100</li> <li>• Industry/ Research Organizations: ` 4000/-</li> </ul> <p><b>Academic Institutions: `</b></p> <ul style="list-style-type: none"> <li>• Research Scholars/PG Students: 2000/-</li> <li>• UG Students: 1000/-</li> <li>• Faculty Members: 3000/-</li> </ul> <p>The above fee include all instructional materials, working lunch, tea and snacks during break, laboratory equipment usage charges, 24 hr free Wi-Fi internet facility. The participants will be provided accommodation on nominal charges, shared basis that to on request, first come first serve basis. The Participants are required to first register on the GIAN portal <a href="http://www.gian.iitkgp.ac.in/GREGN/index">http://www.gian.iitkgp.ac.in/GREGN/index</a> by paying one time registration fee of Rs. 500/-, then select the programme after registration. The above listed registration fee can be paid at the VENUE (GGV Bilaspur (CG)).</p>

## The Faculty



**Prof. Nemkumar Banthia** is a Professor, Distinguished University Scholar April 28, 2016 and Canada Research Chair in Infrastructure Rehabilitation & Sustainability, Faculty of Applied Science School of Civil Engineering, THE UNIVERSITY OF BRITISH COLUMBIA, VANCOUVER, BC CANADA. His research interests

include Materials engineering; concrete; Advanced composite materials; Shotcrete, Fibre reinforcement, Rebound mechanics, Kinematic studies, Optimization; Supplementary cementing materials in concrete. Dr. Banthia holds 5 patents, has published over 400 refereed papers and edited 20 volumes. He serves on Editorial Boards of eight international journals and is the Editor-in-Chief of the J. of Cement and Concrete Composites—a journal with the highest Impact Factor in the field.



Dr. M. Chakradhara Rao is an Associate Professor, Civil Engineering Department, Guru Ghasidas Vishwavidyalaya (a Central University), Bilaspur (C.G.). His research interests are Sustainable Construction Materials, Static and Impact Testing

of Concrete, Microstructural Analysis of Concrete.



Dr. Shailendra Kumar is a Professor, Civil Engineering Department, Guru Ghasidas Vishwavidyalaya (a Central University), Bilaspur (C.G.). His research interest includes Fracture Mechanics of Concrete, Soft Computing Applications to R.C. Structures, Fiber-reinforced Concrete and Alternate Construction Materials.

## Course Co-ordinator

**Dr. M. Chakradhara Rao**

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