



BIOGRAPHICAL SKETCH: PROF. ANANTH RAMASWAMY

Professor, Department of Civil Engineering,
Indian Institute of Science, Bangalore 560012 India

Phone: +91-80- 22932817 / 23608850
E-mail: ananth@iisc.ac.in /
ananthr63@gmail.com or yahoo.com
Mobile +919845967047

Summary:

Prof. Ananth Ramaswamy's research interests are in the areas of 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 structural control, composites and smart materials technology.

Appointment:

- Professor (July, 2009 – to date), Department of Civil Engineering, Indian Institute of Science, Bangalore, 560012
- *Guest Professor* (18th October, 2004- 13th January 2005) Institute of Structural Engineering (IBK), 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, Bangalore, 560012
- *Assistant Professor* (May, 1995 – May, 2001), Department of Civil Engineering, Indian Institute of Science, Bangalore 560012
- *Visiting Lecturer* (January, 1994 – May, 1995), Department of Civil Engineering, Indian Institute of Technology, Kharagpur, West Bengal, India

Education:

- **Ph.D.**, Civil Engineering, May 1992, Louisiana State University, Baton Rouge, LA
- **M.S.**, Civil Engineering, December 1986, University of California, Davis, CA
- **B. Tech.**, Civil Engineering, July 1985, Indian Institute of Technology, Madras, India

Awards & 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)]
- Best reviewer award, Journal of Bridge Engineering, American Society of Civil Engineers (ASCE), 2009.
- Best reviewer award, Journal of Materials in Civil Engineering, ASCE, 2015.

Editorial Services for refereed Journals:

- Associate Editor: ***Journal of Structural Engineering***, American Society for Civil Engineers (ASCE), Since January 2012

- Associate Editor ***Journal of Bridge Engineering***, American Society for Civil Engineers (ASCE), May 2010–November 2017.
- Associate Editor ***Sadhana***, An Academy of Engineering Science (India) journal, Since October 2013

Services rendered for IISc., Senate and Department

- Chairman, Project Management Group (PMG) - Since August 2015.
- M.Sc (Engg.) Thesis examined (for students in Mechanical and Aerospace Engg.)
- Served on the comprehensive exam/general test Board (for students in Civil, Mechanical, and Aerospace Engg.).
- Convener, Department Curriculum Committee (DCC) (March 2014–March 2017).
- Coordinator, Organizing Cultural programs in IISc Campus (March 2018–19) (Engage with SPICMACAY and Campus cultural groups to organize cultural programs for the Students and Campus community on a monthly basis.

Membership in Evaluation/Assessment Committees:

- Member, Project Assessment Committee (PAC) in the area of Civil and Environmental Engineering, of the Science and Engineering Research Board (SERB) / Department of Science and Technology (DST), Government of India, June 2012–15 and 2015–18.
- Member, Project Assessment Committee (PAC) Early career Research award (ECR) and post-doctoral fellowship (PDF) (Engineering Sciences-Civil), of the Science and Engineering Research Board (SERB) /Department of Science and Technology (DST), Government of India 2015–18
- Member, Project Assessment Committee (PAC) International Division (Engineering Sciences-Civil), of the Department of Science and Technology (DST), Government of India, Since 2016.
- Member, Project Assessment Committee (PAC) Empowerment and Equity Opportunities for Excellence in Science (EMEQ) (Engineering Sciences-Civil), of the Science and Engineering Research Board (SERB) /Department of Science and Technology (DST), Government of India. Since 2016.
- Member Research Council, CSIR-SERC, Chennai, August 2013 – April 2017.
- Visitor's Nominee, for Faculty selection committees in old NIT's May 2013 to April 2016
- Member, Selection Committee for hiring of Academic faculty at *I.I.T Hyderabad* (March 2011, November 2011, January 2014, December 2014), *I.I.T Kharagpur* (April 2014, December 2014), *IIT Bombay* (March 2016, October 2017), *IIT Delhi* (December 2016, June 2017), *IIT Kanpur* (March 2017), *IIT Jammu* (September 2017).
- Expert Member, Promotion evaluation Committee of ISRO (Civil Engineering–Meeting once in 6 months to a year).
- Expert Member, Karnataka Vision Group for Supporting Projects in the State (Evaluating Proposals once a year)

Publications:

A. Papers in Refereed Journals (Published or under review)

[Google Scholar Citation 1232, h-index 21, i10-index 31][Scopus h-index 16 citations 713]

1. Guruprasad, Y.K. and Ananth Ramaswamy (2018) "Micromechanical analysis of concrete and reinforcing steel exposed to high temperature", *Construction and Building Materials*, Volume 158, 2018, Pages 761-773
2. Guruprasad, Y.K. Ananth Ramaswamy, Sajeev, K. (2018) "Thermal effect on micro properties of granite aggregate in concrete", *ACI Materials Journal*, V. 115, No. 1, January 2018, 77-88.
3. Reddy, D. Harinadha 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*, JVolume 14, November 2017, Pages 103-114
4. Biswal, S.K. and Ananth Ramaswamy (2017) "Uncertainty based model averaging for long time deformation of concrete structures", *Construction and Building Materials*, V153, 2017, 469-480.
5. Biswal, S.K. and Ananth Ramaswamy (2017) "Finite Element Model Updating of Concrete Structures Based on Imprecise Probability", *Mechanical Systems and Signal Processing*, Volume 94, 15 September 2017, Pages 165-179.
6. 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.
7. Hemalatha, T. Ananth Ramaswamy, and Kishen, J.M.C. (2017) "Investigation on the relationship between microstructure and fracture properties of Self Compacting Concrete (SCC)", *ASTM, Advances in Civil Engineering Materials ACEM-2017*, v6 (1), 480-503, doi: 10.1520/ACEM20170055.
8. Balagopal, R., Ananth Ramaswamy, G.S. Palani and Prasad Rao "Bolt Slip Model for Damage Detection of Bolted Connections in Transmission Line Towers", *International Journal of Steel Structures*, Springer, Under Review SSIJ-D-17-00086, Since March 2017.
9. Guruprasad, Y.K. and Ananth Ramaswamy "Damage assessment of plain and reinforced concrete exposed to high temperature using nondestructive techniques", *Measurement* (Under review Since July 2017, MEAS-S-17-01934).
10. Guruprasad Y.K. Ananth Ramaswamy, "Thermal insulation of concrete and the repair material CFRP exposed to high temperature and different time intervals" *Construction and Building Materials*, Elsevier, (under review, Since April 2018, CONBUILDMAT-D-18-02844).
11. Balagopal, R., Ananth Ramaswamy, G.S. Palani and Prasad Rao Structural "Assessment Of Transmission Line Tower Through Prototype Testing With Modified Bolted Connection Model", *Advanced Steel Construction - an International Journal*, (under Review), Since March 18.
12. Biswal, S.k, Reddy, D. Harinadha, and Ananth Ramaswamy "Reducing Uncertainties in estimating long-time prestress losses in concrete structures using a Hygro thermo chemo mechanical model for concrete, *Computers and Structures*, Elsevier, (Under Revision following review) CAS_2017_1336.
13. Reddy, D. Harinadha and Ananth Ramaswamy "Experimental and Numerical Modeling of Creep in Different Types of Concrete", *Heliyon*, Elsevier, (Under revision following review), 2018 HELIYON_2018_1145)

14. D. Harinadha Reddy and Ananth Ramaswamy "Influence of Mineral Admixtures and Aggregates on Shrinkage in Different Concretes: Experimental and Numerical study", Construction and Building Materials, Under Revision following review, 2018, CONBUILDMAT-D-18-00567
15. Reddy, D. Harinadha and Ananth Ramaswamy "Influence of Mineral Admixtures and Aggregates on Properties of Different Concretes under high Temperature Conditions: II Numerical Study", Journal of Building Engineering, (Under revision following review, JOBE_2017_445).
16. Biswal, S.K. and Ananth Ramaswamy (2016) "Damage identification in concrete structures with uncertain but bounded measurements", Journal of Structural Health Monitoring, SAGE Publishers, pg. 1-14, DOI: 10.1177/1475921716676993 | First Published November 16, 2016
17. Biswal, S.K. and Ananth Ramaswamy (2016) "Measurement of existing prestressing force in concrete structures through an embedded vibrating beam strain gauge", Measurement, 83, 10-19.
18. Hemalatha, T. Ananth Ramaswamy, and Kishen, J.M.C. (2015) "Simplified Mix Design for Production of Self Compacting Concrete", ACI Materials Journal 112(2), 277-286.
19. 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
20. 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.
21. 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.
22. 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, Vol. 31(8), pp. 862-874 doi:10.1016/j.ijadhadh.2011.08.007.
23. 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.
24. 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.
25. 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.
26. 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.
27. 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.
28. 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.
29. 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.

30. Thomas, J. and Ramaswamy, A. (2007) "Shear of Prestressed Concrete Beams having Steel Fibers ", ICE Structures & Buildings Journal, 160 (SB5), 287-293.
31. Thomas, J. and Ramaswamy, A. (2007) "Mechanical Properties of Steel Fiber Reinforced Concrete", Journal of Materials in Civil Engineering, ASCE, 19(5), 385-392.
32. 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.
33. 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)**.
34. 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.
35. 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.
36. 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.
37. Thomas, J. and Ramaswamy, A (2006) "Finite Element Analysis of Shear Critical Prestressed SFRC Beams", Computers and Concrete, Techno-Press, 3(1), 65-77.
38. 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.
39. 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.
40. 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.
41. 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.
42. 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.
43. 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.
44. 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.
45. 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.
46. 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.
47. 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.

48. 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.
49. 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.
50. 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.
51. 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.
52. 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.
53. 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.
54. 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.
55. 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.
56. 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.
57. 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.

B. General Articles in Journals:

- 58 Ramaswamy, A. (2009) "Alexandre Gustave Eiffel: An Engineer Scientist", Resonance, Journal of the Indian Academy of Sciences, September pp. 840-848.

C Book / Monograph / Chapter in a Book:

- 59 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.
- 60 Ali, Sk. F. and Ramaswamy, A. (2010) "Semi-active Structural Control Using MR Dampers, published by VDM verlag, ISBN 978-3-639-29380-7
- 61 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.
- 62 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.

D Discussion in Refereed Journals:

- 63 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.

E Research Papers in International Conference Proceedings:

- 64 Harinadh Reddy and Ananth Ramaswamy "Structural Concrete Repair against Mechanical and Thermal Loads", Proceedings of the 19th Congress of the International Association of Bridge and Structural Engineers (IABSE), Stockholm Sweden, from 21st - 23rd, September 2016.
- 65 Harinadh Reddy and Ananth Ramaswamy "Creep and Shrinkage in Concrete containing Mineral Admixtures", Proceedings of CONCREEP 10, held in Vienna , pg 1524-1533, Sept 21-23 2015
- 66 Suryakant Biswal and Ananth Ramaswamy "health-monitoring of Prestressed Concrete Structures based on Finite Element Model Updating", Proceedings of CONCREEP 10, held in Vienna pg. 1447-1456, September 21-23 2015
- 67 Guruprasad, Y.K. and Ananth Ramaswamy, "Effect of High Temperature Exposure on Concrete: Damage Assessment and Repair Methodology", 37th IABSE Symposium at Madrid, Spain, 3rd – 5th September 2014.
- 68 Biswal, S.K. and Ananth Ramaswamy "Assessment Of Existing Pre-Stressed Tendon Forces In Bridge Girders Using Measured Strain Data With Uncertainty" Proceedings of the 4th FIB Congress, Mumbai, India 10th – 14th February 2014.
- 69 Harinadh Reddy and Ananth Ramaswamy "Prediction of Delayed Strains in Self Compacted Concrete", Proceedings of the 4th FIB Congress, Mumbai, India, 10th -14th February 2014.
- 70 Ananth Ramaswamy "Alternate Repair Material Systems for Application to Structural Concrete Proceedings of the IABSE Conference entitled 'Assessment, Upgrading and Refurbishment of Infrastructure', Rotterdam 6-8th May 2013.
- 71 T. Hemalatha, J.M. Chandra Kishen and A. Ramaswamy "Influence of Mineral Admixtures on Fatigue Behaviour of Self Compacting Concrete - Scanning Electron Microscopy and Micro-indentation Study", Proceedings of the 8th International Conference on Fracture Mechanics of Concrete and Concrete Structures, 10th-14th March 2013, Toledo, Spain..
- 72 Ananth Ramaswamy "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 2-4, 2012.
- 73 Harinadh Reddy & Ramaswamy A. "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.
- 74 Guruprasad Y.K. & Ramaswamy A. "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

- 75 Faruque, Ali, Sk., and Ramaswamy, A (2011) "MR Damper Monitoring For Structural Applications: Experimental Study and Comparison With Nonlinear Control", Transactions, SMiRT 21, 6th-11th November, New Delhi, Division V, paper ID#233.
- 76 Guruprasad, Y.K. and Ramaswamy, A. (2011) "Repair of Concrete Cylinders Wrapped with Carbon Fibre Reinforced Polymer under Compression", Transactions, SMiRT 21, 6th-11th November, New Delhi, Division I, paper ID#232.
- 77 Harinadha Reddy, D., and Ramaswamy, A. (2011) "Time Dependent Deformations in Normal And Heavy Density Concrete", Transactions, SMiRT 21, 6th-11th November, New Delhi, Division I, paper ID#230.
- 78 Hemalatha, T., Chandra Kishen, J.M., and Ramaswamy, A. (2011) "Experimental Study Of Influence of Fly Ash And Silica Fume On Acoustic Emission Characteristics of SCC Beams", SMiRT 21, 6th-11th November, New Delhi, Division II, paper ID#448.
- 79 Ramaswamy, A. and Chandra Kishen J.M. (2010) "Condition Assessment of a Steel Plate Girder Railway Bridge", Proceedings of the IABSE Symposium, Venice, September 22-24, IABSE-0526-2010.
- 80 Sk. Faruque Ali and Ramaswamy, A. (2010) "Comparative Performance of Nonlinear and Intelligent Control Algorithms", Prof. Yozo Fuzino (ed.), Proceedings of the 5th World Conference on Structural Control and Health Monitoring, July 12-14, Tokyo, Japan.
- 81 Chandra Kishen, J.M. and Ramaswamy, A. (2010) "Cracking analysis of brick masonry arch bridge", International Conference on Fracture Mechanics of Concrete and Concrete Structures -High Performance, Fiber Reinforced Concrete, Special Loadings and Structural Applications- B. H. Oh, et al. (eds), 2010 Korea Concrete Institute, ISBN 978-89-5708-182-2, pages 1872-1879.
- 82 Hemalatha, T., Ramaswamy, A. and Chandra Kishen, J.M. (2009) "Computation of Pore Structure of Self Compacting Concrete Using Image Analysis", Proceedings of ICCMS09, IIT Bombay, December 1-3.
- 83 Ramaswamy, A. and Reddy, Harinadha (2008) "Time dependent deformations in concrete: A multi-scale approach", Proceedings of the IUTAM symposium on Multifunctional materials and Smart Structures", (Invited Talk), December 10th -12th , 2008, at IISc, Bangalore, B.Dattaguru, V.K. Aatre and S. Gopalakrishnan (ed.), Springer ISSN 1875-3507, ISBN 978-90-4813770-1
- 84 Ramaswamy, A. (2008) "HPFRC based repair of structural concrete", Proceedings of the International conference on advances in concrete construction (ICACC), (Invited Talk) 7-9 February, Hyderabad, (CD-ROM).
- 85 Ali, Sk. Faruque, Ramaswamy, A (2007) "GA Optimized Semi-Active Adaptive Fuzzy Logic Control for Stay Cable Vibration" Proceedings of 3rd Structural Engineers World Congress, 2nd -7th November, Bangalore (CD-ROM-full paper).
- 86 Ali, Sk. Faruque, Ramaswamy, A. And Agrawal, A. (2007) "Semi-active Base isolation System for Buildings using MR Dampers", Proceedings of the World Forum on Smart Materials and Smart Structures Technology (SMSST), 22nd -27th May, Chongqing and Nanjing, China (Paper number 443, CD-ROM).
- 87 Ali, Sk. Faruque, and Ramaswamy, A. (2006) "FLC based semi-active control of buildings using Magneto-Rheological dampers", Proceedings of the International Congress on Computational Mechanics and Simulation '06 (ICCMS06), 8th -10th December at IIT Guwahati, edited by Damodar Maity and S.K Dwivedi, (CD-ROM-full paper, paper number A158).
- 88 Ali, Sk. Faruque, and Ramaswamy, A. (2006) "Vibration Control of Cable-supported Bridge Using Semi-Active Tendon & Fuzzy Logic Control", Proceedings of the IABSE Symposium on Responding to Tomorrows Challenges Today, 13th – 15th September, Budapest, Hungary, edited by Gyorgy Farkas and Laszlo Dunai (CD-ROM, paper number 115).

- 89 Ali, Sk. Faruque, and Ramaswamy, A. (2006) "Benchmark Control Problem for Highway Bridge based on FLC", Proceedings of ASCE Structures Congress, 17th – 19th May, St. Louis MO, USA, edited by Brad Cross and John Finke, (CD- ROM, paper number 00092-ST).
- 90 Ali, Sk. Faruque, and Ramaswamy, A. (2005) "Non-linear Modeling and Control of Cable stay system under Tower flexibility using Passive and Semi-active Control" Proceedings of the Structural Engineering Convention (SEC-2005), 14th–16th December, IISc Bangalore, edited by J.M. Chandra Kishen and D. Roy, (pg. 393 in book of abstract, CD-ROM, full paper).
- 91 Thomas J, and Ramaswamy A. (2006) "Bond Shear Strength of Reinforcing Bars in Concrete", Proceedings of the second FIB Congress, Naples Italy, 5th-8th June, edited by FIB Italia, CD-ROM full paper number n0201 and Book of abstracts, number 13-6 pg. 264-265.
- 92 Thomas J, and Ramaswamy A (2005) "Material Strength Models of High Strength Steel Fibre Reinforced Concrete", Proceedings of the "Global Construction: Ultimate Concrete Opportunities Young Researchers Forum," 5th -7th July 2005, Dundee, Ed. Dhir, RK, Halliday, JE, Csetenyi, E., Thomas Telford, pg.37-44.
- 93 Ramaswamy, A and Pavan, N.V. (2005) "Optimal Placement of Stiffeners in Cylindrical Shells Subject to Axial Loads", Proceedings of the Joint Mechanics and Materials (McMAT) conference sponsored by ASME/ASCE/SES, June 1st-3rd, Baton Rouge, Louisiana, USA, edited by Prof. G.Z. Voyiadjis, (CD-ROM, paper number 715).
- 94 Ramaswamy, A and Mohan, A.K. (2005), "Size Effects in Fiber Reinforced Concrete", Proceedings of the Joint Mechanics and Materials (McMAT) conference sponsored by ASME/ASCE/SES, June 1st-3rd, Baton Rouge, Louisiana, USA, edited by Prof. G.Z. Voyiadjis, (CD-ROM, paper number 716)
- 95 Ahlawat, A and Ramaswamy, A.(2004) – "Coupled Optimal design of building with TMD", (paper number ST3_10098), Proceedings of XXI ICTAM-2004, August 15th-21st, Warsaw Poland.
- 96 Ahlawat, A and Ramaswamy, (2004) "Optimal Fuzzy control of Smart Base Isolated Benchmark Building" Proceedings of the 17th Engineering Mechanics Conference (EM2004), ASCE, June 14th-17th, Delaware, USA, edited by Tripp Shenton, (CD-ROM, paper number 388).
- 97 Thomas, J., and Ramaswamy A., (2004) "A Comparative Study on the Properties of Steel Fibre Reinforced High Strength Concrete", Proceedings of the ICFRC-International Conference on Fibre Composites, High Performance Concretes and Smart Materials & Workshop on High Volume Fly Ash Concrete", 8th-10th January, Chennai, edited by V.S. Parameswaran, Allied Publishers Chennai, pg. 315-325.
- 98 Saikia, B.P., Phanindra Kumar, Thomas, J., Nanjunda Rao, K.S., and Ramaswamy A., (2004) "A Study on Flexural Performance of Beams Reinforced with GFRP bars", Proceedings of the ICFRC-International Conference on Fibre Composites, High Performance Concretes and Smart Materials & Workshop on High Volume Fly Ash Concrete", 8th-10th January, Chennai, edited by V.S. Parameswaran, Allied Publishers, Chennai, pg.465-474.
- 99 Ahlawat, A. S., Naresh, K. and Ramaswamy, A. (2003) "Shape optimal design of prestressed box girder bridge", Proceedings of International Conference on Modeling, Simulation, Optimization for Design of Multi-disciplinary Engineering Systems, September 24th-26th, Goa, India, edited by K Sudhakar, P.M. Mujumdar and A. Isaacs, (MSO-DMES03, paper number 18, CD-ROM).
- 100 Padmarajaiah, S.K. and Ramaswamy, A.(2003) "Role of Fibers in the Flexural and Shear Response of Prestressed Concrete Beams", Proceedings of International conference on Construction and Management (CONMAT), January 9th – 11th, IIT Kharagpur, West Bengal, edited by J.N. Bandhopadya and Sudhir K. Barai (CD-ROM & Hard Copy), Allied Publishers, New Delhi, pg. 439-449, (Invited Paper).
- 101 Ahlawat, A.S. and Ramaswamy, A.(2002) "Fault Tolerant Fail-Safe Hybrid Control System for Seismically Excited Buildings", Proceedings of Second International Conference on Vibration

- Engineering and Technology of Machinery (VETOMAC-II), December 16th-18th, BARC, Mumbai, edited by G. Goutham and R.K. Sinha, BARC (in CD-ROM paper number 10).
- 102 Kumar, L.S., Ramaswamy, A., and Rao, K.S.N.(2002) " Behavior of GFRP Reinforced SFRC Beams in Flexure and Shear ", Proceedings of the International Conference on Advances in Civil Engineering (ACE), vol. II, pp.1151-1157, edited by Prof. J.N. Bandhopadya and Prof. D. Nagesh Kumar, 3rd-5th January, held at IIT, Kharagpur, West Bengal, Allied Publishers, New Delhi.
 - 103 Jha, P.K., and Ramaswamy, A. (2002)" Reinforced Concrete Elements Under High Strain Rates", Proceedings of the International Conference on Advances in Civil Engineering (ACE), vol. II, pp.1430-1435, edited by Prof. J.N. Bandhopadya and Prof. D. Nagesh Kumar, New Delhi, 3rd-5th January, held at IIT, Kharagpur, West Bengal, Allied Publishers.
 - 104 Ahlawat, A.S. and Ramaswamy, A. (2001) – "Adaptive Hybrid Control Systems for Seismically Excited MDOF Structures", Proceedings of the International Conference on Civil Engineering (ICCE-2001), 23rd-25th July, edited by Technical Committee, Dept. of Civil Engineering, IISc. Bangalore, pp. 180-188.
 - 105 Bansal, A. and Ramaswamy, A (2001)"Thermal Distortion Control of Laminate Composites Using Piezoelectric Elements", Proceedings of the International Conference on Civil Engineering (ICCE-2001), 23rd-25th July, edited by Technical Committee, Dept. of Civil Engineering, IISc. Bangalore, pp. 198-205.
 - 106 Bansal, A. and Ramaswamy, A. (2001) "Vibration Control of Smart Laminated Composites", Accepted for presentation at the First MIT Conference on Computational Fluid and Solid Mechanics, June 12th-15th, (Abstract No. MIT-TA/027) Organized by Prof. K.J. Bathe, M.I.T., Cambridge, Mass.
 - 107 Jha, P.K., and Ramaswamy, A. (2001)" A Strain Rate Dependent Elasto-viscoplastic Model for Reinforced Concrete in Compression and Tension", Second International Conference on Mathematical Modeling (ICMM)-2001, University of Roorkee, January 29th –31st.
 - 108 Ahlawat, A.S. and Ramaswamy, A. (2000)" Optimum Design of Hybrid Mass Damper System for Vibration Control of Wind Excited MDOF Structures", Proceedings of the First International Conference on Vibration Engineering and Technology of Machinery (VETOMAC-I), held at IISc, Bangalore, India, from October 25th –27th. Edited by Dr. K. Venkatraman and Prof. C.S. Manohar, IISc. Bangalore, in CD-ROM form along with a volume of Abstracts.
 - 109 Ahlawat, A.S. and Ramaswamy, A. (2000)" Optimum Hybrid Control System for Wind Excited MDOF Structures", Presented at the International Congress on Theoretical and Applied Mechanics, ICTAM, at Chicago, U.S.A., from 27th August to 2nd September, Abstract No. NN11, Technical Report No.-950, Department of Theoretical and Applied Mechanics, University of Illinois at Urbana-Champaign, ISSN 0073-5264.
 - 110 Ahlawat, A.S. and Ramaswamy, A. (2000)" Optimum Design of Hybrid Mass Damper System for Vibration Control of MDOF Structures", Proceedings of the 14th Engineering Mechanics Conference of ASCE (EM2000), held at Austin, TX, U.S.A. from May 21st –24th. Compiled by Prof. D.R.Maniar and Prof. John Tassoulas, University of Texas at Austin, in CD-ROM form along with a volume of abstracts.
 - 111 Ramaswamy, A. and Venugopal, S. (1999) "A Strain rate Sensitive Finite Element Model For Plain Concrete in Compression", Proceedings of the International Conference on Mathematical Modeling of Nonlinear Systems (ICOMMONS), edited by Prof.J.C.Mishra and Prof.S.B.Sinha, Dept. of Mathematics, IIT Kharagpur, 9th –11th December, Vol.2, pp.64-77.
 - 112 Padmarajaiah, S.K., and Ramaswamy, A. (1999) - "Flexural and Shear Studies of High Strength Fiber Reinforced Prestressed Concrete Beams", Proceedings of the Fifth International Conference on Concrete Technology for Developing Countries, Organized by the National

Council for Cement and Building Material, New Delhi, 17th – 19th November, Vol. 2, pp. V-45-54.

- 113 Ramaswamy, A. and Padmarajaiah, S.K. (1999) "Structural Behavior of Full and Partial Depth High Strength Concrete Fiber Reinforced Prestressed Beams", Proceedings of the 2nd Asia Pacific Specialty Conference on Fiber Reinforced Concrete, August 27th –28th, pp. 183-188, edited by Prof. T.S. Lok and Prof. K.K.H. Tseng, Nanyang Technological University, Singapore. Organized by CI-Premier Conference Organization, Singapore.
- 114 Barzegar, F., and Ramaswamy, A. (1990) "A Secant Post-Cracking Model for Reinforced Concrete with Particular Emphasis on Tension Stiffening". Second International Conference on Computer Aided Analysis and Design of Concrete Structures, Zell-am-see, Austria, pp. 1001-1016.
- 115 Herrmann, L.R., Hamidi, R., and Ramaswamy, A. (1987)"Calibration Study for a Continuum Model of Layered Elastomeric Bearings". Proceedings of Second International Conference and Short Course on Constitutive Laws for Engineering Materials: Theory and Application, University of Arizona, Tucson, Arizona, pp. 1197-1204.

F Research papers in National Conferences and Symposia:

- 116 Guruprasad, Y.K. and Ramaswamy, A. (2010) "Behavior of Fire Damaged Concrete Cylinders with Carbon Fibre Reinforced Polymer Wrap under Monotonic Loading", Proceedings of the Structural Engineering Convention, 8th-10th December, 833-844.
- 117 Ali, S.K.F., Venkatesh, S. and Ramaswamy, A. (2010) "Hybrid Base Isolation based Vibration Control: An Experimental and Analytical Study", Proceedings of the Structural Engineering Convention, 8th-10th December, 152-166, (invited talk)
- 118 Ramaswamy, A. (2010) "New Materials in Civil Engineering Infrastructure Applications: A Review", CiSTUP@ CiSTUP conference at IISc Bangalore, 18th-20th October, Proceedings in CD-ROM (Keynote talk).
- 119 Balagopal, R., Ramaswamy, A. and Arunachalam, S., (2010) "Studies on Damage localization for pole type structures", Proceedings of the Structural Engineering Convention, 8th-10th December 2010, 761-769.
- 120 Balagopal, R., Ramaswamy, Ananth, S. J. Mohan, S. Arunachalam, N., Prasad Rao, R. P. Rokade (2010) Experimental Study on Health Monitoring of Transmission line Towers, CiSTUP@ CiSTUP conference at IISc Bangalore, 18th-20th October, Proceedings in CD-ROM
- 121 Hemalatha, T. Chandra Kishan, J.M., Ramaswamy, (2010) "A. Micromechanical fracture modeling of self compacting concrete (SCC) A Micro Mechanical fracture modeling of Self Compacting Concrete as a pavement material", CiSTUP@ CiSTUP conference at IISc Bangalore, 18th-20th October, Proceedings in CD-ROM.
- 122 Guruprasad, Y. K & Ananth Ramaswamy (2010) "Fatigue Life of Concrete Cylinders with and without Carbon Fibre Reinforced Polymer wrap subjected to Cyclic Loading in Compression" CiSTUP@ CiSTUP conference at IISc Bangalore, 18th-20th October, Proceedings in CD-ROM.
- 123 D.Harinadha Reddy & Ananth Ramaswamy (2010) "Time Dependent Deformations in Normal and Heavy Density Concrete" CiSTUP@ CiSTUP conference at IISc Bangalore, 18th-20th October, Proceedings in CD-ROM.
- 124 Ramaswamy, A. (2009) "Approaches to Repair of Structural Concrete", Invited Talk, Workshop on Repair and Rehabilitation of Structures, (WSRR09), IIT Bombay, August, 28-30.
- 125 Ramaswamy, A., and Reddy, H. (2008) "New Materials and Assessment Methods in Structural Concrete Applications", (Invited Talk) Proceedings of the Structural Engineering Convention (CD-ROM), SERC, Chennai, December.

- 126 Ramaswamy, A., Adam, M.A., Prashant, P., (2007) "Finite Element Assessment Of Reinforced Concrete Beams Repaired With Different Materials", Proceedings of 3rd Indo-German workshop and theme meeting on Seismic Safety of structures, Risk Assessment and Disaster Mitigation, 12th -13th March, at BARC, Mumbai, edited by G.R. Reddy and Y.M. Parulekar, published by BARC Mumbai, pg. 199-214.
- 127 Ramaswamy, A. and Thomas, J. (2005) "Developments of Alternate Reinforcement Forms for Application in Structural Concrete", Second National Conference on Advances in Materials and Mechanics of Concrete Structures, held at IIT Madras 12th-13th August, edited by G Appa Rao, Allied Publishers, Chennai, pg. 405-412, (Invited paper).
- 128 Ali, Sk. Faruque, and Ramaswamy, A. (2005) "Review and Development of Vibration Control Strategies for Cable Supported Bridges", Proceedings of the National Symposium on Structural Dynamics, Random Vibration and Earthquake Engineering (NSDD-2005), 22nd – 23rd July 2005, at IISc Bangalore, edited by C.S. Manohar and D. Roy, published by IISc., pg. 91-97.
- 129 Thomas, J and Ramaswamy, A (2004) " Stress-Strain Behavior of steel fiber reinforced high strength concrete", Proceedings of the National conference on Recent Advances in Civil Engineering, Cochin University for Science and Technology (CUSAT), March 25-27, edited by T. Jose Babu, published by CUSAT, pg. 121-128.
- 130 Akshay Kumar and Ramaswamy, A. (2003) "Effectiveness of GFRP Fabric in Repair of RC Beams", Proceedings of the National Seminar on Seismic Design of Nuclear Power Plants", February 21st-22nd, at SERC Chennai, pp. 201-210.
- 131 Padmarajaiah, S.K. and Ramaswamy, A.(2001) "Role of fibers in Flexural response of HSFRC Prestressed Beams", Proceedings of the National Conference on Trends in Prestressed Concrete, June 1st – 2nd at IIT Madras, pp. 27-35.
- 132 Bhattacharjee, S. and Ramaswamy, A.(2001)"Effect of Cable Non-Linearity on Response of Suspension Bridges to Earthquake Excitation", Proceedings of the National Symposium on Applications of Structural Dynamics to Design (ASDD-2001), Organized by SERC Chennai, January 9th to 11th. Edited by Dr. R. Narayanan and Dr. T.V.S.R. Appa Rao, S.E.R.C. Madras, pp. 151-158, Allied Publishers Ltd., Chennai.
- 133 Ahlawat, A.S. and Ramaswamy, A.(2000)" Optimum Design of Hybrid Control System for MDOF Structures", Proceedings of the 2nd Structural Engineering Convention SEC-2000, edited by Prof. Y. Desai, Prof. Tarun Kant and Prof. A. Mukherjee, IIT Bombay, 5th-8th January, 387-394, Quest Publications, Mumbai.
- 134 Padmarajaiah, S.K., and Ramaswamy, A.(1999) "Influence of fibers in High Strength Prestressed Concrete Beams", Proceedings of the National Conference on Advances and Innovations in Bridge Engineering (AIB'99), edited by Prof. N. Rajagopalan, I.I.T. Chennai, August 12-14, pp. 84-93 Allied Publishers, Chennai..
- 135 Ramaswamy, A. and Jagadisha, M.N. (1999) - "Diaphragm Performance In Distribution of Live Load Moments in Right and Skew Composite Bridges", Proceedings of the National Conference on Advances and Innovations in Bridge Engineering, (AIB'99), edited by Prof. N. Rajagopalan, I.I.T Chennai, August 12-14, pp. 129-136, Allied Publishers, Chennai.
- 136 Brajesh, K., Ahlawat, A.S. and Ramaswamy, A. (1999) "An Active Control Strategy for a Simply Supported Bridge", Proceedings of the National Conference on Advances and Innovations in Bridge Engineering, (AIB'99), edited by Prof. N. Rajagopalan, I.I.T. Chennai, August 12-14, pp.137-145, Allied Publishers, Chennai.

G Research Conferment's

Ph.D.

1. 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 working for Goodyear Tire Akron Ohio USA as a Sr. Engineer]**
2. 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 working for ISRO ISAC, Bangalore as a Scientist G]**
3. 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 working for CUSAT, Cochin, as an Associate Professor]**
4. 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 working for IIT Madras, as an Associate Professor]**
5. Hemalatha, B. “Studies on Characterization of Self Compacting Concrete: Microstructure, Fracture and Fatigue” (jointly with Prof. J.M. Chandra Kishan) **Status Completed 2012. [Presently working for CSIR-SERC, Chennai, Sr. Scientist E]**
6. Guruprasad, Y.K. “Repair and Retrofit Strategies for Structural Concrete against Thermo-mechanical Loadings”, **Status: Completed 2015. [Presently working for BMS-IT College, at Bangalore as a Lecturer]**
7. Biswal, Suryakant “Uncertainty based damage identification and prediction of long-time deformation in concrete structures”. **Status:-. Completed 2016. [Presently working for SSN College, a part of the Shiv Nadar Education Trust, Chennai, Assistant Professor]**
8. 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 working for CSIR-SERC, Chennai, as a Sr. Scientist E]**
9. Reddy Harinadha D. “Time Dependent Deformations and High Temperature Effects on Different Types of Concrete: Experimental and Numerical studies. **Status: Completed 2017.**
10. Pandey, Mrityunjay – “Semi-active Control of Earthquake Induced Vibrations in Building Structures using MR Dampers: Algorithm Development and Benchmark Application”, **Status: Completed 2018.**
11. Pal, Biswajit – “Condition Assessment and Monitoring of Structural Concrete Elements” **Status in Progress**

M.Sc (Engg.)

1. Jagadisha, M.N., – “Effectiveness of Diaphragms in Lateral Distribution of Live Loads in Right and Skew Composite Bridges”, **Status: Completed in 1998.**
2. Venugopal, S., – “A Strain Rate Dependent Elasto-Viscoplastic Model for Plain Concrete in Compression”, **Status: Completed in 1998.**
3. Srinath, K. – “Studies on Nonlinear Analysis of Steel Fiber Reinforced Concrete Structural Elements”, **Status: Completed in 1998.**
4. Jha, Pranava K. –“A Strain Rate Dependent Model for Plain and Reinforced Concrete”,

Completed in 2001.

5. Bhattacharjee, Sudip – “Geometric Nonlinear Effects on the Dynamic Response of Suspension Bridges Due to Earthquake Excitations”, **Status: Completed in 2001.**
6. Bansal, Alok – “Thermal Distortion and Vibration Control of Composite laminates Using Piezoelectric Elements”, M.Sc.(Engg.) **Status: Completed in 2002.**
7. Reddy, Harinadha “Time Dependent Deformations in Normal and Heavy Density Concrete” **Status: Completed in 2009**
8. V. Svetha “Numerical Modelling of Reinforced Concrete Structural Elements and Assemblages Exposed to Thermo-mechanical Loading”, **Status: Completed 2017.**
9. Waghmare, Ambadas “Behavior of RC elements under Bi-axial loads”, **Status in Progress**

H Teaching and ME Project Guidance:

Courses taught over the years:

- Structural Optimization 3:0 credits, **Elective Course**, (Offered alone)
- Bridge engineering 3:0 Credits, **Elective Course**, (Offered alone)
- Limit State Design of Reinforced Concrete 3:0 credits, **Core Course**, (Offered alone)
- Limit State Design of Reinforced Concrete and Masonry 3:0 credits, **Core Course**, (Offered with Prof. B.V.V. Reddy)
- Prestressed Concrete 2:0 Credits, **Elective Course**, (Offered alone)
- Solid Mechanics 3:0 credits, **Core Course**, (Offered alone)
- Advanced Reinforced Concrete and Prestressed Concrete, 3:0 Credits, **Elective Course**, (offered alone)
- Plasticity, Viscoelasticity and Visco-plasticity 3:0 credits, **Elective Course**, (offered alone)
- Theory of Plates and Shells, **Core course**, (offered alone)
- Nonlinear Mechanics, 3 Credits, **Core Course**, (offered Jointly with Prof. J.M. Chandra Kishen and Prof. C.S. Manohar)
- Stability of Structures, **Core course**, (offered alone)

M.E. project Guidance:

1. Rath, Debi Prasad, – “Shape Optimization of R.C.C. Continuum Structural Elements”, **Status: Completed in 1997.**
2. Nimaje, Y.T. – “Study of Parameters of Genetic Algorithms for Optimization of Trusses”, **Status: Completed in 1997.**
3. Kumar, Brajesh – “Control Strategies for Simply Supported Bridges”, **Status: Completed in 1998.**
4. Kumar, Ravi – “Shape Optimization of Prestressed Concrete Beams”, **Status: Completed in 1998.**
5. Mallick, Shantanu Basu – “System Optimization of Road Bridges”, **Status: Completed in 1998.**
6. Prakash, Shankar – “Finite Element Analysis of Prestressed Concrete Beams Having FRP Tendons”, **Status: Completed in 1998.**
7. 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.**
8. Kumar, Naresh – “Shape Optimization of Prestressed Box Girder Bridge Deck System”, **Status: Completed in 2001.**
9. Kumar, Likhari 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)
10. Kumar, Akshaya- "Effectiveness of GFRP Fabrics as a Repair Material for RC Beams", **Status: Completed in 2002.**
 11. Kumar, Phanindra "Behavior of GFRP rebar Reinforced Concrete Beams with fibers", **status: Completed in 2003**(Jointly with Dr. K.S. Nanjunda Rao)
 12. Nahak, Mahendra K., "Shape optimization of Post-Tensioned Prestressed Concrete Slab system", Status: **Completed in 2004.**
 13. Anil, M.K. "Optimal Passive Structural Vibration Control of Secondary Piping Structures" Status: **Completed in 2004.**
 14. Prasad, Aditya. "Optimal Positioning of Seismic Restraint Devices for Power Plant Piping Systems" Status: **Completed in 2005** (Jointly with Prof. C.S. Manohar).
 15. Shailaja, B. "Experimental and Analytical Studies on creep in normal and heavy density concrete" Status: **Completed in 2006.**
 16. Chandra, Vishwanath "Experimental and Analytical studies on Beam Column Joints with and without fibers", Status: **Completed in 2006.**
 17. Ahmad, M.A., "Repair and retrofit of reinforced concrete members" Status: **Completed in 2006.**
 18. 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.**
 19. Saji, K.P. "Experimental and Analytical Approaches to Steel Bridge Identification", Status: **Completed 2009.**
 20. Murthy, P.C.R. "Strut and Tie Model based Repair and Retrofit of Structural Concrete". Status: **Completed 2009.**
 21. Venkatasubaiah " Behavior of Concrete under Thermal and Mechanical Loads" **Status: Completed 2010**
 22. Gore, Jayesh "Nonlinear Finite Element Analysis of SFRC elements", **Status Completed 2011.**
 23. Talukdar, Johnathan "FLC based Vibration Control of composites using Piezo elements", **Status: Completed 2011**
 24. Mohamad Islam "Dynamic Analysis of Vehicle-Structure Interactions in Railway Bridges", **Status: Completed 2012**
 25. **Anil Koushik** "Nonlinear Finite Element Analysis of Post-Tensioned Concrete Girders" **Completed 2012**
 26. **S Sri Vishnu** "Nonlinear Finite Element Analysis of Cable Stayed Bridges" **Completed 2012**
 27. **K Chandu** "Shortest time to travel from Origin to Destination Using BMTc services" **Completed 2013**
 28. **Krishnamurthy B** "Parametric study of lateral thermal track buckling using Beam type and frame type approaches" **Completed 2013**
 29. **Vinod Kumar Rishidev** "Behavior of Reinforced Concrete Square short column with FRP wrapping under uniaxial load" **completed 2013.**
 30. **Aakash B S** "Structural Optimization of Radio Telescope support truss structure using Genetic Algorithms" **Completed 2013.**
 31. **Abhishek Das** "Estimation of creep and shrinkage strains in concrete" **completed 2014**
 32. **Sandeep** "Performance of CFRP as repair material for fire damaged concrete" **Completed 2014.**
 33. **Chandan Ashish** "Optimization of Multi-mode Routes in Minimum time in Bangalore city" **Completed 2015**
 34. **Ravi Sharma** "Degradation of Concrete due to Ingress of Chemical Ions" **Completed 2017.**
 35. **Bharanidharan** "Effect of Temperature on Concrete Degradation," **Completed 2017.**

I Brief Description of Sponsored Research Projects Undertaken at IISc

Research Schemes Funded/ Completed:

1. **Title:** Thermal Distortion and Vibration Control of Laminate Composite Structural Members Using Piezoelectric Laminates
Funding Agency – ISRO-IISc Space Technology Cell
Budget - Rs. 3, 69,150/-
Project Period- 2000-2002 (Completed)
Investigators – Dr. Ananth Ramaswamy (Principal Investigator), Dr.P.S.Nair (ISRO-ISAC) and Mr.Shankarnarayanan (ISRO-ISAC)
Objectives
 - Develop a Finite Element Program to study the behavior of Laminate Composite Elements under thermal and mechanical vibration loads.
 - Develop a Piezoelectric element and study its ability to control thermal distortion and vibration in laminate composites
 - Develop Optimizing strategies for locating piezoelectric elements for effective control.**Status:** – Completed.
2. **Title:** Experimental and Analytical Study on the Behavior of Fiber Reinforced Plastic (FRP) Composite Reinforcements in Plain and Latex Modified Concrete Beam Elements.
Funding Agency – Department of Science and Technology (DST), Government of India
Budget - Rs. 14, 94,185/-
Project Period- 2000-2003 (Completed)
Investigators – Dr. Ananth Ramaswamy (Principal Investigator) and Dr. K.S. Nanjunda Rao
Objectives
 - Studies on the load deformation response of FRP rebar reinforced concrete beams under monotonic loading.
 - Effect of latex additives and short randomly oriented fibers into the concrete matrix in these beam tests
 - Effects of corrosive environmental factors, through exposure of these beams to corrosive agents, on these specimens
 - Finite Element model development to analyze the behavior of the beam specimen including non-linear effects in concrete.
 - Develop design procedures for FRP rebar reinforced concrete elements.**Status** – Completed
3. **Title:** Nonlinear Earthquake Response Analysis and Structural Optimization of Secondary Piping
Funding Agency – Department of Science and Technology (DST), Government of India
Budget - Rs. 9, 19,200/-
Project Period- 2002-2005 (Completed)
Investigators – Prof. C.S. Manohar (Principal Investigator), Dr. Ananth Ramaswamy
Objectives
 - Studies on the seismic performance of secondary piping networks.
 - Optimal location of snubbers and dampers for desired structural performance under seismic forces.**Status** – Completed
4. **Title:** Optimal Design of Axially Symmetrical Stiffened thin Shell Structures Under Buckling Criteria.
Funding Agency – ISRO-IISc Space Technology Cell

Budget - Rs. 4, 28,030/-

Project Period- 2004-2006 (Completed)

Investigators – Dr. Ananth Ramaswamy (Principal Investigator), Shri B.P Shastry (ISRO-VSSC)

Objectives

- Evolve optimization procedures for the design of thin light metal alloy curved shells with longitudinal and transverse stiffeners accounting for buckling and yielding constraints.
- Parameters to be considered include distance between elastic restraints, number of elastic restraints, stiffness of elastic restraints, stiffness of structure between elastic restraints, nature of loads and its levels, and diameter and length of shell.

Status – Completed

5. **Title:** Experimental and Analytical study on the Behavior of Reinforced Concrete Beam Column Joints with and without fibers under cyclic loading

Funding Agency – IGCAR-IISc Cell

Budget - Rs. 17, 65,595/-

Project Period- 2004-2007 (Completed)

Investigators – Dr. Ananth Ramaswamy (Principal Investigator), Shri C.Sivathanu Pillai (IGCAR Kalpakkam)

Objectives:

- Assess the performance of beam column joints, with and without fibers, under cyclic loading.
- Examine the possibility of partially replacing the confining steel rebars with fibers offering equivalent structural performance in terms of ductility and energy absorption.
- Develop an analytical model for reinforced concrete with/without fibers on a finite element platform and validate/ assess its capabilities in predicting the test results on beam column joints of this test program and from other tests reported in the literature.
- Examine the current codal design provisions for beam column joints for their suitability and evolve modifications where necessary.

Status – Completed.

6. **Title:** Characterization of Time dependent deformations in Concrete grades used in Nuclear Power Plants

Funding Agency – BRNS, Mumbai

Budget - Rs. 34, 65,050/-

Project Period- 2004-2008 (Funded)

Investigators – Dr. Ananth Ramaswamy (Principal Investigator), Dr.J.M.Chandra Kishan (CI), Shri G. Prabhakar (PC, NPCL Mumbai)

Objectives:

- Experimental studies on standard cylindrical concrete specimen to measure uniaxial shrinkage and creep in concrete with relative humidity and temperature at curing and testing in addition to level and magnitude of sustained load, and concrete mix as parameters.
- Development of a finite element based analytical framework incorporating hygral, thermal and mechanical load effects for estimating the levels of shrinkage and creep.

Status – Completed.

7. **Title:** Repair Techniques in Reinforced and Prestressed Concrete Structural Components and Assemblages

Funding Agency – CSIR, New Delhi

Budget - Rs. 8, 46,000/-

Project Period- 2004-2007 (Completed)

Investigators – Dr. Ananth Ramaswamy (Principal Investigator)

Objectives:

- Study the effectiveness of different retrofitting methods, i.e., conduct tests on flexure critical RC beams, columns and slab elements retrofitted with composite plates in the tension face; tests on shear critical RC beams with composite plates attached to the web surface, wrapping of the flexure / shear damaged zone in RC beams using a composite fabric, external prestressing, and the use ultra-high performance concrete as plate/wrap for repair. Environmental impact and long term durability aspects will also be assessed experimentally.
- Develop analytical procedures to estimate the effectiveness of the repair and to make an evaluation of the contribution of composite components towards strength of retrofitted concrete elements. The analytical studies will consist of one based on engineering models relying on a broad base of test data and another based on a finite element model accounting for the constitutive properties of the repaired structural element.

Status – Completed.

8. **Title:** Condition Monitoring of Railway Bridges

Funding Agency: South Western Railways, Indian Railways, GOI

Budget: Rs 74.5 Lakhs

Project Period: 2006-2009 (Funded)

Investigators: Prof. Ananth Ramaswamy, Prof. J.M. Chandra Kishen, Prof. D. Roy, Prof. C.S. Manohar

Objectives:

- Evaluate the present condition of five existing bridges in the railway network for the current axle loads, and validate numerical models developed representing these bridges.
- Evaluate the residual life of the bridge under present conditions of fatigue loading and maintenance.
- Explore the feasibility of increasing the loads on the bridge given its current condition with limited intervention and assess its residual life for these loads under fatigue. Comment on level of intervention/maintenance schedules needed for bridge to serve its design life.

Status: Completed.

9. **Title:** Fire resistance and repair of earthquake damaged structures

Funding Agency: United Kingdom-India Education and Research Initiative (UKIERI) Collaborative Research Awards 2007

Project Period: 2008-2011 (Funded)

Budget: (£146000).

Investigators: Jointly developed with University of Edinburgh, IIT Roorkee and IISc, Bangalore:

Team: Professor Asif Usmani and his colleagues from University of Edinburgh, C S Manohar and *Ananth Ramaswamy* from IISc, and Professor P Bhargava and his colleagues from IIT Roorkee

Objectives:

- Understanding of the mechanics of the response of earthquake damaged structures subjected to fire
- Understanding the mechanical behaviour of structural materials subjected to elevated temperature

- Developing mathematical models for determining the reliability of structural components
- Proposing design and retrofitting alternatives using modern materials and methods

Status: Completed.

10. **Title:** Damage Assessment, Repair and Retrofit of Reinforced Concrete Girders and Columns Using Fiber Reinforced Polymer Composite and Cementitious Materials

Funding Agency: CiSTUP, IISc

Project Period: 2010-2012 (Funded)

Budget: (Rs.4, 88,000/-)

Investigator: Prof. Ananth Ramaswamy

Objectives:

- Assess damage in structural concrete columns and girders
- Develop and evaluate repair strategies to mitigate the damage
- Exploratory studies on durability of repair systems
- Evolve non-destructive tools for assessing /quantifying damage and prescribing suitable repair for the same

Status: Completed

11. **Title:** Making Performance Based Structural Engineering for Fire Resistance Attainable

Funding Agency: United Kingdom-India Education and Research Initiative (UKIERI) Collaborative Research Awards 2007

Project Period: 2012-2014 (Funded)

Budget: £19916 (UOE) + Rs14,52,427 (IISc).

Investigators: Jointly developed with University of Edinburgh, IIT Roorkee and IISc, Bangalore:

Team: Professor Asif Usmani and his colleagues from University of Edinburgh, C S Manohar and *Ananth Ramaswamy* Chandra Kishen and Debraj Ghosh from IISc,

Objectives:

- Developing a performance based engineering (PBE) methodologies for providing structural resistance to fire, taking into account the uncertainties in the design process;
- Developing a user friendly software for implementing this methodology in routine situations.

Status: Completed.

12. **Title:** Stochastic Modelling of Hydration Process in Concrete investigations into creep and shrinkage **Funding Agency** – BRNS, Mumbai

Budget - Rs. 36, 73, 040/-

Project Period- 2012-20015 (Funded)

Investigators – Dr. Ananth Ramaswamy (Principal Investigator), K.-Sajeev (CI), Prof. C.S. Manohar, Shri Tarvinder Singh (P-Collaborator)

Objectives:

- Develop a cement hydration based computational model for concrete that accounts for variations in material properties of the concrete mix constituents, relative humidity and temperature effects.
- Include effects of uncertainties associated/ inherent in the model and its parameters on hydration and consequently on the mechanical properties of concrete.
- Assess the influence of material properties of mix ingredients, humidity and temperature on mechanical properties of concrete.
- Model validation through simulation of structural concrete responses.

Status – Completed

13. **Title:** Development of a Model For Evaluating Prestress Losses Considering Creep & Shrinkage Losses in Concrete & Relaxation Losses In Steel Over 100 Years
Funding Agency – BRNS, Mumbai
Investigators: Prof. Ananth Ramaswamy (PI), Prof. J.M. Chandra Kishen (CI), Shri V. Madhlik (PC), Mrs. Y. Parulkar (PC) and Dr. G.R.Reddy (PC)
Budget - Rs. 41, 18, 140/-
Project Period- 2012-2015 (Funded)
Objectives:
- Conduct experiments to measure composite time dependent deformations (creep, shrinkage and relaxation) in prestressed concrete girders and panels. Companion cylinders for creep and prisms for shrinkage studies will be undertaken. Influence of humidity, temperature, level of prestress and service load will be considered.
 - Develop and validate analytical model for short term prediction of these deformations.
 - Evolve procedures to estimate time dependent deformations for long term based on short term measurements.
 - Establish procedures for estimation of loss in prestress due to combined effect of creep, shrinkage and relaxation of steel over a period of 100 years of service life.
- Status** – Completed
14. **Title:** Petro-graphical Chemical and Computational Studies on Concrete at High Temperature
Funding Agency – BRNS, Mumbai
Budget - Rs. 48, 87,760/-/
Project Period- 2012-2015 (Funded)
Investigators – Dr. K. Sajeew, (Principal Investigator), Prof. Ananth Ramaswamy (CI), Prof. C.S. Manohar (CI), Shri Tarvinder Singh (P-Collaborator)
Objectives:
- Behavior of coarse aggregate when exposed to different temperature
 - Melting of coarse aggregate and melt migration effect
 - Chemical diffusion and chemical reaction at high pressure temperature conditions
 - Develop a data set on the behavior of concrete to fire (very High Temperature) with different coarse aggregate material (rocks)
 - Concrete degradation model under thermo-mechanical loading will be developed and validated with available test results from the present study and others reported in the literature.
 - Uncertainties that influence the material properties of mix ingredients, moisture and heat transfer processes and their effect on mechanical properties of concrete will be studied.
 - Results from tests on structural members exposed to high temperature and loading will then be used to validate the model.
- Status** – Completed

Miscellaneous

Society Memberships:

- Member, American Society for Civil Engineers (ASCE).
- Member International Association for Bridge and Structural Engineers (IABSE).
- Member Federation International de Beton (FIB).
- Member, Indian Society for Theoretical and Applied Mechanics, Kharagpur (ISTAM).
- Member, Indian Association for Structural Engineers, Mumbai (IASE).
- Member, Indian Roads Congress (IRC).

- Faculty in Short term Course on FEA for Practicing Engineers, CSIC, IISc., 1996.
- Trained undergraduate engineering students over the summer in the institute sponsored program entitled “Young Engineers Fellowship” for a career in research, 2000
- Set and evaluated institute entrance exam papers for the department 2004

Reviewer for Funding Agencies

- Department of Science and Technology, India
- CSIR, India
- Austrian Research Foundation, Austria
- Georgian National Science Foundation

Reviewer for Journals:

- ASCE Journals (Engineering Mechanics; Bridge Engineering; Structural Engineering; Materials in Civil Engineering; Computing in Engineering; Journal of Constructed Facilities in Civil Engineering)
- ACI Journal (Structural and Materials Journal)
- Elsevier Journals (Engineering Structures; Cement and Concrete Composites, Construction and Building Materials; EAAI; Finite Element in Analysis and Design; Composites B; Material Science and Engineering Part A; Sound and Vibration)
- AIAA Journal
- Proceedings of ICE (Construction Materials; Structures and Buildings; Journal of Engineering and Computational Mechanics)
- IOP Journals (Journal of Smart Materials and Structures; Journal of Physics: Condensed Matter)
- Wiley Journals (EESD; Journal of Structural control and Health Monitoring)
- Springer Journal (Structural and Multidisciplinary Optimization; Soft Computing; Materials and Structures: RILEM Journal; Sadhana, Academy Proceedings in Engineering Science; Journal of the Institute of Engineers India)
- Taylor and Francis Journals (International Journal for Computational Methods in Engineering Science & Mechanics; Journal of Mechanics based Design of Structures and Machines; Journal of Civil Engineering and Management)
- Sage Journals (Intelligent Materials and Smart Structures; Shock and Vibration Digest)
- Journal of the Indian Academy of Sciences (Current Science; Pramana; Bulletin of Material science)
- Techno Press, South Korea (Structural Engineering and Mechanics; Smart Structures and Systems)
- KSCE, Journal of Civil Engineering, South Korea
- IOS Press (Journal of Intelligent and Fuzzy Systems)
- Mult-Science UK Publishers (International Journal of Space Structures)
- Dove Press (Mechanics of Advanced Materials and Structures)
- Cambridge University Press (AIEDAM: Artificial Intelligence in Engineering Design, Analysis and Manufacturing)
- Indian Society for Earthquake Technology, India
- Journal of Scientific and Industrial Research, CSIR, India

Reviewer for Ph.D. & M.S. Thesis:

IIT Delhi; IIT Madras; IIT Kharagpur; IIT Mumbai; IIT Guwahati, NIT Suratkal, BITS Pilani; Anna University, Chennai and IISc Bangalore

Events Organized (International):

- 7th Asia-Pacific-Network of Centers for Research in Smart Structures Technology (ANCRiSST 2012) Workshop on 27-28th July 2012 at J.N. Tata Auditorium, IISc. Bangalore. (Co-organized with Prof. S. Gopalakrishnan of Aerospace Engineering Department)
- 5th Asia Pacific Summer School (APSS 2012) on Smart Structures Technology 22nd July to 11th August 2012, at Civil Engineering and Aerospace Engg. Department, IISc. Bangalore (Co-organized with Prof. S. Gopalakrishnan of Aerospace Engineering Department)

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 22nd-27th 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 5th –17th 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 13th 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 Lectures:

- "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, 9th-14th 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., 17th-22nd 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, 19th-23rd January 1998.
- 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
- 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, 17th-21st, January 2005.
- "*Seismic Safety Assessment, Vulnerability and Retrofit*", Home Ministry-NPCBEERM short term

course from 13th June–16th 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, 9th-13th 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, 8th-13th 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, 7th-11th December 2009 at Civil Engineering Department IISc.
- Delivered a lecture on vibration in bridges at R&D Engineers, DRDO, Pune, October, 1995.
- 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, 14th-28th 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, 28th December 1998 – 9th January 1999.
- Delivered the Concrete Day Lecture on “Developments in Concrete Technology”, Indian Concrete Institute-Karnataka Chapter, Bangalore, 7th 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, 26th-30th 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, 14th February 2002.
- Delivered a Lecture on “Vibration Control” at Sida Ganga Institute of Technology, Tumkur, Karnataka, 21st February 2003.
- Delivered a Lecture on “Role of Fibers in Structural Concrete” at a workshop Organized by Association of Consulting Civil Engineers, Bangalore 2nd-3rd, January 2004. Delivered a Lecture on “Fiber Reinforced Concrete”, INSTRUCT Program for Professional Engineers, 28th 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, 9th-14th August 2004.
- Delivered a Lecture on “Influence of Fibers in Performance of Prestressed Concrete Beams”, Institute of Structural Engineering (IBK), ETH Zurich, November 11th, 2004.

- Delivered a Lecture on "Overview of Research Interests", Institute of Structural Engineering (IBK), ETH Zurich, December 1st 2004.
- Delivered a Lecture on "Principles of Concrete Mix Design", INSTRUCT Program for Professional Engineers, 24th August 2005.
- Delivered a lecture on "Detailing in Special Structures" INSTRUCT Program for Professional Engineers, 17th April 2008.
- Lecture on "Research in Mechanics of Structural Concrete and Vibration Control" at Civil Engineering Department, IIT Madras, 17th 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 17th December 2009 at Bangalore.
- Delivered a lecture on "Structural Control and Condition Assessment" at the 3rd Asia Pacific Summer School on Smart Structures Technologies July 15th - August 4th, 2010, University of Tokyo, Japan.

Brief Description of Consultancy Projects at IISc that received Funds:

1. **Title:** Dynamical Analysis of Mechanically Launched Bridges
Funding Agency - Research and Development Engineers, Establishment, DRDO, Government of India
Budget - Rs. 3 lakhs
Project Period- 1996 (8 months)
Consultants – Prof. C.S. Manohar and Dr. Ananth Ramaswamy
Objectives
 - Development of Finite Element Models for Ten Configurations of the mechanically launched Bridges.
 - Determine Free Vibration Characteristics.
 - Determination of Forced Response due to Artillery Tanks.
 - Determination of Critical Velocities that lead to unacceptably high levels of Lateral Oscillations.**Status** – Completed
2. **Title:** Certification of Quality of Epoxy Bonding Agent used in 2.5 Km Long Pre-cast Match cast Segmental Via-Duct over Mysore Road.
Funding Agency: M/s Larsen & Toubro Ltd., ECC (Const.) Group, Bangalore
Project Period: 1997-98 (8 months, in phases)
Budget: Rs. 1.3 Lakhs
Consultants: Dr. Ananth Ramaswamy, Prof. B.K. Raghu Prasad and Dr. K.S. Nanjunda Rao
Objectives:
 - Conduct tests on the given epoxy-bonding agent as per the FIP (European) code.
 - Evaluate and certify the suitability of the epoxy-bonding agent for segmental bridge construction.**Status:** Completed
3. **Title:** Certification of Quality of Epoxy Bonding Agent used in Pre-cast Match cast Segmental Bridge construction.
Funding Agency: M/s Fosroc Chemicals (India) Ltd., Bangalore
Project Period: 1998 (8 months in phases)
Budget: Rs. 50,000.

Consultants: Dr. Ananth Ramaswamy, Prof. B.K. Raghu Prasad and Dr. K.S. Nanjunda Rao

Objectives:

- Conduct tests on the given epoxy-bonding agent as per the FIP (European) code.
- Evaluate and certify the suitability of the epoxy-bonding agent for segmental bridge construction.

Status: Completed.

4. **Title:** Certification of Quality of Epoxy Bonding Agent used in Pre-cast Match cast Segmental Bridge construction.

Funding Agency: M/s Sanfield India Ltd., Bhopal

Project Period: 1998-99 (8 months in phases)

Budget: Rs. 50,000.

Consultants: Dr. Ananth Ramaswamy, Prof. B.K. Raghu Prasad and Dr. K.S. Nanjunda Rao

Objectives:

- Conduct tests on the given epoxy-bonding agent as per the FIP (European) code.
- Evaluate and certify the suitability of the epoxy-bonding agent for segmental bridge construction.

Status: Completed.

5. **Title:** Structural Analysis / Adequacy of Shear Keys Provided for Markandaya Dam Project

Funding Agency- M/s Koimattur and Bellad Associates, Dharwad

Project Period - One Month, 1999

Budget Estimates: Rs. 25,000/-

Consultant: Dr. J.M. Chandra Kishan, Dr. Ananth Ramaswamy

Objectives:

- Evaluate the Designed Shear Key for Structural Adequacy
- Specify the Required Concrete Strength

Status- Completed.

6. **Title:** Certification of Quality of Epoxy Bonding Agent used in Pre-cast Match cast Segmental Bridge construction.

Funding Agency: M/s Fosroc Chemicals (India) Ltd., Bangalore

Project Period: 1999

Budget: Rs. 75,000.

Consultants: Dr. Ananth Ramaswamy, Prof. B.K. Raghu Prasad and Dr. K.S. Nanjunda Rao

Objectives:

- Conduct tests on the given epoxy-bonding agent as per the FIP (European) code.
- Evaluate and certify the suitability of the epoxy-bonding agent for segmental bridge construction.

Status: Completed

7. **Title:** Determination of Tensile Bond Strength.

Funding Agency: Karnataka Power Corporation, Bangalore

Project period: 1 month, 2000

Budget: Rs. 55,000.

Consultants: Prof. B.K. Raghu Prasad, Dr. Ananth Ramaswamy, Dr. J.M. Chandra Kishan, Dr. K.S. Nanjunda Rao.

Objectives:

- Direct tensile strength tests of old and new concrete will be determined.
- Pull out tests on shear lugs, tensile strength of notched beams will be Determined.
- Tests on old masonry and new concrete will also be done.

Status- Completed

8. **Title-** Bamboo Arch Roofing and Composite Beams
Funding Agency- International Network of Bamboo and Rattan (INBAR), Beijing, China
Project Period: Six Months, 2001
Budget- Rs. 50,400/-
Consultant- Dr. Ananth Ramaswamy and Dr. J.M. Chandra Kishan
Objectives:
- Assess the design methods for Bamboo Reinforced Concrete Girders.
- Status-** Completed.
9. **Title-** Design Review of Overhead Water-tank for Koppal, Karnataka
Funding Agency- IC&T Pvt. Ltd., Bangalore
Project Period: One Month, May, 2000
Budget- Rs. 15,000/-
Consultant- Prof. B.R. Srinivasa Murthy and Dr. Ananth Ramaswamy
Objectives-
- Proof Check the design provided for the water tank.
- Status-** Completed.
10. **Title-** Design Review of Brigade Tower Software Park Building B, Bangalore
Funding Agency- M/s Brigade Group Constructions, Bangalore
Project Period: 2 Months, 2001-2002
Budget- Rs 3.79 Lakhs
Consultant- Dr. J.M. Chandra Kishan, Prof. Ananth Ramaswamy and Dr. K.S. Nanjunda Rao
Objectives-
- Examine the designs provided for the building and identify the possible source for the observed cracks in some beams and walls through both a load test and analysis.
 - Recommend repair and retrofit measures.
- Status-** Completed.
11. **Title-** Retrofit Measures to the Nethravathi steel truss bridge at KM 327 of National Highway 48, Bangalore-Mangalore Section
Funding Agency- Department of Public Works, Government of Karnataka
Project Period: 3 Weeks, 2002
Budget- Rs 1.95 Lakhs
Consultant- Prof. B. R. Srinivasamurthy and Prof. Ananth Ramaswamy
Objectives-
- Assess the damage in the steel truss road bridge, recommend retrofit measures and Specify safe traffic load for retrofitted bridge.
- Status-** Completed.
12. **Title-** Rehabilitation of the existing Brick Masonry Arch Bridge across Vrishabhavathy River on Magadi Road, Bangalore
Funding Agency- Bangalore Mahanagara Palike
Project Period: 18 Months, 2003-2005.
Budget- Rs 5.0 Lakhs
Consultant- Prof. B. R. Srinivasamurthy and Prof. Ananth Ramaswamy
Objectives-
- Conduct a load test and assess suitability of existing masonry arch bridge for Rehabilitation
 - Analyze, design and detail a rehabilitation scheme for a defunct Brick Masonry Arch bridge.
 - Monitor Implementation of the proposed rehabilitation scheme for the bridge, Including quality assurance

- Status** – Completed
13. **Title-** Expert review of highway interchange at Hosur road at chain-age 16.345, Bangalore
Funding Agency- Nandi Infrastructure Corridor Enterprise Limited, Bangalore
Project Period: 4 months, 2006
Budget- Rs 1.98 Lakhs
Consultant- Prof. Ananth Ramaswamy and Prof. J.M. Chandra Kishen
Objectives-
- Assess pile impact dynamic monitoring assessment studies for quality assurance.
 - Assess overall design of the interchange, including post-tensioning aspects.
- Status** – Completed
14. **Title-** Proof Checking of two (Curved) Road over Bridges at km 16/385 near Bangalore International Airport, Devanahalli,
Funding Agency- M/s Larsen & Toubro, ECC- Construction Division, Bangalore
Project Period: 1 Month, July, 2007.
Budget- Rs 2.69574 Lakh
Consultant- Prof. J.M. Chandra Kishen and Prof. Ananth Ramaswamy
Objectives-
- Analyze, and check design and details of the bridges.
 - Check and approve the drawings providing the structural details for the bridges
- Status** – Completed
15. **Title-** Proof checking of one (straight) Road over Bridges at km 16/385 near Bangalore International Airport, Devanahalli,
Funding Agency- M/s Larsen & Toubro, ECC- Construction Division, Bangalore
Project Period: 1 Month, October, 2007.
Budget- Rs 2.63956 Lakh
Consultant- Prof. J.M. Chandra Kishen and Prof. Ananth Ramaswamy
Objectives-
- Analyze, and check design and details of the bridges.
 - Check and approve the drawings providing the structural details for the bridges
- Status** – Completed
16. **Title-** Proof Checking of three Road over Bridges at km 508/129, 517/806, 524/263 on NH7.
Funding Agency- M/s Feedback Ventures, Bangalore
Project Period: 1 Month, November, 2007.
Budget- Rs 10.52160 Lakh
Consultant- Prof. B.K. Raghu Prasad, Prof. Ananth Ramaswamy and Prof. J.M. Chandra Kishen
Objectives-
- Analyze, and check design and details of the bridges.
 - Check and approve the drawings providing the structural details for the bridges
- Status** – Completed
17. **Title-** Proof Checking of Road under Bridge on NH7 Bangalore Salem Section
Funding Agency- National Highways, GOI
Project Period: 1 Month, January 2008.
Budget- Rs 3.6 2316Lakh
Consultant- Prof. J.M. Chandra Kishen and Prof. Ananth Ramaswamy
Objectives-
- Analyze, and check design and details of the box section and reaction slab.
 - Check and approve the drawings providing the structural details for the bridges
- Status** – Completed
18. **Title:** Proof Checking of Designs for underground water tanks at Kavaloor, Benikopa, Thondial

and Kavanoor.

Funding Agency: Karnataka Land Army Corporation

Period: four Months, April-August, 2008

Budget: Rs. 25000/-

Consultant: Prof. A.R.K. Rao and Prof. Ananth Ramaswamy

Objectives: Analyze, and check design details of water tanks and check and approve Drawings providing structural details.

Status: Completed

19. **Title:** Proof Checking of Temporary support structures need for casting and moving Road over bridge elements on NH7 at km 524/263.

Funding Agency- M/s Feedback Ventures, Bangalore

Project Period: 1 Month, September 2008.

Budget- Rs 1.9663 Lakhs

Consultant- Prof. J.M. Chandra Kishen and Prof. Ananth Ramaswamy

Objectives-

- Analyze, and check design and details of the temporary crib support structure design.
- Check and approve the drawings providing the temporary structural system.

Status – Completed

20. **Title-** Proof checking of one (straight) Road over Salem Undelepset Section

Funding Agency- M/s Scott Wilson, Bangalore

Project Period: 1 Month, December, 2008.

Budget- Rs 2.949 Lakh

Consultant- Prof. J.M. Chandra Kishen and Prof. Ananth Ramaswamy

Objectives-

- Analyze, and check design and details of the bridges.
- Check and approve the drawings providing the structural details for the bridge

Status – Completed

21. **Title** – Proof Checking Repair and Rehabilitation of Air India SATS Cargo Complex, BIAL, Bangalore.

Funding Agency M/s Larsen and Toubro, ECC-Construction Division, Bangalore

Project Period: 1 Month, January, 2009

Budget- Rs 1.9451 Lakh

Consultant- Prof. J.M. Chandra Kishen and Prof. Ananth Ramaswamy

Objectives-

- Analyze, and check design and details of the damaged Post-Tensioned slab.
- Assess need for repair and check rehabilitation suggested

Status – Completed

22. **Title:** Proof Checking of Temporary support structures need for casting and moving Road over bridge elements on NH7 at km 517/806.

Funding Agency- M/s KNR Constructions, Bangalore

Project Period: 1 Month, September 2009.

Budget- Rs 1.48684 Lakhs

Consultant- Prof. J.M. Chandra Kishen and Prof. Ananth Ramaswamy

Objectives-

- Analyze, and check design and details of the temporary crib support structure design.
- Check and approve the drawings providing the temporary structural system.

Status – Completed.

23. **Title-** Proof Checking of one Road under Bridge and two Road over bridges in the Mangalore Udupi Section

Funding Agency- National Highways, GOI

Project Period: 1 Month, August 2010.

Budget- Rs 10.89764 Lakh

Consultant- Prof. J.M. Chandra Kishen and Prof. Ananth Ramaswamy

Objectives-

- Analyze, and check design and details of the box section and reaction slab.
- Check and approve the drawings providing the structural details for the bridges

Status – Completed.

24. **Title-** Proof Checking of four RC Road Bridge on National Highway near Bijapur Section

Funding Agency- M/s KNRCL, Bangalore

Project Period: 1 Month, October 2010.

Budget- Rs 3.50533 Lakh

Consultant- Prof. J.M. Chandra Kishen and Prof. Ananth Ramaswamy

Objectives-

- Analyze, and check design and details of the RC Slab and Girder Bridges.
- Check and approve the drawings providing the structural details for the bridges

Status – Completed

25. **Title-** Proof Checking of two Prestressed Concrete Road Bridges on National Highway at Bijapur Section

Funding Agency- M/s KNRCL, Bangalore

Project Period: 1 Month, October 2010.

Budget- Rs 3.95756 Lakh

Consultant- Prof. J.M. Chandra Kishen and Prof. Ananth Ramaswamy

Objectives-

- Analyze, and check design and details of the PCC bridge girder and slab bridge.
- Check and approve the drawings providing the structural details for the bridges

Status – Completed

26. **Title-** Proof Checking of two RC box type Road Bridge on National Highway in Bijapur Section

Funding Agency- M/s KNRCL, Bangalore

Project Period: 1 Month, November 2010.

Budget- Rs 3.66196 Lakh

Consultant- Prof. J.M. Chandra Kishen and Prof. Ananth Ramaswamy

Objectives-

- Analyze, and check design and details of the box section and reaction slab.
- Check and approve the drawings providing the structural details for the bridges

Status – Completed

27. **Title-** Design review of Bridge over Krishna River at km 740.

Funding Agency- M/s India Infrastructure Engineers, Ltd

Project Period: 1 Month, November 2010.

Budget- Rs 4.32376 Lakh

Consultant- Prof. J.M. Chandra Kishen and Prof. Ananth Ramaswamy

Objectives-

- Analyze, and check design and details of the multi-span prestressed box span and prestressed girder span having alternate stitched spans providing continuity.
- Check and approve the drawings providing the structural details for the bridges

Status – Completed

28. **Title-** Design review in-house analysis and design of Tech Box Structures

Funding Agency- M/s Reinforced Earth, Ltd

Project Period: May 2011.

Budget- Rs 1.47802 Lakh

Consultant- Prof. Ananth Ramaswamy

Objectives-

- Analyze, and check design and details of typical precast Tech-box units and their placement in multiple units as a bridge under IRC loads.
- Check and approve the drawings providing the structural details for the units

Status – Completed

29. **Title-** Proof Checking of one Road under Bridge (RUB) No. 516C KM 4/939 between Yalahanka and Krishnarajapuram stations

Funding Agency- National Highways, GOI

Project Period: 1 Month, August 2011.

Budget- Rs 3.89 Lakh

Consultant- Prof. J.M. Chandra Kishen and Prof. Ananth Ramaswamy

Objectives-

- Analyze, and check design and details of the box section and reaction slab.
- Check and approve the drawings providing the structural details for the bridges

Status – Completed.

30. **Title-** Proof Checking of one Road over Bridge (ROB) Chain-age 197.0303 at Kannur-Vengalam-Kutipuram on NH 17

Funding Agency- M/s Scott Wilson

Project Period: 1 Month, from August 2011-12.

Budget- Rs 3.88256 Lakh

Consultant- Prof. J.M. Chandra Kishen and Prof. Ananth Ramaswamy

Objectives-

- Analyze, and check design and details of the PCC bridge girder and slab bridge.
- Check and approve the drawings providing the structural details for the bridges

Status – Completed.

31. **Title-** Proof Checking of one Road over Bridge (ROB) Chain-age 187.024 at Kannur-Vengalam-Kutipuram on NH 17

Funding Agency- M/s Scott Wilson

Project Period: 1 Month, from August 2011-12.

Budget- Rs 3.93771 Lakh

Consultant- Prof. J.M. Chandra Kishen and Prof. Ananth Ramaswamy

Objectives-

- Analyze, and check design and details of the PCC bridge girder and slab bridge.
- Check and approve the drawings providing the structural details for the bridges

Status – Completed

32. **Title-** Proof Checking of one Road over Bridge (ROB) Chain-age 101-801 on NH 207

Funding Agency- M/s Transtroy (India) Ltd, Devanhalli, Bangalore.

Project Period: 1 Month, September 2013.

Budget- Rs 3.44945 Lakh

Consultant- Prof. J.M. Chandra Kishen and Prof. Ananth Ramaswamy

Objectives-

- Analyze, and check design and details of the Steel-composite bridge girder and slab bridge.
- Check and approve the drawings providing the structural details for the bridges

Status – Ongoing

33. **Title-** Proof Checking of one Road over Bridge (ROB) Chain-age 83-816 on NH 207

Funding Agency- M/s Transtroy (India) Ltd, Devanhalli, Bangalore.

Project Period: 1 Month, September 2013.

Budget- Rs 3.16855 Lakh

Consultant- Prof. J.M. Chandra Kishen and Prof. Ananth Ramaswamy

Objectives-

- Analyze, and check design and details of the PSC bridge girder and slab bridge.
- Check and approve the drawings providing the structural details for the bridges

Status – Ongoing

34. **Title-** Proof Checking of one Road over Bridge (ROB) Chain-age 131-860 on NH 207

Funding Agency- M/s Transtroy (India) Ltd, Devanhalli, Bangalore.

Project Period: 1 Month, September 2013.

Budget- Rs 3.33709 Lakh

Consultant- Prof. J.M. Chandra Kishen and Prof. Ananth Ramaswamy

Objectives-

- Analyze, and check design and details of the PSC bridge girder and slab bridge.
- Check and approve the drawings providing the structural details for the bridges

Status – completed

35 **Title-** Design review of in-house analysis and design of Tech Box Structures for Road Interchange at Marthahalli, Bangalore.

Funding Agency- M/s Reinforced Earth, Ltd

Project Period: October 2014.

Budget- Rs 3.29802 Lakh

Consultant- Prof. Ananth Ramaswamy

Objectives-

- Analyze, and check design and details of typical precast Tech-box units and their placement in multiple units as a bridge under IRC loads.
- Check and approve the drawings providing the structural details for the units

Status – Completed

36 **Title-** Evaluate the Design Concept of EcBcDc Technology for High rise Construction

Funding Agency- M/s Chetna Consulting Engineers.

Project Period: December 2014.

Budget- Rs 2.9802 Lakh

Consultant- Prof. Ananth Ramaswamy

Objectives-

- Analyze, and check design and details of typical High rise structure based on EcBcDc basis

Status – Completed.

37 **Title-** Design review of in-house analysis and design of Tech Box Structures for Road Interchange at Marthahalli, Bangalore.

Funding Agency- M/s Reinforced Earth, Ltd

Project Period: April 2015

Budget- Rs 1.68 Lakh

Consultant- Prof. Ananth Ramaswamy

Objectives-

- Analyze, and check design and details of typical precast Tech-box units and their placement in multiple units as a bridge under IRC loads.
- Check and approve the drawings providing the structural details for the units

Status – Completed

38 **Title** Proof Checking of 250m Steel Transmission Tower

Funding Agency: Bharath Electronics Limited (BEL), Bangalore.

Project Period: June-August 2016

Budget: Rs 3.56 Lakhs

Consultant Prof. Ananth Ramaswamy

Objectives: Analyze and check the design and detailing of a Lattice Tower for Codal Compliance.

Status: Completed.

39 Title: Proof Checking EWS Housing in Ejipura, Bangalore

Funding: M/S Garuda, Bangalore.

Budget: Rs 13.2Lakhs

Consultant- Prof. Ananth Ramaswamy

Objectives Proof Checking Analysis and Design of Three Tower Construction of EWR Housing in Ejipura, Bangalore.

Status: In Progress.