

DEPARTMENT OF CIVIL ENGINEERING**A Report on*****AICTE SPONSORED 6 DAYS ONLINE STTP ON “LIFE CYCLE ASSESSMENT AND STRUCTURAL HEALTH MONITORING OF STRUCTURES”***

Date	:	2 nd to 7 th November 2020
Organized by	:	Department of Civil Engineering
Convener	:	Dr.S.P.Sangeetha , VP (Academics)
Co-Convener	:	Dr.R.Divahar , HoD/Civil Engg. Dr.P.S.Aravind Raj , Associate Professor
Venue	:	Online – Microsoft Teams
Chief Guest	:	Inauguration: Mr.Anil Kumar Pillai General Manager Tech Services Ramco Cements Chennai
Keynote Speakers	:	Mr.Anil Kumar Pillai GM, Tech Services, Ramco cements, Chennai Dr.S.P.Sangeetha Vice Principal(Academics) & Professor, Department of Civil Engineering, Aarupadai Veedu Institute of Technology, Paiyanoor, Tamilnadu Dr Chandramouli S.V Professor, Department of Civil Engineering, PES University, Bengaluru-560085 Er. S.S.Gaharwar Sr Pr Scientist & Former Head, Bridge Engineering and Structures Division, CSIR-CRRI, New Delhi -110025 Dr.R.Divahar HoD & Associate Professor Department of Civil Engineering Aarupadai Veedu Institute of Technology, Paiyanoor, Tamilnadu Dr.Urmil Dave Professor & Head, Nirma University, Ahmedabad Dr. M.S. Haji Sheik Mohammed Director, Centre for Prevention and Control of Corrosion in Concrete Structures (PC3S) B.S. Abdur Rahman Crescent Institute of Science and Technology, Chennai. Dr.P.S.Aravind Raj Associate Professor, Department of Civil Engineering, Aarupadai Veedu Institute of Technology, Paiyanoor, Tamilnadu

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Dr.P.Sivakumar

Former Chief Scientist,
CSIR-Structural Engineering Research Centre,
Chennai

Dr.T.Ch.Madhavi

Professor and Head, Department of Civil Engineering
SRM IST, Ramampuram

Dr. Shifana Kaafil

Assistant Professor, Architecture, Dar Al-Hekma University

Dr. J.S. Sudarsan

Professor(Assistant), School of Construction Management
NICMAR (Pune Campus)

Dr.S.Elavenil

Professor, Structural Engineering Division
School of Civil Engineering
VIT University, Chennai Campus

Er. M.Ravikumar

Deputy General Manager
Structures Division, L&T IDPL
TCTC Building, Manapakkam

Dr. T. PALANISAMY

Assistant Professor
Department of Civil Engineering
National Institute of Technology Karnataka (NIT K)

Department of Civil Engineering, Aarupadai Veedu Institute of Technology organized an AICTE Sponsored 6 days Online STTP on “Life cycle Assessment & Structural Health Monitoring of Structures” from 2nd to 7th November 2020. The aim of this STTP is to provide an insight to faculty members in the field of Civil Engineering about the path breaking developments in Health monitoring and Life cycle assessment of structures. The lectures were delivered by distinguished speakers from various backgrounds to make the program insightful and pronounced. The topics for the STTP include components of structural health monitoring, NDT, Life cycle assessment of structures, case studies on sustainability, application in bridges, etc. This STTP served very helpful for upgrading knowledge on recent technologies in the assessment of structures worldwide. The eminent resource persons of the STTP were from the various parts of the world.

The inauguration of STTP began with a welcome address by Dr.S.P.Sangeetha, Vice-Principal(Academics) & Convenor of the STTP. Dr.S.A.V.Satya Murty, Director(Research), VMRF delivered the presidential address and congratulated the participants. Dr. L.Prabhu, Vice-Principal(Admin) AVIT delivered the special address. Dr.R.Divahar, HoD (Civil) & Co-Convenor of the STTP deliberated about the event. The chief guest of the conference Mr.Anil Kumar Pillai, GM, Tech Services, Ramco cements, Chennai delivered the inaugural address. The inaugural session was concluded with a vote of thanks by Dr.P.S.Aravind Raj, Associate Professor (Civil) & Co-Convenor of the STTP which was then continued by the technical session by resource persons.

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Mr. Anil Kumar Pillai, GM, Tech Services, Ramco cements, Chennai

Mr. Anil Kumar Pillai delivered a presentation on the topic “Sustainability and Durability in Concrete Structures”. He explained clearly the durability and sustainability of concrete, the influence of materials and practices on sustainability. A brief overview on Ramco cements with respect to sustainability was presented by the resource person. He also explained how to maintain the Impermeability of concrete and the various tests for evaluating durability.

Dr. S.P. Sangeetha, Professor (Civil Engineering) & Vice-Principal (Academics), AVIT

Dr. S.P. Sangeetha has delivered a lecture on Inventory analysis for Life cycle assessment of structures. In her lecture, she explained how LCA contributes to sustainable development and presented inventory life cycle models of various structures. The energy consumption in various phases of life cycle of buildings and its greenhouse gas emissions were explained very clearly. Various recommendations of Eco-friendly management practices were also suggested by the Professor.

Dr. Chandramouli SV, Professor, Civil Engineering, PES University, Bangalore

Dr. Chandramouli SV gave a brief presentation on the topic “Structural Monitoring of Civil Infrastructure- Introduction and concept”. He figured out the need for structural health monitoring and the concepts involved in structural health monitoring. A case study on Neva Cable-Stayed Bridge, St. Petersburg, Russia was also discussed by him. Various levels of Sophistications of SM Scheme were also explained very clearly.

Dr. R. Divahar, Associate Professor & HoD (Civil Engineering), AVIT

Dr. R. Divahar explained about the short and long term monitoring of structures. He presented on most integrated and reliable monitoring systems for structures including detection, recording and processing of any strong motion vibrations that may affect the structure. Also in his presentation, many case studies on the structural health monitoring of bridges were explained clearly.

Er. S.S. Gaharwar, Sr Pr Scientist & Former Head, Bridge Engineering & Structural Divisions, CSIR-CRRI, New Delhi.

Er. S.S. Gaharwar presented a lecture on “Optimizing Maintenance of Bridges through Structural Health Monitoring”. He explained the maintenance cycle, performance parameters, various techniques of measurements and schemes of instrumentation. Various case studies and recent developments related to the topic were also discussed. The database management system in GIS Environment has also been explained by the resource person.

Dr. Urmil V Dave, Professor & Head, Civil Engineering, Nirma University, Ahmadabad

Dr. Urmil V Dave briefed about the Condition survey, Evaluation and Assessment of damage. Professor discussed on the in-situ evaluation of concrete, its importance and need and process. He also gave a brief explanation on non-destructive testing for strength estimation of concrete, corrosion assessment, Location and diameter of reinforcement and cover thickness of concrete elements. A clear discussion on non-destructive testing for detection of cracks/ voids/ Delaminations etc. in concrete elements was also given by the speaker.

Dr. M.S. Haji Sheik Mohammed, B.S. Abdur Rahman Crescent Institute of Science & Technology, Chennai

Dr. M.S. Haji Sheik Mohammed presented on the topic “Corrosion Prevention and Protection Strategies for Service Life Extension of RC Structures”. He explained the need for durable reinforced concrete structures, mechanisms, causes and consequences of corrosion of steel in concrete, Corrosion prevention strategies including surface coatings, corrosion inhibitors, coatings to steel rebars and conventional methods like cathodic protection.

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Dr.P.S.Aravind Raj, Associate Professor(Civil Engineering) , AVIT

Dr.P.S.Aravind Raj, in his lecture explained about the different types of damages in civil engineering structures and the traditional Non-Destructive Testing techniques that are introduced to detect damages in structures. The nature of various NDT's and their applications in Civil engineering practices were discussed. Also, the recently developed Structural Health Monitoring(SHM) methods for damage identification in structures were also explained in detail.

Dr.P.Sivakumar, Former chief scientist, CSIR-SERC, Chennai

Dr.P.Sivakumar has high-lighted the significance of non-destructive testing of concrete structures. In his speech, he elaborated on Where to use NDT and discussed on the various NDT methods which includes Ultrasonic pulse velocity, Rebound hammer testing, Hall-cell Electrical potential method, Carbonation test. All basic features of the above mentioned methods were explained in detail.

Dr.T.Ch.Madhavi, Professor & Head, SRMIST, Chennai

Dr.T.Ch.Madhavi briefed about the Masonry buildings. She explained the vulnerability of masonry structures, high lightened the difference between brick and block masonry structures, nature of masonry. Seismic retrofitting, its need, basic concepts involved in seismic retrofitting and the types of structures which are vulnerable were also discussed by Professor.

Dr.Shifana Fatima Kaafil, Dar Al Hekma University, Saudi Arabia

Dr.Shifana Fatima Kaafil gave a brief lecture on "Life cycle assessment of structures using finite element method". In her lecture, she explained how a 2D element using FEM has been developed to reflect the damage quantitatively and qualitatively, how quantification of damage and suggestions for rehabilitation using Fuzzy information has been done and she finally gave a detail explanation on fracture analysis of concrete specimens using finite element method.

Dr.J.S.Sudarsan, Professor, School of Construction Management, NICMAR(Pune Campus)

Dr.J.S.Sudarsan discussed about various case studies on sustainability. He shared with the participants his research works on sustainable buildings and explained briefly on how to make a building energy and resource efficient. He also discussed on how best is the construction wetland technique suited for treatment of grey water in buildings.

Dr.S.Elavenil, Professor, School of Civil Engineering, VIT University, Chennai

Dr.S.Elavenil delivered a presentation on "Seismic Protection of Bridges". In her presentation, she explained on the bridge bearings, various forces acting on bridge bearings, movements on bridge bearings, development of bearings. She also gave a brief explanation on types of bearings and its selection. Base isolation of railway bridges were also clearly explained by Professor.

Er.M.Ravikumar, Deputy General Manager, Structures Division, L&T IDPL, Manapakkam

Er.M.Ravikumar explained briefly on how to design a smart bridge and the applications of smart bridge as movable bridge and in car traffic. He also explained the involvement of disciplines and stakeholders. Many case studies were also explained to the participants making them understand the practical situations and needs.

Dr.T.Palanisamy, NIT, Surathkal, Karnataka

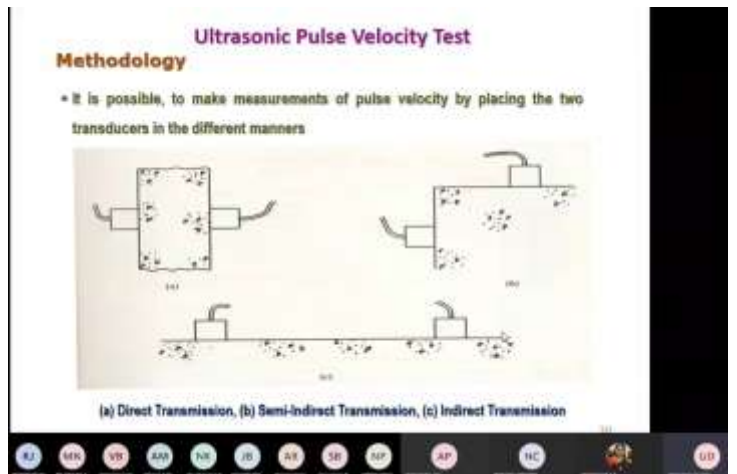
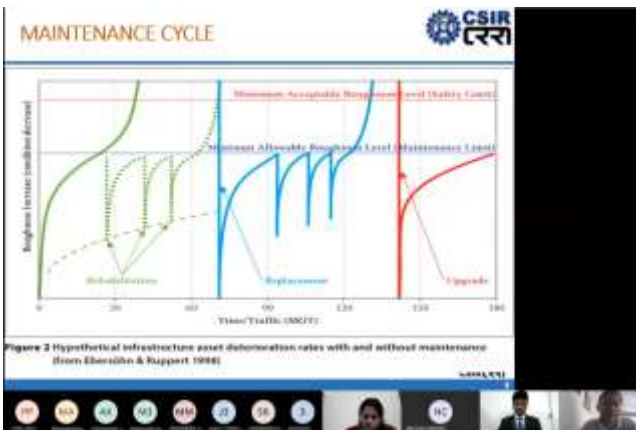
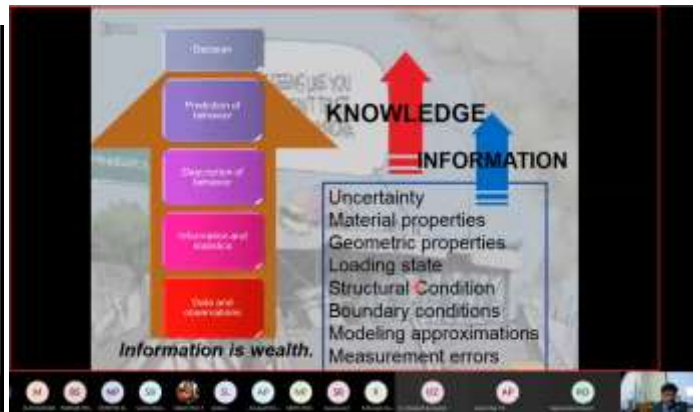
Dr.T.Palanisamy discussed on the limitation of IS Code with respect to durability. He explained about the various transport mechanisms in concrete. Durability provision, environmental exposure, values of minimum cement

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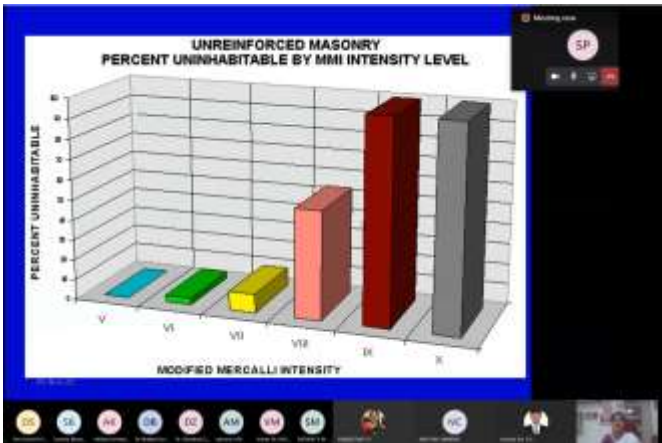
content, maximum water cement ratio, minimum grade of concrete for different exposure conditions, nominal cover to meet the durability requirements as per IS 456 : 2000 were discussed and compared with other codes including European standard EN 206- 2000, Australian Standard AS 3600: 2001 and American Standard ACI 318: 2008.

More than 60 participants from various AICTE approved institutions participated in the STTP and their feedback on each session was received through a link. As per norms of AICTE, an online assessment was conducted on the last day of the STTP and certificates were distributed to eligible participants.

ONLINE SESSION PHOTOS

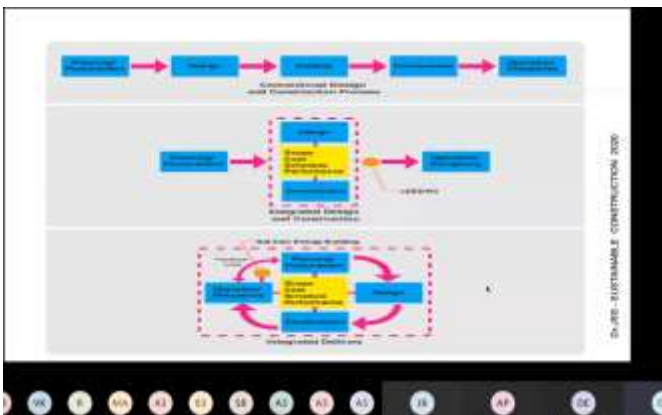


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Composite Materials

- To overcome the deficiencies, there is a need to go for some additive materials with conventional Construction materials.
- In the form of fibres or graded fine aggregates like sand or silica fume.
- Uses of composite/Additive materials*
 - It has high ratio of stiffness to weight
 - Containing more than one bonded material
 - Each with different structural properties
 - Has the capability to arrest the crack propagation



Seismic Isolation of Benicia-Martinez Benicia, California

Major Bridge (MJB) – Girder Type

Total length > 60m


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PROGRAM SCHEDULE - PHASE 1 (2nd - 7th NOVEMBER 2020)

DAY	DATE	SESSION	TIME	RESOURCE PERSON	TOPIC OF THE SESSION
DAY 1	2.11.2020	FN	9:00AM-10:30AM	Mr.Anil Kumar Pillai GM, Tech Services, Ramco cements, Chennai	Sustainability and Durability in concrete structures
		FN	11:00AM - 12:30PM	Dr.S.P.Sangeetha Vice Principal(Academics) & Professor, Department of Civil Engineering, Aarupadai Veedu Institute of Technology, Paiyanoor, Tamilnadu	Inventory Analysis for Life Cycle Assessment of Structures
		AN	02:00PM - 04:00PM	Dr Chandramouli S.V Professor, Department of Civil Engineering, PES University, Bengaluru-560085	Structural Monitoring of Civil infrastructure
DAY 2	3.11.2020	FN	9:00AM-10:30AM	Er. S.S.Gaharwar Sr Pr Scientist & Former Head, Bridge Engineering and Structures Division, CSIR-CRRI, New Delhi -110025	Optimizing Bridge Maintenance using Structural Health Monitoring
		FN	11:00AM - 12:30PM	Dr.R.Divahar HoD & Associate Professor Department of Civil Engineering Aarupadai Veedu Institute of Technology, Paiyanoor, Tamilnadu	Short term and Long term monitoring of Structures.
		AN	02:00PM - 04:00PM	Dr.Urmil Dave Professor & Head, Nirma University, Ahmedabad	Condition Survey, Evaluation and Assessment of Damage
DAY 3	4.11.2020	FN	9:00AM-10:30AM	Dr. M.S. Haji Sheik Mohammed Director, Centre for Prevention and Control of Corrosion in Concrete Structures (PC3S) B.S. Abdur Rahman Crescent Institute of Science and Technology, Chennai.	Corrosion Prevention and Protection Strategies for Service Life Extension of RC Structures
		FN	11:00AM - 12:30PM	Dr.P.S.Aravind Raj Associate Professor, Department of Civil Engineering, Aarupadai Veedu Institute of Technology, Paiyanoor, Tamilnadu	Damage Identification and Inspection of Structures.
		AN	02:00PM - 04:00PM	Dr.P.Sivakumar Former Chief Scientist, CSIR-Structural Engineering Research Centre, Chennai	Non-Destructive Testing

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DAY 4	5.11.2020	FN	9:00AM-10:30AM	Dr. T.Ch.Madhavi Professor and Head, Department of Civil Engineering SRM IST, Ramampuram	Failures in brick masonry buildings.
		FN	11:00AM - 12:30PM	LAB SESSION	
		AN	02:00PM - 04:00PM	Dr. Shifana Kaafil Assistant Professor, Architecture, Dar Al-Hekma University	Life cycle assessment of structures
DAY 5	6.11.2020	FN	9:00AM-10:30AM	Dr. J.S. Sudarsan Professor(Assistant), School of Construction Management NICMAR (Pune Campus)	Case studies on sustainability
		FN	11:00AM - 12:30PM	LAB SESSION	
		AN	02:00PM - 04:00PM	Dr.S.Elavenil Professor, Structural Engineering Division School of Civil Engineering VIT University, Chennai Campus	Earthquake protective system in bridges
DAY 6	7.11.2020	FN	9:00AM-10:30AM	Er. M.Ravikumar Deputy General Manager Structures Division, L&T IDPL TCTC Building, Manapakkam	A Smart Bridge Design Walk
		FN	11:00AM - 12:30PM	Dr. T. PALANISAMY Assistant Professor Department of Civil Engineering National Institute of Technology Karnataka (NIT K)	Limitation of Indian codes with respect to durability
		AN	2:00PM - 4:30PM	Valediction, Test and Feedback	



CONVENOR
DR.S.P.SANGEETHA
VP (ACADEMICS)
AVIT



COORDINATOR
DR. P.S.ARAVIND RAJ
ASSOCIATE PROFESSOR
CIVIL ENGG. DEPT
AVIT



HOD/CIVIL ENGG.
AVIT



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