


RETROFITTING AND REHABILITATION OF CIVIL INFRASTRUCTURE

PROF. Sriman Kumar Bhattacharyya
Department of Civil Engineering
IIT Kharagpur
PROF. Swati Maitra
Department of Civil Engineering
IIT Kharagpur

INTENDED AUDIENCE : M.E/M.Tech/PhD students from Civil, Architecture, Construction Engineering background or equivalent specialization and BE/B.Tech students from similar background can take this course as elective

INDUSTRIES APPLICABLE TO : All civil engineering design and consultancy firms, construction companies, material manufacturers related to concrete technology will recognize this course for its practical applications

COURSE OUTLINE :

The major objective of this course is to give an in-depth understanding of the various methods of repair, retrofitting and rehabilitation techniques for masonry and concrete structures. The causes and types of deterioration, the evaluation of the existing condition of infrastructure, the materials for repair and retrofitting, the maintenance and strengthening techniques is covered in detail in this course. Seismic retrofitting and design of retrofitted structural components using recent techniques and materials have been included in the course. The course covers the challenging issues for efficient retrofitting and rehabilitation in order to extend the durability of existing structure in a sustainable manner.

ABOUT INSTRUCTOR :

Prof. Swati Maitra is an Assistant Professor in Ranbir & Chitra Gupta School of Infrastructure Design and Management, IIT Kharagpur. She obtained her PhD from IIT Kharagpur and Masters' from IIT Bombay in Civil Engineering. She is a recipient of awards like DAAD Fellowship by the German Academic Exchange Service and Bihar PWD Medal by the Indian Roads Congress. Dr. Maitra's research area includes sustainable concrete and cementitious materials, retrofitting and rehabilitation, concrete pavement analysis, design and performance evaluation, concrete overlay or whitetopping. She has published nearly 35 technical papers in international and national journals, book chapters and proceedings of conferences, seminars and workshops. Prof. Sriman Kumar Bhattacharyya is a Professor in Civil Engineering Department and presently the Deputy Director of IIT Kharagpur. He was a Former Director of CSIR-Central Building Research Institute (CBRI). Prof. Bhattacharyya's research area includes sustainable building materials, fluid-structure interaction, structural health monitoring, FRP-concrete composite system, structural restoration, numerical modelling and structural fire engineering. He has published about 250 technical papers in several international and national journals, book chapters, proceedings of international and national conferences, seminars and workshops. He has developed web-based and video-based NPTEL courses titled 'Finite element method in Engineering' and 'Strength of Materials', which are currently running. He has several patents based on his research. Prof. Bhattacharyya has received several prestigious awards like 'Distinguished Alumnus Award' by IIEST (BESU Shibpur), 'Concrete Technologist of the year' by Indian Concrete Institute, 'Telkom Best Lecturer Award' for the best teacher in Civil Engineering at the University of Durban-Westville, South Africa and many others. Dr. Swati Maitra and Prof. S. K. Bhattacharyya jointly teach the course Retrofitting and Rehabilitation of Infrastructure (ID60016) in IIT Kharagpur for the last 4 years.

Prof. Sriman Kumar Bhattacharyya is a Professor in Civil Engineering Department and presently the Deputy Director of IIT Kharagpur. He was a Former Director of CSIR-Central Building Research Institute (CBRI). Prof. Bhattacharyya's research area includes sustainable building materials, fluid-structure interaction, structural health monitoring, FRP-concrete composite system, structural restoration, numerical modelling and structural fire engineering. He has published about 250 technical papers in several international and national journals, book chapters, proceedings of international and national conferences, seminars and workshops. He has developed web-based and video-based NPTEL courses titled 'Finite element method in Engineering' and 'Strength of Materials', which are currently running. He has several patents based on his research. Prof. Bhattacharyya has received several prestigious awards like 'Distinguished Alumnus Award' by IIEST (BESU Shibpur), 'Concrete Technologist of the year' by Indian Concrete Institute, 'Telkom Best Lecturer Award' for the best teacher in Civil Engineering at the University of Durban-Westville, South Africa and many others. Prof. S. K. Bhattacharyya teach the course Retrofitting and Rehabilitation of Infrastructure (ID60016) in IIT Kharagpur for the last 4 years.

COURSE PLAN :

Week 1: Overview of Retrofitting and Rehabilitation of Civil Infrastructure

Week 2: Condition Evaluation and Testing

Week 3: General Repair and Strengthening of Concrete Structures

Week 4: Fiber Reinforced Polymer Composites (FRPC) and its Characteristics

Week 5: Retrofitting by FRP Composites

Week 6: Retrofitting by FRP Composites (continued…)

Week 7: Retrofitting by FRP Composites (continued…)

Week 8: Concrete Overlay for Pavement Rehabilitation

Week 9: Retrofitting of Masonry Structures

Week 10: Retrofitting of Building structures damaged due to seismic event

Week 11: Retrofitting of Special structures damaged due to seismic events

Week 12: Retrofitting of Steel Structures