

## ANANTH RAMASWAMY, PhD

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### RESEARCH INTERESTS

Material characterization, condition assessment and health monitoring of structural elements (concrete, steel and composites) under monotonic and cyclic loads (Thermo-mechanical) and structural protection methods using FRP and cementitious composites and the use of composites and smart materials technology.

### EDUCATION

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|--|-------------------|------|
| • Louisiana State University, Baton Rouge, LA, <b>Doctor of Philosophy</b>     | Civil Engineering | 1992 |
| • University of California, Davis, CA, <b>Master of Science</b>                | Civil Engineering | 1986 |
| • Indian Institute of Technology, Madras, India, <b>Bachelor of Technology</b> | Civil Engineering | 1985 |

### APPOINTMENTS

- **Professor and Chairman** (1<sup>st</sup> March 2019 - to date), Department of Civil Engineering, **Indian Institute of Science**, India
- **Professor (HAG)** (Since August 2021), Department of Civil Engineering, **Indian Institute of Science**, India.
- **Professor** (July 2009 – July 2021), Department of Civil Engineering, **Indian Institute of Science**, India.
- **Guest Professor** (18th October 2004- 13th January 2005) Institute of Structural Engineering, Department of Civil Engineering (BAUG), **Swiss Federal Institute of Technology (ETH)**, Zurich, Switzerland.
- **Associate Professor** (May, 2001 - July, 2009), Department of Civil Engineering, **Indian Institute of Science**, India.
- **Assistant Professor** (May, 1995 - May, 2001), Department of Civil Engineering, **Indian Institute of Science**, India.
- **Visiting Lecturer** (January 1994 - May 1995), Department of Civil Engineering, **Indian Institute of Technology**, Kharagpur, India.

### *Other Concurrent Appointments at IISc, Bangalore, India.*

- **Chairman, Project Management Group (PMG)** (21<sup>st</sup> August 2015 -31<sup>st</sup> December 2019)
- **Coordinator, IISc-SPICMACAY Cultural programs** on the IISc campus (Since October 2017)

### HONORS AND RECOGNITIONS

- C.P.W.D. Medal of Indian Roads Congress for best paper on maintenance [with Jaiprasad, R., Srinivasa Murthy, B.R., and Jaigopal, S. (2007)].
- Editorial Board Member, Engineering Structures, Elsevier, since August 2021
- DST (International Div.) Only expert Nominated for evaluating IC-IMPACTS, Indo-Canada NCE Projects, Nov 23-26<sup>th</sup> 2016.
- Associate Editor Journal of Structural Engineering, American Society for Civil Engineers (ASCE), January 2012 till date.
- Associate Editor Journal of Bridge Engineering, American Society for Civil Engineers (ASCE), May 2010-November 2017.
- Associate Editor Sadhana, An Indian Academy of Science (India) journal, October 2013 till date.
- SERB-DST PAC Member for ECR & NPDF (Civil Eng. Since 2015) EMR (Civil Eng. since 2012); EMEQ (Civil Eng. Since 2017) and POWER (Civil Eng. Since 2021)
- Best reviewer award, Journal of Bridge Engineering, American Society of Civil Engineers (ASCE), 2009.
- Best reviewer award, Journal of Materials in Civil Engineering, American Society of Civil Engineers (ASCE), 2015.

### **Services rendered for the Institute (Last 3 years)**

- **New MTech Program (Dam Engineering Major in M.Tech Civil Engineering, commenced August 2021).**

As the Chair of the Department of Civil Engineering, interactions were held with officials from the Central Water Commission to participate in the the Dams Rehabilitation Implementation Program (DRIP) initiative in the in the Ministry of Water

Resources (MOWR), GOI and coordinated with colleagues in the Department to develop a new Major in the area of Dam Engineering as a Major in the MTech Civil Engineering program to have sponsored students from DRIP-CWC, MOWR, GOI over the next ten years. **One Batch of the new MTech Civil Engg (Dam Engineering Major) with GOI sponsored candidates have been admitted in Aug 2021.** Further, a proposal for a Centre for excellence in Dam Engg at their under preparation for possible support from the Government of India.

- As Chair of the specially constituted committee to look at the viability of PNG for the IISc campus, extensive interactions with M/s GAIL were undertaken to facilitate PNG for the IISc campus. Agreements with M/s GAIL to supply PNG to the Institute are in place and work is in progress.
- A one-of-a-kind Fire Structural test facility is being developed in the Civil Engineering Department under the DST-FIST program (2017-2022). **Designs for housing the test facility is in the tendering stage and the Fire Structure test facility is being manufactured by the firm.** PNG is being used as a fuel for the test facility.
- As Chair PMG, the completion of three under construction building projects on IISc campus having a combined financial value of about Rs 85 Cr was facilitated coordinating with a team of engineers from KPWD and different contracting agencies to expeditiously completing the works while interacting with the IISc administration and end user Departments. **All PMG works completed and handed over in December 2019.**
- **As Coordinator identified by IISc, I have interacted with SPICMACAY** volunteers to have cultural programs by Professional artists organized on the IISc campus, to enhance the cultural vibrancy within the IISc campus. Presently under the pandemic situation these programs are being organized in an ONLINE mode every month since October 2020 and from April 2022 it is an in-person event once more.
- **Served on the Committee constituted to identify the architects to construct the medical school and hospital.** I also served on another committee to assess the architectural plans for the hospital from the standpoint of meeting sustainability in the design and dust free construction process.

## PUBLICATIONS

Scopus: Citations: 1444 h-index: 19  
Google Scholar: Citations: 2542 h-index: 24 I-10-index: 38

### Journal articles

- Biswajit Pal and Ananth Ramaswamy, (2023) **"A Multi-physics Based approach to predict Mechanical Behavior of Concrete Element in a Multi-scale framework"**, Mechanics of Materials, Elsevier (January 2023, 104509, 31 pages).
- Biswajit Pal and Ananth Ramaswamy Title: **A multi-scale approach to predict shrinkage and creep of cementitious composite in a hygro-thermo-chemo-mechanical framework-Theoretical formulation and numerical validation**, Construction and Building Materials, No.: CONBUILDMAT-D-22-12109-under review) Elsevier.
- Biswajit Paal and Ramaswamy. A (2023) **Meso-scale study to predict High-Temperature behavior of Concrete structures in a Hygral-Thermal-Chemical-Mechanical Framework. Engineering Structures, Elsevier** ENGSTRUCT-D-23-00639-under review Elsevier.r
- Himanshu and Ramaswamy, Ananth **"A Discrete cohesive zone model for beam elements International Journal of Fracture, Springer** ID 167d5073-726c-4312-8d1b-7323b9228 under review, Springer
- Hemalatha, T, and Ananth Ramaswamy (2022) **Review of alternative ash aggregates in concrete-solution towards waste management and environmental protection**, Environmental Science and Pollution Research <https://doi.org/10.1007/s11356-022-21720-x>
- Sanhita Das, Shubham Sharma, Ananth Ramaswamy, Roy, D., Reddy, J.N. (2021) **"A geometrically inspired model for brittle damage in compressible elastomers"**, Journal of Applied Mechanics, (Accepted). *J. Appl. Mech.*, ASME, Aug 2021, 88(8): 081002 (12 pages),

- Biswajit Pal and Ananth Ramaswamy (2021) “**Meso-scale model for Concrete at Both Ambient and High Temperature**”, Journal of Structural Engg, 48(3) pp 181-188.
- Balagopal, R, Ananth Ramaswamy, Palani, G.S. and Rao, N.P, (2020) “**Simplified Bolted Connection Model for Analysis of Transmission Line Towers**”, Structures, Elsevier, 27, 2114-2125.
- Guruprasad Y.K. Ananth Ramaswamy, (2019) “**Thermal insulation of concrete and the repair material CFRP exposed to high temperature and different time intervals**” Construction and Building Materials, Elsevier, v205, pp. 549-565
- Biswal, S.K, Reddy, D. Harinadha, and Ananth Ramaswamy (2019) “**Reducing Uncertainties in estimating long-time prestress losses in concrete structures using a Hygro-thermo chemo mechanical model for concrete**, Computers and Structures, Elsevier, v211, pp. 1-13.
- Guruprasad, Y.K. and Ananth Ramaswamy (2018) “**Micromechanical analysis of concrete and reinforcing steel exposed to high temperature**”, Construction and Building Materials, Elsevier, Volume 158, 2018, Pages 761-773.
- Guruprasad, Y.K. Ananth Ramaswamy, Sajeev, K. (2018) “**Thermal effect on micro properties of granite aggregate in concrete**”, ACI Materials Journal, American Concrete Institute (ACI), V. 115, No. 1, January 2018, 77-88.
- Reddy, D. Harinadh and Ananth Ramaswamy (2017) “**Influence of Mineral Admixtures and Aggregates on Properties of Different Concretes under high Temperature Conditions: I Experimental Study**”, Journal of Building Engineering, Elsevier, Volume 14, November 2017, Pages 103-114.
- Biswal, S.K. and Ananth Ramaswamy (2017) “**Uncertainty based model averaging for long time deformation of concrete structures**”, Construction and Building Materials, Elsevier, V153, 2017, 469-480.
- Biswal, S.K. and Ananth Ramaswamy (2017) “**Finite Element Model Updating of Concrete Structures Based on Imprecise Probability**”, Mechanical Systems and Signal Processing, Elsevier, Volume 94, 15 September 2017, Pages 165–179.
- Hemalatha, T. and Ramaswamy, A. (2017) “**A review on fly ash characteristics- Towards promoting high volume utilization in developing sustainable concrete**”, Journal of Cleaner Production, Elsevier Science, 147, 546-559.
- Hemalatha, T. Ananth Ramaswamy, and Kishen, J.M.C. (2017) “**Investigation on the relationship between microstructure and fracture properties of Self Compacting Concrete (SCC)**”, American Standards for Testing and Methods (ASTM), Advances in Civil Engineering Materials ACEM-2017, v6 (1), 480-503, doi: 10.1520/ACEM20170055.
- Reddy, D. Harinadha and Ananth Ramaswamy (2017) “**Experimental and Numerical Modeling of Creep in Different Types of Concrete**”, Heliyon, Elsevier, Heliyon(2018)e00698, doi 10.1016/j Heliyon2018e00698
- Biswal, S.K. and Ananth Ramaswamy (2016) “**Measurement of existing prestressing force in concrete structures through an embedded vibrating beam strain gauge**”, Measurement, Elsevier, 83, 10-19.
- Hemalatha, T. Ananth Ramaswamy, and Kishen, J.M.C. (2015) “**Simplified Mix Design for Production of Self Compacting Concrete**”, ACI Materials Journal, American Concrete Institute (ACI), 112(2), 277-286.
- Hemalatha, T. Ananth Ramaswamy, and Kishen, J.M.C. (2015) “**Micromechanical Analysis of Self Compacting Concrete**”, Materials and Structures: RILEM Journal (DOI 10.1617/s11527-014-0435-z), 48:3719–3734
- Kishen J. M. Chandra, Ananth Ramaswamy, Manohar C S (2013) “**Safety Assessment of Masonry Arch Bridge: Field Testing and Simulations**”, Journal of Bridge Engineering, ASCE February, Volume 18(2), 162-171.
- Guruprasad, Y.K. and Ananth Ramaswamy (2012) “**Behavior of Fire Damaged Concrete Cylinders with Carbon Fibre Reinforced Polymer Wrap under Monotonic Loading**”, Journal of Structural Engineering, (India), Vol. 39, No. 1, April-May, pp. 77-83.
- Narayanamurthy, V., Chen, J.F., Cairns, J. and Ramaswamy, A. (2011) “**Effect of shear deformation on interfacial stresses in plated beams subjected to arbitrary loading**”,

International Journal of Adhesion & Adhesives, Elsevier, Vol. 31(8), pp. 862-874 doi: 10.1016/j.ijadhadh.2011.08.007.

- Thomas, Job, and Ramaswamy, A. (2009) **“Nonlinear FE analysis of prestressed SFRC beams in flexure”**, Journal of Bridge Engineering, Proc. of ICE, UK, 162(BE3), 119-126.
- Ali, Sk. Faruque and Ramaswamy, A. (2009) **“Hybrid Structural Control using Magneto-rheological Dampers for Base Isolated Structures”**, IOP Smart Materials and Structures, doi 10.1088/0964-1726/18/5/055011.
- Ali, Sk. Faruque and Ramaswamy, A. (2009) **“Optimal Dynamic Inversion based Semi active Control of Benchmark Bridge using MR Dampers”**, Journal of Structural Control and Health Monitoring, DOI: 10.1002/stc.325, 16, 564-585.
- Ali, Sk. Faruque and Ramaswamy, A. (2009) **“Testing and Modeling of MR Damper and its Application to SDOF Systems using Integral Back-stepping Technique”**, Journal of Dynamic Systems, Measurement and Control, ASME, March, Vol. 131 / 021009-1to11.
- Ali, Sk. Faruque and Ramaswamy, A. (2009) **“Optimal Fuzzy Logic Control for MDOF Structural Systems Using Evolutionary Algorithm”**, Engineering Applications of Artificial Intelligence, Elsevier, 22, 407-419.
- Ali, Sk. Faruque and Ramaswamy, A. (2008) **“GA optimized FLC driven semi-active control for Phase II smart nonlinear base isolated benchmark building”**, Journal of Structural Control and Health Monitoring, 15, 797-820.
- Ramaswamy, A, and Muttasim Adam Ahmedi (2008) **“New materials in structural concrete repair”**, Journal of Structural Engineering, SERC, Chennai, India, v.35 (4), pp. 26-36, April-June.
- Thomas, J. and Ramaswamy, A. (2007) **“Shear of Prestressed Concrete Beams having Steel Fibers”**, ICE Structures & Buildings Journal, 160 (SB5), 287-293.
- Thomas, J. and Ramaswamy, A. (2007) **“Mechanical Properties of Steel Fiber Reinforced Concrete”**, Journal of Materials in Civil Engineering, ASCE, 19(5), 385-392.
- Saikia, B., Kumar, P., Thomas, J., Rao, K.S.N., and Ramaswamy A. (2007) **“Serviceability Performance in Flexure of Beams with GFRP Rebars”**, Construction and Building materials, 21, 1709-1719.
- Jaiprasad, R., Srinivasamurthy, B.R., Ramaswamy, A., Jaigopal, S. (2006) **“Rehabilitation on 140 Years Old Brick Masonry Arch Bridge Across Vrishabhavathi Valley in Bangalore, Karnataka-Case Study”** printed in Indian Roads Congress (IRC) Journal Volume 67 Part 1, 121-126 **(C.P.W.D. Medal of Indian Roads Congress for best paper on maintenance)**.
- Thomas, J., and Ramaswamy, A. (2006) **“Width and Spacing of Flexural Cracks in Partially Prestressed T-Beams with Steel Fibers in Partial / Full Depth”**, ACI Structural Journal, 103(4), 568-576.
- Thomas, J., and Ramaswamy, A. (2006) **“Load deflection performance of partially prestressed concrete T-beams with steel fibers in partial and full depth”**, Structural Concrete Journal of FIB, 7(No. 2), 65-75.
- Thomas, J., and Ramaswamy, A. (2006) **“Shear Strength of Partially Prestressed Concrete T-Beams with Steel Fibers in Partial/Full Depth”**, ACI Structural Journal, 103(3), 427-435.
- Thomas, J. and Ramaswamy, A (2006) **“Finite Element Analysis of Shear Critical Prestressed SFRC Beams”**, Computers and Concrete, Techno-Press, 3(1), 65-77.
- Thomas, J. and Ramaswamy, A. (2006) **“Shear-flexure analysis of prestressed concrete T-beams containing steel fibers over partial or full depth”** Structural Engineering International, Journal of the International Association of Bridge and Structural Engineers (IABSE), vol. 16(1), 66-73.
- Saikia, B., Thomas, J., Ramaswamy A. and Rao, K.S.N. (2005) **“Performance of Hybrid Rebars as Longitudinal Reinforcement in Normal Strength Concrete”**, Materials and Structures: A RILEM Journal, vol. 38 (No.284), pp. 857-864.
- Ahlawat, A.S., and Ramaswamy, A., (2004) **“Multi-Objective Optimal FLC Driven Active and Hybrid Control System for Seismically Excited Nonlinear Buildings”**, ASCE, Journal of Engineering Mechanics, v. 130(4), 416-423.
- Ahlawat, A.S. and Ramaswamy, A., (2004) **“Multi-objective Optimal FLC for Response Control of Wind-Excited Tall Buildings”** ASCE, Journal of Engineering Mechanics, v130 (4), 524-530.
- Padmarajaiah, S.K. and Ramaswamy, A. (2004) **“Flexural Strength Predictions of Steel Fiber Reinforced High Strength Concrete in Fully / Partially Prestressed Beam Specimen”**, Cement

and Concrete Composites Journal, v26, 275-290.

- Ahlawat, A.S. and Ramaswamy, A. (2003) **“Multi-objective Optimal Absorber System for Torsionally Coupled Seismically Excited Structures”**, Engineering Structures: Journal of Earthquake Engineering, Wind and Ocean Engineering, 25(7), 941-950.
- Ahlawat, A.S. and Ramaswamy, A. (2002) **“Multi-objective Optimal FLC Driven Hybrid Mass Damper for Torsionally Coupled Seismically Excited Structures”**, Journal of Earthquake Engineering and Structural Dynamics, 31(12), 2121-2139.
- Bansal, A. and Ramaswamy, A. (2002) **“FE Analysis of Piezo-laminate Composites under thermal loads”**, Journal of Intelligent Material Systems and Structures, v.13, No.5, 291-301.
- Ahlawat, A.S. and Ramaswamy, A. (2002) **“Multi-Objective Optimal Design of FLC Driven Hybrid Mass Damper for Seismically Excited Structures”**, Earthquake Engineering and Structural Dynamics, 31(5), 1459-1479, May.
- Padmarajaiah, S. K. and Ramaswamy, A. (2002) **“Comparative Flexural Response of Full and Partial Depth Fibrous High Strength Concrete Prisms Containing Trough Shape Steel Fibers”**, Journal of Materials in Engineering, ASCE, v. 14(2), pp.130-136, March / April.
- Padmarajaiah, S. K. and Ramaswamy, A. (2002) **“A Finite Element Assessment of Flexural Strength of Prestressed Concrete Beams with Fiber Reinforcement”**, Journal of Cement and Concrete Composites, vol. 24(2), pp. 229-241, April.
- Padmarajaiah, S. K. and Ramaswamy, A. (2001) **“Crack Width Predictions for High Strength Concrete Fully / Partially Prestressed Beam Specimens Containing Steel Fibers”**, Structural Journal, ACI, v. 98(6), Nov.-Dec., pp.852-861.
- Ahlawat, A.S. and Ramaswamy, A. (2001) **“Multi-objective Optimal Structural Vibration Control Using Fuzzy Logic Control System”**, Journal of Structural Engineering, ASCE, 127(11), pp.1330-1337.
- Padmarajaiah, S.K. and Ramaswamy, A. (2001) **“Behavior of Fiber Reinforced High Strength Concrete Prestressed and Reinforced Beam Specimen Subjected to Shear”**, Structural Journal, ACI, v. 98(5), Sept.-Oct, pp. 752-761.
- Padmarajaiah, S.K. and Ramaswamy, A. (2001) **“A Beam and Arch Action Model for Computing the Shear Strength of Prestressed and Reinforced HSFRC Beams”**, Journal of Structural Engineering, SERC, Chennai, India, v.28 (1), pp. 7-15, April-June.
- Rath, D.P., Ahlawat, A.S. and Ramaswamy, A. (1999) **“Shape Optimization of RC Flexural Members”**, Journal of Structural Engineering, ASCE, 125(12), 1439-1446.
- Ramaswamy, A., Barzegar, F., and Voyiadjis, G.Z. (1995) **“A Study of Layering Procedures in Finite Element Analysis of RC Flexural and Torsional Elements”**, Journal of Structural Engineering, ASCE, 121(12), pp. 1773-1783.
- Ramaswamy, A., Barzegar, F., and Voyiadjis, G.Z. (1994) **“A Post-Cracking formulation for Finite Element Analysis of RC Structures Based on Secant Stiffnesses”**, Journal of Engineering Mechanics, ASCE, 120(12), 1994.
- Herrmann, L.R., Ramaswamy, A., and Hamidi, R. (1989) **“Analytical Parameter study for a class of Elastomeric Bearings”**, Journal of Structural Engineering, ASCE, 115(10), pp. 2415 - 2434.
- Herrmann, L.R., Hamidi, R., Nobari, F.S., and Ramaswamy, A. (1988) **“Nonlinear Behavior of Elastomeric Bearings. II: Analysis and Verification”**, Journal of Engineering Mechanics, ASCE, 114(11), pp. 1831-1853.

### Journal Discussions

- Ramaswamy, A. (1995) **On Compression Response of Cracked Reinforced Concrete** by Vecchio F.J. and Collins, M.P., Journal of Structural Engineering, Vol. 119, No.12, December 1993, pp. 3590-3610, Discussion Appeared in Journal of Structural Engineering, Vol. 121, No.7, July 1995, pp. 1152-1153.

### General articles & book chapters

- Biswajit Pal and Ramaswamy, A. (2022) **“Mechanistic analysis of cementitious composite at meso-scale”**, *Stability and Failure of High-Performance Composite Structure*, Springer Nature, Singapore (in Press- agreement id 89152100).

- Hemalatha T., and Ramaswamy, A., (2021) **“Fly ash Cement”**, *Handbook of Fly Ash*, ed. Prof. Kamal Kar, Butterworth-Heinemann Elsevier, ISBN: 978-0-12-817686-3
- Ali, Sk. F. and Ramaswamy, A (2013) **“Nonlinear Structural Control Using Magneto-rheological Damper”**, Chapter in a book entitled **“Design Optimization of Active and Passive Structural Control Systems”** edited by Nikos Lagaros, Vagelis Plevris and Chara ch. Mitropoulou, IGI Global, DOI: 10.4018/978-1-4666-2029-2.ch013.
- Ali, Sk. F. and Ramaswamy, A. (2010) **“Semi-active Structural Control Using MR Dampers**, published by VDM verlag, ISBN 978-3-639-29380-7
- Ramaswamy, A. (2009) **“Alexandre Gustave Eiffel: An Engineer Scientist”**, Resonance, Journal of the Indian Academy of Sciences, September pp. 840-848
- Ali, Sk. Faruque, and Ramaswamy, A. (2007) **“Developments in Structural Optimization and Applications to Intelligent Structural Vibration Control”** Chapter in a book entitled *Intelligent Computational Paradigms in Earthquake Engineering*, edited by Lagros, N.D. and Tsompanakis, Y., Idea Group inc, 101-122.
- Ramaswamy, A and Ahlawat, A.S. (2005) **“A Review of Recent Advances in Layout Optimization of Skeletal Structures”**, in *Recent Advances in Structural Engineering*, edited by Jagadish, K.S. and Iyengar, R.N., University Press, Hyderabad, pg. 56-89.

### Conferences & Symposia proceedings

- Waghmare, Ambadas and Ramaswamy, Ananth (2022) **“Nonlinear analysis of reinforced concrete structural elements”**, Paper 0175, IABSE Symposium Prague, May 25-27, 2022.
- Biswal, S.K., Reddy, D. Harinadha, Ananth Ramaswamy (2021) **“Estimation of Prestress Loss in Concrete Structures Coupling Concrete Hydration and Associated Uncertainty”**, paper id# 2031912, EMI / PMC Conference, ASCE, 25-28<sup>th</sup> May, (ONLINE event).
- Biswajit Pal and Ananth Ramaswamy (2021) **“Meso-scale study of notched and un-notched plain concrete beam under three-point bending”**, 3<sup>rd</sup>-5<sup>th</sup> February 2021 IABSE Congress for Resilient Technologies, Christchurch New Zealand (ONLINE Event).
- Harinadha Reddy and Ananth Ramaswamy (2021) **“Degradation of Concrete Elements Under Thermal and Mechanical Loads and its repair”**, 3<sup>rd</sup>-5<sup>th</sup> February 2021 IABSE Congress for Resilient Technologies, Christchurch New Zealand (ONLINE Event).
- Pal B., Ramaswamy A. (2022) Meso-Scale Study of Plain Concrete Beam Under Both Ambient and High Temperature. In: Sena-Cruz J., Correia L., Azenha M. (eds) Proceedings of the 3rd RILEM Spring Convention and Conference (RSCC 2020). RSCC 2020. RILEM Book series, vol 34. Springer, Cham. [https://doi.org/10.1007/978-3-030-76465-4\\_14](https://doi.org/10.1007/978-3-030-76465-4_14)
- Biswajit Pal and Ananth Ramaswamy (2019) **“Meso-Scale Model for Concrete at both Ambient and elevated temperatures**, Proceedings of INCAM 2019, 3<sup>rd</sup> - 5<sup>th</sup> July 2019 at J.N. Tata Auditorium, IISc Bangalore.
- Waghmare, A., and Ananth Ramaswamy (2019) **“Non-linear Analysis of Reinforced Concrete including Bond Slip Effects”** Proceedings of INCAM 2019, 3<sup>rd</sup> - 5<sup>th</sup> July 2019 J.N. Tata Auditorium, IISc, Bangalore.
- Svetha, V., Harinadh Reddy and Ananth Ramaswamy (2018) **“Response of Structural Concrete Assemblages to Thermo-Mechanical Loads”**, Proceedings of the 40th of the International Association of Bridge and Structural Engineers (IABSE) Congress on “Tomorrows Megastructures”, Nantes, France 19<sup>th</sup> -21<sup>st</sup> September 2018.
- Suryakanta Biswal and Ananth Ramaswamy (2018) **“Estimation of Prestress Losses in Concrete Structures over a Long time”**, Proceedings of the 40th of the International Association for Bridge and Structural Engineers (IABSE) Congress on “Tomorrows Megastructures”, Nantes, France 19<sup>th</sup> -21<sup>st</sup> September 2018.
- Svetha, V., Harinadha Reddy and Ananth Ramaswamy (2016) **“Uncertainty analysis of Hygro-thermo-Chemo Mechanical Analysis of Concrete”**, Structural Engineering Convention, IIT Madras, Chennai, 21-23 December 2016.
- Harinadh Reddy, D., and Ananth Ramaswamy (2016) **“Structural Concrete Repair against Mechanical and Thermal Loads”**, Proceedings of the 19<sup>th</sup> Congress of the International Association of Bridge and Structural Engineers (IABSE), Stockholm Sweden, from 21<sup>st</sup> - 23<sup>rd</sup>, September 2016.

- Harinadh Reddy, D. and Ananth Ramaswamy (2015) **“Creep and Shrinkage in Concrete containing Mineral Admixtures”**, Proceedings of CONCREEP 10, held in Vienna, pg 1524-1533, 21<sup>st</sup> – 23<sup>rd</sup> Sept. 2015
- Suryakant Biswal and Ananth Ramaswamy (2015) **“Health-monitoring of Prestressed Concrete Structures based on Finite Element Model Updating”**, Proceedings of CONCREEP 10, held in Vienna pg. 1447-1456, September 21<sup>st</sup> -23<sup>rd</sup>, 2015
- Guruprasad, Y.K. and Ananth Ramaswamy, (2014) **“Effect of High Temperature Exposure on Concrete: Damage Assessment and Repair Methodology”**, 37<sup>th</sup> IABSE Symposium at Madrid, Spain, 3<sup>rd</sup> – 5<sup>th</sup> September 2014.
- Biswal, S.K. and Ananth Ramaswamy (2014) **“Assessment of Existing Pre-Stressed Tendon Forces in Bridge Girders Using Measured Strain Data with Uncertainty”** Proceedings of the 4<sup>th</sup> FIB Congress, Mumbai, India 10<sup>th</sup> – 14<sup>th</sup> February 2014.
- Harinadh Reddy and Ananth Ramaswamy (2014) **“Prediction of Delayed Strains in Self Compacted Concrete”**, Proceedings of the 4<sup>th</sup> FIB Congress, Mumbai, India, 10<sup>th</sup> -14<sup>th</sup> February 2014.
- Ananth Ramaswamy (2013) **“Alternate Repair Material Systems for Application to Structural Concrete”**, Proceedings of the IABSE Conference entitled 'Assessment, Upgrading and Refurbishment of Infrastructure', Rotterdam 6-8<sup>th</sup> May 2013.
- Hemalatha, T., Chandra Kishen, J.M., and Ramaswamy, A., (2013) **“Influence of Mineral Admixtures on Fatigue Behaviour of Self Compacting Concrete - Scanning Electron Microscopy and Micro-indentation Study”**, Proceedings of the 8<sup>th</sup> International Conference on Fracture Mechanics of Concrete and Concrete Structures, 10<sup>th</sup>-14<sup>th</sup> March 2013, Toledo, Spain.
- Biswal, S.K. and Ramaswamy, A. (2012) **“Damage Identification in Reinforced Concrete Beams”**, Proceedings of the ANCRISRT Conference, 27-28 July, IISc Bangalore.
- Ananth Ramaswamy (2012) **“Performance of normal and self-compacting Concrete with mineral admixtures”**, Keynote-lecture Proceedings of International conference in Sustainability Challenges & Advances in Concrete Technology (SCACT), PSG Tech, Coimbatore, May 2<sup>nd</sup> – 4<sup>th</sup>, 2012.
- Harinadh Reddy & Ramaswamy A. (2012) **“Hydration Based Model to Predict Creep and Shrinkage in Concrete, Proceedings of International Conference on Numerical Modelling Strategies for Sustainable Concrete Structures, Aix en Provence France, 29th May - 1st June 2012.**
- Guruprasad Y.K. & Ramaswamy A. (2012) **“Fatigue life of fire damaged concrete Cylinders repaired with carbon fibre Reinforced polymer subjected to cyclic Loading in compression”**, Proceedings of International Conference on Numerical Modelling Strategies for Sustainable Concrete Structures, Aix en Provence France, 29th May - 1st June 2012
- Faruque, Ali, Sk., and Ramaswamy, A (2011) **“MR Damper Monitoring for Structural Applications: Experimental Study and Comparison with Nonlinear Control”**, Transactions, SMiRT 21, 6<sup>th</sup>-11<sup>th</sup> November, New Delhi, Division V, paper ID#233.
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## TECHNICAL REPORTS:

### A. SPONSORED RESEARCH PROJECTS

(Sponsored projects detailed below have been reviewed annually (in person / online) and funds released thereafter. A technical report has been submitted before the annual review in every instance).

- Dr. Ananth Ramaswamy (Principal Investigator), Dr. P.S. Nair (ISRO-ISAC) and Mr. Shankarayanan (ISRO-ISAC), **Thermal Distortion and Vibration Control of Laminate Composite Structural Members Using Piezoelectric Laminates**, ISRO-IISc Space Technology Cell, (2000-2002).
- Dr. Ananth Ramaswamy (Principal Investigator) and Dr. K.S. Nanjunda Rao, **Experimental and**

- Analytical Study on the Behavior of Fiber Reinforced Plastic (FRP) Composite Reinforcements in Plain and Latex Modified Concrete Beam Elements**, Department of Science and Technology (DST), Government of India, (2000-2003).
- Prof. C.S. Manohar (PI) and Dr Ananth Ramaswamy (Co-PI) “**Nonlinear Earthquake Response Analysis and Structural Optimization of Secondary Piping**”, Department of Science and Technology, Government of India, (2001-2004).
  - Prof. Ananth Ramaswamy (PI), Dr. V. Shastry (VSSC, ISRO) - “**Optimal Design of Axially Symmetrical Stiffened thin Shell Structures Under Buckling Criteria**, ISRO-IISc Space Technology Cell, (2004-2006).
  - Dr. Ananth Ramaswamy (Principal Investigator), Shri C.Sivathanu Pillai (IGCAR Kalpakkam), **Experimental and Analytical study on the Behavior of Reinforced Concrete Beam Column Joints with and without fibers under cyclic loading**, IGCAR-IISc Cell, (2004-2007).
  - Prof. Ananth Ramaswamy (PI) (Dr. G.R. Reddy, RSD, BARC, DAE, Shri Prabhakar, NPCL, DAE) **Characterization of Time dependent deformations in Concrete grades used in Nuclear Power Plants** Board of Research in Nuclear Science, BRNS-DAE, (2004-2007).
  - Dr. Ananth Ramaswamy (Principal Investigator), **Repair Techniques in Reinforced and Prestressed Concrete Structural Components and Assemblages**, CSIR, New Delhi, (2004-2007).
  - Prof, Manohar, Prof. Ananth Ramaswamy & Prof. J.M. Chandra Kishen “**Condition Monitoring of Railway Bridges**”. South Western Railways, Ministry of Railways, Government of India., (2007-2010)
  - Dr. Asif Usmani, C S Manohar, Dr. Ananth Ramaswamy, Dr. P Bhargava (2008-2011), **Fire resistance and repair of earthquake damaged structures**, United Kingdom-India Education and Research Initiative (UKIERI), (2008-2011).
  - Prof. Ananth Ramaswamy (2010-2012), **Damage Assessment, Repair and Retrofit of Reinforced Concrete Girders and Columns Using Fiber Reinforced Polymer Composite and Cementitious Materials**, CiSTUP, IISc (2010-2012).
  - Prof. Asif Usmani, Prof. Manohar, Prof. Ananth Ramaswamy, Prof. JM Chandra Kishen and Prof. Debraj Ghosh **Making Performance Based Structural Engineering for Fire Resistance Attainable**, United Kingdom-India Education and Research Initiative (UKIERI), (2011-2014)
  - Prof. Ananth Ramaswamy, (PI), Prof. Sajeed Krishnan (Co-I) and Prof. C.S. Manohar (Co-I) & (Dr. G.R. Reddy, RSD, BARC, DAE) “**Stochastic Modelling of Hydration Process in Concrete investigations into creep and shrinkage** Board of Research in Nuclear Science, Government of India, (2012-2016).
  - Prof Ananth Ramaswamy, and Prof. JM Chandra Kishen & (Dr. G.R. Reddy, RSD, BARC, DAE) “**Development of a Model for Evaluating Prestress Losses Considering Creep & Shrinkage Losses in Concrete & Relaxation Losses in Steel Over 100 Years**. Board of Research in Nuclear Sciences, Government of India, (2012-2016).
  - Dr. K. Sajeed, (Principal Investigator), Prof. Ananth Ramaswamy (CI), Prof. C.S. Manohar (CI), Shri Tarvinder Singh (P- Collaborator) (2012-2015), **Petro-graphical Chemical and Computational Studies on Concrete at High Temperature**, BRNS, Mumbai, (2012-2016).
  - Prof. Ananth Ramaswamy (PI) and Prof. Debashish Roy (C-PI) Dr. Elizabeth John (R), Dr Donna Mathews, Dr. Santhosh (VSSC, ISRO) “**Response of Adhesive Bonded Laminate Composites to Thermo-Mechanical Loads**, IISc-ISRO, Center for Excellence, (2018-2023).

## **B. CONSULTANCY SERVICES OFFERED (Investigators, Titles, Client, Briefly Nature of work)**

Each consultancy project has a final technical report or the design documents and drawings are approved and submitted post peer review.

- Prof. C.S. Manohar & Prof. Ananth Ramaswamy (1996) “**Dynamical Analysis of Mechanically Launched Bridges**”, RDE-DRDO, GOI, Pune. Task involved developing FE Models for collapsible / foldable Mechanically Launched Bridges of various configurations and conducting free and forced vibration analysis to establish critical velocities for unacceptably high lateral sway induced under Battle Tank traversals. **Status-Completed**.
- Prof. Raghu Prasad, Prof. Ananth Ramaswamy and Prof. J.M. Chandra Kishen (1997-98)”

**Certification of the Quality of Epoxy Bonding Agent used in Segmental Bridge Construction**” M/S EC-L & T, Constructions. Task involved conducting suite of tests on Epoxy Bonding agent to meet various prescribed test protocols specified in CEB-FIP codes, to qualify for segmental girder construction of prestressed concrete girders. The composition of the products was altered by the suppliers over trials to qualify for deployment of the product in segmental girder construction applications. **Status-Completed.**

- Prof. Ananth Ramaswamy and Prof. J.M. Chandra Kishen (1999) “**Adequacy of Shear keys provided for Markandeya Dam Project**”, M/s Koimattur & Bellad Associates. Task involved FE modelling and assessment of critical failure surfaces and efficacy of the shear key design in Dam stability. **Status-Completed.**
- Prof. Ananth Ramaswamy and Prof. J.M. Chandra Kishen (2000) “**Bamboo Arch Roofing and Composite Beams**”, International Association for Bamboo and Rattan (INBAR). Task involved FE modelling and testing of externally bamboo reinforced concrete beams and assessing the structural performance of Bamboo reinforcements in structural concrete applications. **Status-Completed.**
- Prof. B.R. Srinivasamurthy and Prof. Ananth Ramaswamy (2000) “**Design Review of Overhead Water-tank for Koppal, Karnataka**”, IC&T Pvt Ltd., Task involving reviewing designs and drawings of overhead water tanks for compliance with applicable codal provisions. **Status-Completed.**
- Prof. JM Chandra Kishen, Prof. Anant Ramaswamy and Dr. K.S. Nanjunda Rao (2001) “**Design Review of Brigade Tower Software Park Building B, Bangalore**”. Brigade Group. Task involved review of design and drawings of exiting Software technology park Buildings having large span post-tensioned column free slab elements and identify reasons for the damage on various portions of the building and recommend repair and retrofit measures. **Status-Completed.**
- Prof. BR Srinivasamurthy and Prof. Ananth Ramaswamy (2003) “**Retrofit Measures to the Nethravathi steel truss bridge at KM 327 of National Highway 48, Bangalore-Mangalore Section**”, National Highways. Task involved assessing failed section of a bridge and recommend remedial measures for restoration of bridge. **Status-Completed.**
- Prof. BR Srinivasamurthy and Prof. Ananth Ramaswamy (2004-05) “**Rehabilitation of the existing Brick Masonry Arch Bridge across Vrishabhavathy River on Magadi Road, Bangalore**”, BBMP Bangalore. Task involved evaluation of an Old defunct existing masonry arch bridge (built in the 1853) for residual capacity, and provide design, drawings and construction methodology for rehabilitation to enhance the capacity of the bridge. for compliance with applicable codal provisions in a cost competitive manner and operationalize the repaired bridge. **Status-Completed.** **Related paper received Indian Roads Congress C.P.W.D. Medal.**
- Prof. JM Chandra Kishen and Prof. Ananth Ramaswamy(2005) “**Expert review of highway interchange at Hosur road at chainage 16.345, Bangalore**”, NICE, Bangalore. Task involved assessing the designs for pile foundation and post-tensioning work in this highway interchange for compliance with applicable codal provisions. **Status-Completed.**
- Prof. JM Chandra Kishen and Prof. Ananth Ramaswamy(2006)“**Proof Checking of two (Curved) and one straight Road over Bridges at km 16/385 near Bangalore International Airport, Devanahalli**”, L& T Construction. Task involved proof checking of design and drawings for the Bangalore Airport Trumpet interchange Road over Bridge for compliance with applicable codal provisions. **Status-Completed.**
- Prof. Raghu Prasad, Prof. Ananth Ramaswamy and Prof. JM Chandra Kishen (2007) “**Proof Checking of three Road over Bridges at km 508/129, 517/806, 524/263 on NH7**”. M/S Feedback Ventures, Bangalore. Task involved proof checking of design and drawings for the Road over Bridges for compliance with applicable codal provisions. **Status-Completed.**
- Prof. JM Chandra Kishen and Prof. Ananth Ramaswamy (2008) **Proof Checking of Road under Bridge on NH7 Bangalore Salem Section**, National Highways. Task involved proof checking of design and drawings for the Road under Bridges for compliance with applicable codal provisions. **Status-Completed.**
- Prof. ARK Rao and Prof. Ananth Ramaswamy (2008) “**Proof Checking of Designs for underground water tanks at Kavaloor, Benikopa, Thondial and Kavanoor. M/s Karnataka Land Army**, Task involved Assessing the designs and drawings for underground water tanks for compliance with applicable codal provisions. **Status-Completed.**
- Prof. JM Chandra Kishen and Prof. Ananth Ramaswamy (2008) **Proof Checking of Temporary support structures need for casting and moving Road over bridge elements on NH7 at km 524/263.** M/S Feedback Ventures, Bangalore Task involved assessing the design and drawings of Road over Bridge for compliance with applicable codal provisions.

**Status-Completed.**

- Prof. J.M. Chandra Kishen and Prof. Ananth Ramaswamy(2009) “**Proof checking of one (straight) Road over Salem Undelepset Section**” M/s Scott Wilson, Bangalore. Task involved proof checking of design and drawings for the Road under Bridges for compliance with applicable codal provisions. **Status-Completed.**
- Prof. J.M. Chandra Kishen and Prof. Ananth Ramaswamy (2009)**Proof Checking Repair and Rehabilitation of Air India SATS Cargo Complex, BIAL, Bangalore.** M/S Larsen and Toubro, LTD. Task involved assessing the mechanized movement of CARGO in the facility and evolving repairs needed in the structural system for this facility for compliance with applicable codal provisions. **Status-Completed.**
- Prof. J.M. Chandra Kishen and Prof. Ananth Ramaswamy (2009)**Proof Checking of Temporary support structures need for casting and moving Road over bridge elements on NH7 at km 517/806.** M/s KNR Constructions, Bangalore Task involved proof checking of analysis and design and drawings for the Temporary support structures for compliance with applicable codal provisions. **Status-Completed.**
- Prof. J.M. Chandra Kishen and Prof. Ananth Ramaswamy (2009) **Proof Checking of one Road under Bridge and two Road over bridges in the Mangalore Udupi Section,** National Highways. Task involved assessing the analyses and design of the bridge system, reaction blocks and drawings for compliance with applicable codal provisions. **Status-Completed.**
- Prof. J.M. Chandra Kishen and Prof. Ananth Ramaswamy (2010)**Proof Checking of four RC Road Bridge on National Highway near Bijapur Section** M/s KNRCL, Task involved assessing the design and drawings of Road over Bridge for compliance with applicable codal provisions. **Status-Completed.**
- Prof. J.M. Chandra Kishen and Prof. Ananth Ramaswamy (2010) “**Proof Checking of two Prestressed Concrete Road Bridges on National Highway at Bijapur Section** M/s KNRCL, Task involved review of analyses and design and drawings for prestressed concrete Bridges for compliance with applicable codal provisions. **Status-Completed.**
- Prof. J.M. Chandra Kishen and Prof. Ananth Ramaswamy (2010) **Proof Checking of two RC box type Road Bridge on National Highway in Bijapur Section** M/s KNRCL, Task involved review of analyses and design and drawings for Box type concrete bridges for compliance with applicable codal provisions. **Status-Completed.**
- Prof. J.M. Chandra Kishen and Prof. Ananth Ramaswamy(2011) **Design review of Bridge over Krishna River at km 740.** B/S India Infrastructure PVT LTD. Task involved design review of multi-span prestressed box and prestressed girder bridges for compliance with applicable codal provisions. **Status-Completed.**
- Prof. Ananth Ramaswamy (2011) **Design review in-house analysis and design of Tech Box Structures,** M/s Reinforced Earth Systems ltd. The task involved assessing the analysis and design of the box jacked segmental units and the reaction slab-wall system used in construction process for the in-situ segmental road under bridge construction for compliance with applicable codal provisions. **Status-Completed.**
- Prof. J.M. Chandra Kishen and Prof. Ananth Ramaswamy(2011) **Proof Checking of one Road under Bridge (RUB) No. 516C KM 4/939 between Yalahanka and Krishnarajapuram stations** M/s National Highways, Task involved assessing the analyses, design and drawings of the road under bridge design for compliance with applicable codal provisions. **Status-Completed.**
- Prof. J.M. Chandra Kishen and Prof. Ananth Ramaswamy (2012) **Proof Checking of two Road over Bridge (ROB) Chainage 187.024 and Chainage 197.0303 at Kannur-Vengalam-Kutipuram on NH 17** M/s Scott Wilson. Task involved review of analysis, design and drawings of two road over bridges for compliance with applicable codal provisions. **Status-Completed.**
- Prof. J.M. Chandra Kishen and Prof. Ananth Ramaswamy (2012-13) **Proof Checking of three Road over Bridge (ROB) Chainage 101-801, Chainage 83-816 Chainage 131-860 on NH 207.** M/s Transtroy inc. Task involved assessing the design and drawings of Road over Bridge for compliance with applicable codal provisions. **Status-Completed.**
- Prof. Ananth Ramaswamy (2014) **Design review of two in-house analysis and design of Tech Box Structures for Road Interchange at Marthahalli, Bangalore.** M/s Reinforced

Earth Systems Ltd. The task involved assessing the analysis and design of the box jacked segmental units and the reaction slab-wall system used in construction process for the in-situ segmental road under bridge construction for compliance with applicable codal provisions. **Status-Completed.**

- Prof. Ananth Ramaswamy (2014-15) **Evaluate the Design Concept of EcBcDc Technology for High rise Construction**, M/s Chetna Consulting Engineers. Task involved Analyze, and check design and details of typical High-rise structure based on EcBcDc basis and approve this new concept in high rise construction. **Status-Completed.**
- Prof. Ananth Ramaswamy (2016-17) **Proof Checking of 250m Steel Transmission Tower** M/s BEL, Bangalore. Task involved assessment of analysis, design and drawings of tall steel Transmission-line Towers. for compliance with applicable codal provisions. **Status-Completed.**
- Prof. Ananth Ramaswamy (2019-20) **Proof Checking EWS Housing in Ejipura, Bangalore M/s Garuda, Bangalore.** Task involved assessing the analyses and design of three towers of EWR Housing in Eijapura Bangalore for compliance with applicable codal provisions. **Status-Completed.**
- Prof. Ananth Ramaswamy (2020) **Proof. Checking of Trumpet Interchange Road Over Bridge widening Near Bangalore Airport. M/s Vijay Nirmana Construction., Bangalore.** Task involves assessing the design and drawings of the road over bridge sections being developed for widening the sections as an independent unit for compliance with applicable codal provisions. **Status-Completed.**
- Prof. Ananth Ramaswamy (2020) **Proof Checking of Design and Drawings for the construction of the Kempegowda Statue in Bangalore**, M/s Ram Sutar Creations New Delhi. Task involved Review of the analysis, design and drawings for the supporting framework needed to support the façade 108 feet tall statue of Nada Prabhu Hiriyá Kempe Gowda-Coming up at Bangalore International Airport, for compliance with applicable codal provisions. **Status-Completed.**
- Prof. Ananth Ramaswamy (2020) **Proof Checking of Design of Control Cabin and Security room of M/s GAIL India Hubli**”, M/s Sharda Infra Engineers, Hubli. Task involved Review of the design and drawings of the building for compliance with applicable codal provisions. **Status-Completed.**
- Prof Ananth Ramaswamy (2020) **Proof Checking of design and drawings for a G+4 Police Station in Quepem, Goa**, M/s Shivam Infratech. Task involved review of analysis and Design of the building for compliance with applicable codal provisions. **Status-Completed.**
- Prof. Ananth Ramaswamy (2020-21) **Proof Checking of Design and Drawings of Four Lane ROB and it's approaches at LC48E/C on NH205**, in Andhra Pradesh, M/s Krishi Infratech. Task involved review of analysis and Design and Drawings of road over bridges for compliance with applicable codal provisions. **Status-completed.**
- Prof. Ananth Ramaswamy (2021) **Proof Checking of Design and Drawings of the UHPFRC Bridge at Kashedi Gh at, Maharashtra, M/s ILF Mumbai.** Task involved review of analysis, designs and drawings for the substructure and foundations made using conventional RCC, and the super structure comprising of precast dry jointed post tensioned UHPFRC (New Material) U-box elements and conventional cast in-situ RCC slab composite superstructure system. **Status-Completed.**
- Prof. Ananth Ramaswamy (2021) **Proof Checking of Design and Drawings of the UHPFRC Bridge at Kashedi Ghat, Maharashtra, M/s ILF Mumbai.** Task involved review of analysis, designs and drawings for the substructure and foundations made using conventional RCC, and the super structure comprising of precast dry jointed post tensioned UHPFRC (New Material) U-box elements and conventional cast in-situ RCC slab composite superstructure system. **Status-Completed.**
- Prof. Ananth Ramaswamy (2021) **Proof Checking of Design and Drawings of the UHPFRC Bridge at Kullur, Mangalore M/s SDPL, Pune.** Task involved review of analysis, designs and drawings for the substructure and foundations made using conventional RCC, and the super structure comprising of precast dry jointed post tensioned UHPFRC (New Material) U-box elements and conventional cast in-situ RCC slab composite superstructure system. **Status-Completed.**
- Prof. Ananth Ramaswamy (2021) **“Review of Design and Material approval -Spherical**

bearings proposed to use at Signature & Forecourt bridge projects at Kempegowda International Airport, Bangalore”, M/s BBR India Ltd.. Design and details of Material used in Pot bearing used in highway bridges was assessed for compliance with codal standards..**Status Completed**

- Prof. Ananth Ramaswamy (2022) **Proof Checking of Design and Drawings of the UHPFRC Bridges (9 Bridges) Maharashtra, M/s R K Chavan, Contractors, Pune.** Task involved review of analysis, designs and drawings for the substructure and foundations made using conventional RCC, and the super structure comprising of precast dry jointed post tensioned UHPFRC (New Material) U-box elements and conventional cast in-situ RCC slab composite superstructure system. **Status-in progress**
- Prof. Ananth Ramaswamy (2022) **Proof Checking of Design and Drawings of the UHPFRC Bridges (3 Bridges) Maharashtra, M/s SDPL, Pune.** Task involved review of analysis, designs and drawings for the substructure and foundations made using conventional RCC, and the super structure comprising of precast dry jointed post tensioned UHPFRC (New Material) U-box elements and conventional cast in-situ RCC slab composite superstructure system. **Status-in progress**

## RESEARCH CONFERMENTS

### Ph.D.

- Padmarajaiah, S.K. – **“Influence of Fibers on the Behavior of High Strength Concrete in Fully / Partially Prestressed Beams: An Experimental and Analytical Study”**, Ph.D., Status: Completed in 2000. [*Presently employed with Goodyear Tire Akron Ohio USA as a Sr. Engineer*]
- Ahlawat, A.S. - **“Intelligent Optimal Control of Earthquake or Wind Induced Flexural and Torsionally Coupled Vibrations in Buildings”**, Ph.D., Status: Completed in 2003 [(i) *Thesis awarded Sir Vithal N. Chandavarkar Memorial Medal of IISc, for Progress in Industry or Human Suffering;*(ii) *Best Thesis Award of the Indian National Academy of Engineers, New Delhi 2003-04.*]. [*Presently employed with ISRO ISAC, Bangalore as a Scientist G*]
- Thomas, J. – **“Behavior of Partially Prestressed Concrete T-Beams having steel fibers over partial or full depth-An experimental and analytical study”** Status: Completed 2005. [*Presently employed with CUSAT, Cochin, as a Professor*]
- Ali, Sk. Faruque - **“Semi-active Control of Earthquake Induced Vibrations in Structures using MR Dampers: Algorithm Development, Experimental Verification and Benchmark Applications”** Status: Completed 2008. [*Presently employed with IIT Madras, as an Associate Professor*]
- Hemalatha, B. **“Studies on Characterization of Self Compacting Concrete: Microstructure, Fracture and Fatigue”** (jointly with Prof. J.M. Chandra Kishan) Status Completed 2012. [*Presently employed with CSIR-SERC, Chennai, Sr. Scientist E*]
- Guruprasad, Y.K. **“Repair and Retrofit Strategies for Structural Concrete against Thermo-mechanical Loadings”**, Status: Completed 2015. [*Presently employed with MSRIT, at Bangalore as an Associate Professor*]
- Biswal, Suryakant **“Uncertainty based damage identification and prediction of long-time deformation in concrete structures”**. Status: -. Completed 2016. [*Presently employed with s a Post-Doctoral Fellow, in University of Exeter, U.K.*]
- Balagopal, R. **“Experimental and Analytical Studies on Damage Detection and Failure Analysis of Transmission Towers and Tower like Structures.”** ERP Candidate from CSIR-SERC, Chennai (Organization guide- Dr. G.S .Palani) Status-Completed 2017 [*Presently employed with CSIR-SERC, Chennai, as a Principal Scientist*]
- Reddy Harinadha D. **“Time Dependent Deformations and High Temperature Effects on Different Types of Concrete: Experimental and Numerical studies.** Status: Completed 2017. [*Presently employed with BMS School of Architecture as an Associate Professor*]
- Pandey, Mrityunjay – **“Semi-active Control of Earthquake Induced Vibrations in Building Structures using MR Dampers: Algorithm Development and Benchmark Application”**, Status: Completed 2018 [*Presently employed with Associate Professor, Mala Reddy College,*

Hyderabad].

- Pal, Biswajit – **“Response of Structural Concrete Elements to Thermo-Mechanical Loads: a mesoscale approach”** Status in Progress (Joined 2017, *Comprehensive exam completed 2019*).
- Rajiv Kumar Ranjan **“Response of Structural geopolymer Concrete: A multiscale approach”**, Status in Progress. (Joined 2018, *Comprehensive exam completed in January 2021*).
- Himanshu S. **“Response of Adhesive bonded Honeycomb Composites to thermo-mechanical loads”** Status in progress (Joined 2019, *Comprehensive exam completed in July 2021*)
- Shubham Sharma **“Response of Adhesively bonded Laminate Composites to thermo-Mechanical Loads”** Status in progress, (Joined 2019, *Comprehensive exam completed in July 2021*).
- Pradeep S **“A Multiscale approach to modelling the response of flowing Cementitious composites in 3D printed concrete**, Status in progress, (Joined 2019, *Comprehensive exam Completed in August 2021*).
- Pranjal Chechani Vishnu Kumar **“Development of procedures for Carbon sequestration in fresh concrete”**, in progress (Joined 2020, *Comprehensive exam Completed in June 2022*).
- Upadhyayulu M.M.A. Saigopal . **“Rate dependent modelling of concrete”** (Joined 2022, PMRF)

### M.Sc (Engg.) / M.Tech (Res).

- Jagadisha, M.N., – **“Effectiveness of Diaphragms in Lateral Distribution of Live Loads in Right and Skew Composite Bridges”**, Status: Completed in 1998 [*Presently employed with Tata Elexi, Bangalore*].
- Venugopal, S., – **“A Strain Rate Dependent Elasto-Viscoplastic Model for Plain Concrete in Compression”**, Status: Completed in 1998.
- Srinath, K. – **“Studies on Nonlinear Analysis of Steel Fiber Reinforced Concrete Structural Elements”**, Status: Completed in 1998.
- Jha, Pranava K. – **“A Strain Rate Dependent Model for Plain and Reinforced Concrete”**, Completed in 2001.
- Bhattacharjee, Sudip – **“Geometric Nonlinear Effects on the Dynamic Response of Suspension Bridges Due to Earthquake Excitations”**, Status: Completed in 2001 [*Completed Ph.D. in U.S.A. and employed as an Assoc. Professor in Auburn Alabama*].
- Bansal, Alok – **“Thermal Distortion and Vibration Control of Composite laminates Using Piezoelectric Elements”**, M.Sc. (Engg.) Status: Completed in 2002 [*Presently employed with BHEL India at Delhi*].
- Reddy, Harinadha **“Time Dependent Deformations in Normal and Heavy Density Concrete”** Status: Completed in 2009 [*continued for Ph.D in IISc and completed in 2017 and employed with BMS School of Architecture, Bangalore as Assoc Professor*]
- V. Svetha **“Numerical Modelling of Reinforced Concrete Structural Elements and Assemblages Exposed to Thermo-mechanical Loading”**, Status: Completed 2017. [*Pursuing her Ph.D. in Michigan State University USA*]
- Waghmare, Ambadas **“Behavior of RC elements under Multi-axial loads”**, Status Completed 2020 [*Presently employed with L & T Bombay*].
- Akash Yadav **“Condition Assessment of Bridge Structures”**, Status: in progress, joined 2020.

### **TEACHING and PROJECT GUIDANCE:**

#### Courses taught over the years:

- Structural Optimization 3:0 credits, Elective Course, (Offered alone-till 2015)
- Optimization Methods 3:0 Credits Core for TSE & Elective for others (Offered alone Since 2016 to 2021).
- Bridge engineering 3:0 Credits, Elective Course, (Offered alone Since 2006)
- Limit State Design of Reinforced Concrete 3:0 credits, Core Course, (Offered alone, 1999-2000)
- Mechanics of Concrete Design 3:0 Credits, Core Course (Offered alone, Since 2020)
- Prestressed Concrete 2:0 Credits, Elective Course, (Offered alone, 1999-2002)
- Solid Mechanics 3:0 credits, Core Course, (Offered alone, 2001-2004)

- Advanced Reinforced Concrete and Prestressed Concrete, 3:0 Credits, Elective Course, (offered alone, 2002-2004)
- Plasticity, Viscoelasticity and Visco-plasticity 3:0 credits, Elective Course, (offered alone, 2004-2005)
- Theory of Plates and Shells, Core course, (offered alone, 2006-2008)
- Nonlinear Mechanics, 3 Credits, Core Course, (offered Jointly with Prof. J.M. Chandra Kishen and Prof. C.S. Manohar, 2006-2008)
- Stability of Structures, Core course, (offered alone, 2004-2006)
- Theory of Plasticity 3 credits ( Offered alone 2017-2019)
- Mechanics of Structural Concrete 3 Credits (Offered alone since 2020)
- Stability and Design of Steel Structures 3 credits (Offered alone Jan April 2022)

#### M.E. project Guidance:

- Rath, Debi Prasad, – **“Shape Optimization of R.C.C. Continuum Structural Elements”**, Status: Completed in 1997.
- Nimaje, Y.T. – **“Study of Parameters of Genetic Algorithms for Optimization of Trusses”**, Status: Completed in 1997.
- Kumar, Brajesh – **“Control Strategies for Simply Supported Bridges”**, Status: Completed in 1998.
- Kumar, Ravi – **“Shape Optimization of Prestressed Concrete Beams”**, Status: Completed in 1998.
- Mallick, Shantanu Basu – **“System Optimization of Road Bridges”**, Status: Completed in 1998.
- Prakash, Shankar – **“Finite Element Analysis of Prestressed Concrete Beams Having FRP Tendons”**, Status: Completed in 1998.
- Kotadia, Umesh - **“Effect of Parapets, Railings and Continuity on the Live Load Moment Distribution Factors in Composite Slab on Girder Bridges”**, Status: Completed in 2000.
- Kumar, Naresh – **“Shape Optimization of Prestressed Box Girder Bridge Deck System”**, Status: Completed in 2001.
- Kumar, Likhar Sushant – **“Behavior of Steel and Fiber Reinforced Plastic (FRP) Reinforced Concrete Beams Containing Fibers: An Experimental and Analytical Study”**, Status: Completed in 2001. (Jointly with Dr. K.S. Nanjunda Rao)
- Kumar, Akshaya- **“Effectiveness of GFRP Fabrics as a Repair Material for RC Beams”**, Status: Completed in 2002.
- Kumar, Phanindra **“Behavior of GFRP rebar Reinforced Concrete Beams with fibers”**, status: Completed in 2003(Jointly with Dr. K.S. Nanjunda Rao)
- Nahak, Mahendra K., **“Shape optimization of Post-Tensioned Prestressed Concrete Slab system”**, Status: Completed in 2004.
- Anil, M.K. **“Optimal Passive Structural Vibration Control of Secondary Piping Structures”** Status: Completed in 2004.
- Prasad, Aditya. **“Optimal Positioning of Seismic Restraint Devices for Power Plant Piping Systems”** Status: Completed in 2005 (Jointly with Prof. C.S. Manohar).
- Shailaja, B. **“Experimental and Analytical Studies on creep in normal and heavy density concrete”** Status: Completed in 2006.
- Chandra, Vishwanath **“Experimental and Analytical studies on Beam Column Joints with and without fibers”**, Status: Completed in 2006.
- Ahmad, M.A., **“Repair and retrofit of reinforced concrete members”** Status: Completed in 2006.
- Ratna Kumar Jalli **“Experimental and Analytical studies on Beam Column Joints with and without fibers under cyclic loading and assessment of repair”** Status: Completed in 2007.
- Saji, K.P. **“Experimental and Analytical Approaches to Steel Bridge Identification”**, Status: Completed 2009.
- Murthy, P.C.R. **“Strut and Tie Model based Repair and Retrofit of Structural Concrete”**.

**Status:** Completed 2009.

- Venkatasubaiiah “**Behavior of Concrete under Thermal and Mechanical Loads**” Status: Completed 2010
- Gore, Jayesh “**Nonlinear Finite Element Analysis of SFRC elements**”, Status Completed 2011.
- Talukdar, Johnathan “**FLC based Vibration Control of composites using Piezo elements**”, Status: Completed 2011
- Mohamad Islam “**Dynamic Analysis of Vehicle-Structure Interactions in Railway Bridges**”, Status: Completed 2012
- Anil Koushik “**Nonlinear Finite Element Analysis of Post-Tensioned Concrete Girders**” Completed 2012
- S Sri Vishnu “**Nonlinear Finite Element Analysis of Cable Stayed Bridges**” Completed 2012
- K Chandu “**Shortest time to travel from Origin to Destination Using BMTC services**” Completed 2013
- Krishnamurthy B “**Parametric study of lateral thermal track buckling using Beam type and frame type approaches**” Completed 2013
- Vinod Kumar Rishidev “**Behavior of Reinforced Concrete Square short column with FRP wrapping under uniaxial load**” completed 2013.
- Aakash B S “**Structural Optimization of Radio Telescope support truss structure using Genetic Algorithms**” Completed 2013.
- Abhishek Das “**Estimation of creep and shrinkage strains in concrete**” completed 2014
- Sandeep “**Performance of CFRP as repair material for fire damaged concrete**” Completed 2014.
- Chandan Ashish “**Optimization of Multi-mode Routes in Minimum time in Bangalore city**” Completed 2015
- Ravi Sharma “**Degradation of Concrete due to Ingress of Chemical Ions**” Completed 2017.
- Bharanidharan “**Effect of Temperature on Concrete Degradation,**” Completed 2017.
- C. Chandrasekher “**Creep and Shrinkage studies in SCC concrete**” Completed 2018
- Srikanth Sharma “**Investigation on Moisture Migration into Concrete**” Completed 2018
- Saurabh Saxena “**Effect of High Temperature on SCC Concrete**” Completed 2018
- Bhat Pranmoy “**Thermo-Mechanical studies on Concrete**” Completed 2019.
- Jayaprakash, N., “**Migration of Moisture in Concrete**”, in Progress-to complete in July 2021.
- Sukanta Ghatak, “**Mechanistic Modelling of FRC**”, in Progress-to complete in 2021.
- Saurav Kumar “**Seismic Damage Assessment of RC Buildings** in progress
- Deepak Mahadeshwar “**Response of Functionally graded Materials** in progress.

## REVIEWER FOR FUNDING AGENCIES

- SERB & Dept. of Sci. and Tech., India
- CSIR, India.
- CEFIPRA, India
- Austrian Research Foundation, Austria.
- Georgian National Science Foundation. IUSSTF, India

## REVIEWER FOR REFFEREED JOURNALS

- Journal of Structural Engineering, ASCE
- Journal of Bridge Engineering, ASCE
- Structural Journal, ACI
- Mechanical Systems and Signal Processing, Elsevier
- Engineering Structures, Elsevier.
- Composites B, Elsevier
- Journal of Sound and Vibration, Elsevier
- Smart Structures and Materials, IOP
- Construction Materials, Inst. of Eng., U.K.
- Earthquake Engineering and Structural Dynamics, Wiley.
- Journal of Engineering Mechanics, ASCE
- Journal of Materials in Civil Engineering, ASCE
- Materials Journal, ACI
- Construction and Building Materials, Elsevier
- Cement and Concrete Composites, Elsevier
- Finite Element in Analysis and Design, Elsevier.
- AIAA Journal
- Evolutionary Algorithms and Artificial Intelligence, Elsevier
- Journal of Structural Control and Health Monitoring, Wiley
- Materials and Structures: RILEM, Springer.

## Reviewer / Examiner for Ph.D. & M.S. Thesis:

- IIT Delhi; IIT Madras; IIT Kharagpur; IIT Mumbai; IIT Guwahati, NIT Suratkal, BITS Pilani; IIT Hyderabad, CUSAT, Cochin; Anna University, Chennai and IISc Bangalore, RMIT, Melbourne Australia.

## EVENTS ORGANIZED & Delivered Talks (International & National Conferences and Workshops)

- **7<sup>th</sup> Asia-Pacific-Network of Centers for Research in Smart Structures Technology** (ANCRiSST 2012) Workshop on 27-28<sup>th</sup> July 2012 at J.N. Tata Auditorium, IISc. Bangalore. (Co-organized with Prof. S. Gopalakrishnan of Aerospace Engineering Department).
  - Biswal, S.K. and Ramaswamy, A. (2012) "Damage Identification in Reinforced Concrete Beams", Proceedings of the ANCRISRT Conference, 27-28 July, IISc Bangalore.
- **5<sup>th</sup> Asia Pacific Summer School (APSS 2012) on Smart Structures Technology** 22<sup>nd</sup> July to 11<sup>th</sup> August 2012, at Civil Engineering and Aerospace Engg. Department, IISc. Bangalore (Co-organized with Prof. S. Gopalakrishnan of Aerospace Engineering Department)
  - Delivered Lectures on "Optimal Control" at the 5<sup>th</sup> Asia Pacific Summer School on Smart Structures Technologies, 22<sup>nd</sup> July to 11<sup>th</sup> August 2012, at IISc Bangalore, India.
- **4<sup>th</sup> Indian Conference on Applied Mechanics (INCAM, 2019), 3<sup>rd</sup> -5<sup>th</sup> July 2019.** (Co-Organized with Prof. M.S. Bobji) of Mechanical Engineering.
  - Biswajit Pal and Ananth Ramaswamy (2019) "**Meso-Scale Model for Concrete at both Ambient and elevated temperatures**", Proceedings of INCAM 2019, 3<sup>rd</sup> - 5<sup>th</sup> July 2019 at J.N. Tata Auditorium, IISc Bangalore.
  - Waghmare, A., and Ananth Ramaswamy (2019) "**Non-linear Analysis of Reinforced Concrete including Bond Slip Effects**" Proceedings of INCAM 2019, 3<sup>rd</sup> - 5<sup>th</sup> July 2019 J . N . Tata Auditorium, IISc, Bangalore.

## AICTE-QIP / ISTE / NPEEE Short Term Courses:

### Organized and Delivered Lectures:

- "**Optimization: Theory and Applications in Engineering**", AICTE - QIP Program for college teachers, held from 22<sup>nd</sup>-27<sup>th</sup> September 1997 at IISc. Delivered Lectures on "Linear and Non-Linear Programming", "Integer Programming" and "Genetic Algorithms in Structural Optimization", and edited course notes.
- "**Structural Damage Assessment, Vulnerability and Retrofit**", MHRD-NPEEE short term course from 5<sup>th</sup> –17<sup>th</sup> July 2004, at IISc, delivered a series of lectures covering topics in Seismic Resistant design including concepts of ductility, detailing, repair/rehabilitation and retrofit; seismic resistant bridge forms and evaluation of existing bridges; cost-benefit analysis of repair/rehabilitation and retrofit; and edited the course notes.
- "**High Performance Cement and Fiber Reinforced Composites**", a one-day International symposium on 13<sup>th</sup> December 2005, having invited talks by international experts covering advances in fiber reinforced concrete, high performance concrete and composites for repair. Delivered a lecture on "Flexural and shear behavior of fiber reinforced partially prestressed concrete beams".

## Delivered Guest Lectures / Invite Talks / Workshop Lectures:

- Delivered a lecture on "**Vibration in Bridges**" at **R&D Engineers**, DRDO, Pune, October 1995.
- "**Finite Element Analysis of Reinforced Concrete**", in Short Term AICTE-QIP Course on "*Fracture Mechanics of Concrete*", Coordinated by Prof. B.K. Raghu Prasad at IISc, 9<sup>th</sup>-14<sup>th</sup> September 1996.
- "**Concrete Plasticity**" and "**Nonlinear Finite Element Analysis of Concrete**", in Short Term QIP-AICTE Course on "*Nonlinear Finite Element Analysis*", Coordinated by Prof. P.C. Pandey at IISc., 17<sup>th</sup>-22<sup>nd</sup> November 1997.
- "**Reinforced Concrete Design and Detailing for Ductility**", in Short term QIP-AICTE course on "*Structural Design for Dynamic Loads*", Coordinated By Prof. B.K Raghu Prasad at IISc, 19<sup>th</sup>-23<sup>rd</sup>

January 1998.

- Delivered a lecture on **Visco-elastic and Visco-plastic modeling of materials**, SASE-DRDO, Chandigarh. November 1998.
- **“FRC Composites”**, in ISTE Short Term Course on “Advances in Cementitious Materials and Testing”, Coordinated by Dr. K.U. Muthu and Dr. M.R. Kalagal at M.S. Ramaiah College of Engineering, Bangalore, 14<sup>th</sup>-28<sup>th</sup> March 1998.
- **“Constrained NLP Problems”** and **“Genetic Algorithms”**, ISTE Short Term Course on Systems Techniques and Applications to Civil Engineering”, Coordinated by Prof. V.P. Huggi, at BLDEA Vachana Pitamaha Dr. Halakatti College of Engineering and Technology, Bijapur, 28<sup>th</sup> December 1998 – 9<sup>th</sup> January 1999.
- Delivered the Concrete Day Lecture on **“Developments in Concrete Technology”**, Indian Concrete Institute-Karnataka Chapter, Bangalore, 7<sup>th</sup> September 2000.
- **“Concrete Elements with Fibers”**, in Short Term AICTE Course on *“Advanced Techniques and Standards in Testing of Materials”*, Coordinated by Dr. V. Ramarajan, MVJ college of Engineering, Bangalore, 26<sup>th</sup>-30<sup>th</sup> March 2001.
- Delivered a set of lectures on **“High Performance Concrete”**, “Damage Detection and Assessment of Concrete Structures”, “Fiber Reinforced Concrete” and “Repair and Assessment of Concrete Structures” at BARC, Mumbai, 14<sup>th</sup> February 2002.
- Delivered a Lecture on **“Vibration Control”** at Sida Ganga Institute of Technology, Tumkur, Karnataka, 21<sup>st</sup> February 2003.
- Delivered a Lecture on **“Role of Fibers in Structural Concrete”** at a workshop Organized by Association of Consulting Civil Engineers, Bangalore 2<sup>nd</sup>-3<sup>rd</sup>, January 2004. Delivered a Lecture on “Fiber Reinforced Concrete”, INSTRUCT Program for Professional Engineers, 28<sup>th</sup> June 2004.
- Delivered a Lecture on **“Genetic Algorithms in Structural Optimization”** AICTE-ISTE Short term Technical Program on “Soft Computing Tools in Civil Engineering”, organized by Dr. K.U. Muthu and Mr. H. Narendra at MS Ramaiah Institute of Technology, 9<sup>th</sup>-14<sup>th</sup> August 2004.
- Lectures in the course on **“Earthquake Resistant Design”**, in the semester long National Program on Earthquake Engineering Education (NPEEE) program in collaboration with Dr. J.M. Chandra Kishen, August-December 2004
- Delivered a Lecture on **“Influence of Fibers in Performance of Prestressed Concrete Beams”**, Institute of Structural Engineering (IBK), ETH Zurich, November 11<sup>th</sup>, 2004.
- Delivered a Lecture on **“Overview of Research Interests”**, Institute of Structural Engineering (IBK), ETH Zurich, December 1<sup>st</sup>, 2004.
- Delivered a Lecture on **“Principles of Concrete Mix Design”**, INSTRUCT Program for Professional Engineers, 24<sup>th</sup> August 2005.
- **Ductility-Material, Sectional, structural: Seismic Sustenance** and “Seismic Response of Soil-Structure Systems”, in Short Term AICTE-QIP Course on “Earthquake Resistant Design”, Coordinated by Dr. K.S. Nanjunda Rao at IISc, 17<sup>th</sup>-21<sup>st</sup>, January 2005.
- **“Seismic Safety Assessment, Vulnerability and Retrofit”**, Home Ministry-NPCBEERM short term course from 13<sup>th</sup> June–16<sup>th</sup> July 2005, at IISc, coordinated by Prof. B.K. Raghu Prasad, delivered a series of lectures covering topics in Seismic Resistant design including concepts of ductility, detailing, repair/rehabilitation and retrofit; seismic resistant bridge forms and evaluation of existing bridges; Vulnerability and Loss Estimation; Structural Vibration Control.
- **“Earthquake Resistant Design”** MHRD-NPEEE short term course, 9<sup>th</sup>-13<sup>th</sup> October 2006, at IISc, coordinated by Prof. J.M. Chandra Kishen, delivered a series of lectures covering topics in Seismic Resistant design including concepts of ductility, detailing, repair/rehabilitation and retrofit; seismic resistant bridge forms and evaluation of existing bridges; Vulnerability and Loss Estimation; Structural Vibration Control.
- **“Seismic Resistant Design of Masonry and Reinforced Concrete Buildings”** National Program on Earthquake Engineering Education (NPEEE) short term course, 8<sup>th</sup>-13<sup>th</sup> January 2007, at IISc, Coordinated by Dr. K.S. Nanjunda Rao, delivered a series of lectures covering topics in “Seismic Resistant design including concepts of ductility, & detailing”; “Structural Vibration Control”.
- **Courses on “Computational Structural Mechanics”** and “Structural Design for Seismic Loads and Retrofit Methods”, Delivering Lectures in the Semester long National Program on Earthquake Engineering Education (NPEEE) program in collaboration with Dr. J.M. Chandra Kishen,

February-June 2007.

- **“Engineering Optimization”** at a workshop on Computer Aided Transportation Planning and Traffic Engineering, 7<sup>th</sup>-11<sup>th</sup> December 2009 at Civil Engineering Department IISc.
- Delivered a lecture on **“Detailing in Special Structures”** INSTRUCT Program for Professional Engineers, 17<sup>th</sup> April 2008.
- Lecture on **“Research in Mechanics of Structural Concrete and Vibration Control”** at Civil Engineering Department, IIT Madras, 17<sup>th</sup> December 2008.
- Lecture on **“Repair and Retrofit of Structural Concrete”**, University of Edinburgh, September 18, 2009.
- Delivered a lecture on **“Role of Admixtures in Normal Concrete and SCC Mix Design”** at a workshop on “Advances in Concrete Mix Design and Usage of Admixtures” organized by BMTPC & Dr. Fixit Institute on 17<sup>th</sup> December 2009 at Bangalore.
- Delivered a lecture on **“Structural Control and Condition Assessment”** at the 3<sup>rd</sup> Asia Pacific Summer School on Smart Structures Technologies July 15<sup>th</sup> - August 4<sup>th</sup>, 2010, University of Tokyo, Japan.
- Delivered an Invited Talk **“Creep and Shrinkage Models for Concrete”**, at the Indo-US Science and Technology Forum Workshop Organized by CBRI Roorkee 16-18 December 2010.
- Delivered lectures on **“Optimization and Vibration Control”** in the 4<sup>th</sup> Asia Pacific Summer School on Smart Structures Technologies, 16<sup>th</sup> August 2011 at Tongji University, Shanghai, China.
- Delivered Lectures on **“Optimal Vibration Control”** at the 5<sup>th</sup> Asia Pacific Summer School on Smart Structures Technologies, 22<sup>nd</sup> July to 11<sup>th</sup> August 2012, at IISc Bangalore, India.
- Delivered an Invited Talk **“Mix Design of Self Compacting Concrete”**, at the Advanced Materials for Energy Efficient Buildings Workshop, Organized by CBRI Roorkee at Delhi, 13-15 February 2013.
- Delivered a Talk on **“Response of Concrete at Elevated Temperatures”**, at Workshop on Nano Technology in Concrete, 13-14 March 2013, at CBRI Roorkee.
- Delivered an Invited Talk entitled **“Hygro-thermo-chemo-mechanical Model for Creep in Concrete”**, at a Special Symposium in Honour of Prof. G.Z. Voyiadjis at KAIST, Seoul, Korea, 24<sup>th</sup> March 2016.
- Delivered a Talk on **“Modelling of Creep in Concrete”**, 4<sup>th</sup> March 2017 at Civil Engineering Department, IIT Kanpur.
- Delivered a Guest Lecture **“Hygro-Thermo-Mechanical Modelling of Concrete”**, at the Institute of Structural Engineering (IBK), ETH Zurich, Switzerland 26<sup>th</sup> September 2018.
- Delivered a Guest Lecture on **“Hygro Thermo-Chemo Mechanical Modelling of Concrete”** at IIT Roorkee 24<sup>th</sup> March 2019.
- Delivered an ONLINE Invited Lecture at CSIR-SERC on **“Structural Health Monitoring”** August 18<sup>th</sup>, 2020.
- Delivered an ONLINE Invited Talk **“Thermo-Mechanical Response of Concrete”**, at National Teacher’s Training Institute, Chandigarh on 3<sup>rd</sup> September 2020.
- Delivered an ONLINE Invited Lecture at MSRIT, Bangalore on **“Hygro-thermo-Mechanical Modelling of Concrete”** on 12<sup>th</sup> September 2020
- Delivered an ONLINE Invited Lecture at GB Institute, Pant Nagar **“On Structural Health Monitoring”** on 7<sup>th</sup> December 2020
- Delivered an ONLINE Invited Lecture on **“Structural Health Monitoring: Influence of Materials”** at NIT Sikkim on 2<sup>nd</sup> March 2021.
- Ramaswamy, A. **“Achievements in civil structures and engineering in India”**, Bangalore Chapter of INAE, 15<sup>th</sup> September 2021, (ONLINE)
- Ramaswamy, A. **“A Hygro-thermo mechanical model for concrete over different length scales”**, IISc- Tokyo University of Science (TUS), exchange program (ONLINE)., 30<sup>th</sup> September 2021(ONLINE)
- Ramaswamy, A. **“A Hygro-Thermo Chemo-Mechanical Model for Concrete”**, Invited Talk, at AICTE-QIP Workshop on “Smart Cities: Opportunities and Challenges” Organized by Dr. Nimmi Gupta, NITTTR Chandigarh, 26<sup>th</sup> October 2021. (ONLINE)
- Ramaswamy, A., **“Condition Assessment and Health Monitoring of Bridge Girders”**,

Organized by Dr. Piyali Sengupta, International Workshop on Smart and Resilient Bridges, 4<sup>th</sup> December 2021. (ONLINE).

- Ramaswamy, A “**Active and Semi-active Vibration Control Strategies.**”, Invited as a Keynote Speaker at the 17th Symposium on Earthquake Engineering (17SEE) from 17th to 19th November 2022, Organized by Earthquake Engg IIT Roorkee with the association of Indian Society of Engineering Technology (ISET).