# BHAIRAVAVAJJULA NAGESWARA RAO
## (B N Rao)

Office Address
Professor, Department of Civil Engineering
STR208, Structural Engineering Division
Indian Institute of Technology Madras
Chennai, PIN 600 036, India
Tel: 91-44-22574285 (office) /91-9444743191 (mobile)
Fax: 91-44-22575286 (office)
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Home Address
Qtrs. No. C2-6-6A (Marutham Building)
Indian Institute of Technology Madras
Chennai, PIN 600 036, India
Tel: 91-44-22576285 (home)

**Research Interests:**

- Research interests include computational solid/facture mechanics, finite element analysis, meshless analysis, structural reliability, stochastic mechanics, fuzzy structural analysis, dimension reduction methods, and related fields.

**Scopus ID:** 24462032800

**ResearcherID www.researcherid.com of Thomson ISI:** C-1484-2013

**Education:**

- **Ph.D.** (Structures, Mechanics & Materials) **[January 1998 – May 2002]**
  **The University of Iowa**, Iowa City, IA 52242-1527, USA
  **Dissertation Title:** Stochastic Meshless Methods for Deformation and Fracture in Materials and Structures
  **Thesis Advisor:** Professor Sharif Rahman

- **M.E.** (Civil Engineering) **[August 1992 - March 1994]**
  **The Maharaja Sayajirao University of Baroda,** Vadodara, Gujarat, India
  **Dissertation Title:** Study of Strength Characteristics and Toughness Indices of Plain and Fiber Reinforced Concrete
  **Thesis Advisor:** Professor Anandji Kalyanji Shah

- **B.Tech.** (Civil Engineering) **[August 1988 - June 1992]**
  **Jawaharlal Nehru Technological University**, Hyderabad, Andhra Pradesh, India
  **Final Project Title:** Design of a Multi-Storied Building and an Auditorium
  **Project Advisor:** Professor K. Surayya

**Professional Experience:**

- **Professor** **[July 2013 – Present]**
  **Department of Civil Engineering**
  **Indian Institute of Technology Madras**

- **Associate Professor** **[March 2009 – July 2013]**
  **Department of Civil Engineering**
  **Indian Institute of Technology Madras**

- **Assistant Professor** **[May 2004 – March 2009]**
  **Department of Civil Engineering**
  **Indian Institute of Technology Madras**

- **Post Doctoral Research Scholar** **[May 2002 – May 2004]**
  **Center for Computer Aided Design**
  **The University of Iowa**

- **Graduate Research Assistant** **[January 1998 – May 2002]**
  **Center for Computer Aided Design**
  **The University of Iowa**

- **Teaching Assistant** **[January 1999 - December 2000]**
  **The University of Iowa**

- **Lecturer** **[September 1995 - January 1998]**
  **The University of Technology**, Kingston, Jamaica, West Indies

- **Lecturer** **[August 1994 - September 1995]**
  **Jawaharlal Nehru Technological University**, College of Engineering, Kakinada, India

**Teaching Activities at IIT Madras:**

| Courses Teaching / Taught | Student level |
|---|---|
| CE2020: Structural Analysis | B.Tech |
| CE2310: Mechanics of Materials | B.Tech |
| CE3050: Basic Structural Steel Design | B.Tech |
| CE3060: Basic Reinforced Concrete Design | B.Tech |
| CE3080: Computer Methods in Civil Engineering | B.Tech |
| CE3100: Structural Engineering Laboratory | B.Tech |
| CE5380: Structural Design of Foundations | M.S./M.Tech/PhD |
| CE5610: Finite Element Analysis | B.Tech/M.S./M.Tech/PhD |
| CE5650: Computing Skills | M.S./M.Tech/PhD |
| CE5680: Soil Structure Interaction Analysis | M.S./M.Tech/PhD |
| CE5730: Probability Methods in Civil Engineering | M.S./M.Tech/PhD |
| CE5740: Experimental Techniques | M.S./M.Tech/PhD |
| CE5760: Special Topics in Advanced Structural Mechanics | M.S./M.Tech/PhD |
| CE6770: Finite Element Analysis Software Laboratory | M.S./M.Tech/PhD |
| CE7770: Computational Fracture Mechanics | B.Tech/M.S./M.Tech/PhD |

In addition, involved in organizing Industrial Seminar course for B.Tech and M.Tech students.

Developed *NPTEL* "Finite Element Analysis (Video)" Course (http://nptel.iitm.ac.in/syllabus/105106051/)

**Research Guidance at IIT Madras:**

| Research degree | Name of the scholar | Title of thesis | Year of award | Guide/ co-guide |
|---|---|---|---|---|
| **Ph.D.** | Mr. Rajib Chowdhury (CE04D025) | High Dimensional Model Representation for Structural Reliability Analysis | July 2008 | Guide (main)<br><br>(Co-guide Prof. A Meher Prasad, CE) |
| **Ph.D.** | Mr. R. Munirami Reddy (CE04D020) | Sensitivity and Probabilistic Fracture Analysis Using Fractal Finite Element Method | July 2009 | Guide (main) |
| **Ph.D.** | Mr. Rajesh K N (CE06D028) | Coupled Meshfree and Fractal Finite Element Method for Fracture Mechanics and Unbounded Domain Problems | January 2010 | Guide (main) |
| **Ph.D.** | Mr. Arun C O (CE05D002) | Stochastic Meshfree Method for Elasto-Plastic Damage Analysis | February 2010 | Guide (main)<br><br>(Co-guide Prof. S M Sivakumar, AM ) |
| **Ph.D.** | Mr. A. S. Balu (CE06D017) | Efficient Method for Structural Reliability Bounds Estimation under Mixed Uncertainties | December 2011 | Guide (main) |
| **Ph.D.** | Mr. M. V. N. Sivakumar (CE06D025) | Probabilistic Fracture Analysis of Through Wall Cracked Pipes Using Strain Based Approach | September 2012 | Guide (main)<br><br>(Co-guide Prof. S R Satish Kumar, CE ) |
| **Ph.D.** | Mr. S. Muthulingam (CE10D028) | Numerical Analysis of Chloride-Induced Steel Rebar Corrosion in Concrete Exposed to Natural Chloride Environment | July 2014 | Guide (main) |
| **Ph.D.** | Mrs. Jayalakshmi S (CE09D009) | Engineering Models for Seismic Activity in India | December 2014 | Guide (main)<br><br>(Co-guide Dr. S T G Raghukanth, CE ) |
| **M.S.** | Ms. N. V. | Fuzzy Finite Element | July 2008 | Co-Guide |

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|---|---|---|---|---|
| | Sunitha (CE05S008) | and Meshless Methods for Soil Structure Interaction Problems | | (Guide (main) Dr. G. R. Dodagoudar, CE) |
| **M.S.** | Mr. B. Nandulal (CE04S009) | Element Free Galerkin Method for Bimaterial Interface Crack | July 2008 | Co-Guide<br><br>(Guide (main) Prof. C. Lakshmana Rao, AM) |
| **M.S.** | Mr. Dhrubajyoti Mukherjee, (CE08S004) | Fully Equivalent Operational Model and Sensitivity Analysis of Unreinforced Masonry Structures | August 2010 | Co-Guide<br><br>(Co-guide Prof. A Meher Prasad, CE) |
| **M.S.** | Mr. Mohammad Ghouse Pasha (AM07S002) | Numerical Modeling of Failure in Cement Concrete using a Unit Cell Approach | November 2010 | Co-Guide<br><br>(Guide (main) Prof. C. Lakshmana Rao, AM) |
| **M.S.** | Mr. R Raghu Rajan (AM06S012) | Numerical Study of Bi-Material Interface Crack Problems | December 2010 | Co-Guide<br><br>(Guide (main) Prof. K. Ramesh, AM) |
| **M.S.** | Mrs. Aysha Kalanad (CE08S006) | Structural Crack Diagnosis Using Improved Cracked Finite Element and Genetic Algorithm | December 2010 | Guide (main) |
| **M.S.** | Mr. D Vijai Anand (AM09S014) | Efficient Extraction of Vortex Structures Using Reduced Order Methods | July 2012 | Co-Guide<br><br>(Guide (main) Dr. B. S. V. Prasad Patnaik, AM) |
| **M.S.** | Mrs. Anju Krishnan (CE10S006) | Reliability Analysis of Raft Foundations | July 2012 | Co-Guide<br><br>(Guide (main) Dr. G. R. Dodagoudar, CE) |

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|---|---|---|---|---|
| **Dual Degree in Civil Engineering** | Mr. S Sagar Goud (CE09B050) | Thermo-Hydro-Mechanical Behavior of Concrete | May 2014 | Guide (main) |
| **M.Tech** | Mr. Bayisa Bekele Lemma (CE12M103) | Finite Element Analysis and Parametric Study of Concrete Box Girder Bridge | May 2014 | Guide (main) |
| **M.Tech** | Mr. Saurabh Samant (CE12M119) | Finite Element Investigation of Corroded Reinforced | May 2014 | Guide (main) |

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|---|---|---|---|---|
| | | Concrete Beams | | |
| **M.Tech** | Mr. Sagadevan Radha (CE11M109) | Analysis, Modelling, and Optimization of Laminated Glass | May 2013 | Guide (main) |
| **M.Tech** | Mr. Athalekar Nikhil Atmaram (CE11M091) | Service life modeling of RC structures exposed to chloride environment | May 2013 | Guide (main) |
| **M.Tech** | Mr. Arun Mathews (CE10M102) | Analytical Fragility Curves for Highway Bridges | May 2012 | Guide (main) |
| **M.Tech** | Mr. Arunlal K (CE09M094) | Finite Element Analysis of Integral Abutment Bridges Subjected to Thermal Loading | May 2011 | Guide (main) |
| **M.Tech** | Mr. Ezhilan Muthu (CE09M100) | Numerical Study on Capacity of Biaxial Hollow Slabs | May 2011 | Guide (main)<br><br>(Co-Guide Dr. Amlan Kumar Sengupta, CE) |
| **M.Tech** | Mr. Kiran TA (ME09M142) | Scaled Down Modeling of Nuclear Containment Building | May 2011 | Guide (main)<br><br>(Co-Guide Dr. Shankar Krishnapillai, ME) |
| **M.Tech** | Mr. Mariappan M (CE08M089) | Seismic Fragility Curves Using HDMR Based Response Surface Approach | May 2010 | Co-Guide<br><br>(Guide (main) Prof. K. Ramesh, AM) |
| **M.Tech** | Mr. Nataraja G (CE08M090) | Stability Analysis of Steel Space Structures With System Parametric Uncertainties | May 2010 | Guide (main) |
| **M.Tech** | Mr. B.Sreehari (CE08M085) | Finite Element Analysis of Prestressed Concrete Structures | May 2010 | Guide (main) |
| **M.Tech** | Ms. S. Jayalakshmi (CE07M096) | Meshless Method for Bending and Buckling Analysis of Linear Members | May 2009 | Co-Guide<br><br>(Guide (main) Prof. V. Kalyanaraman, CE) |
| **M.Tech** | Mr. M. T. Narayana (CE07M101) | Application of Artificial Neural Networks in Structural Engineering | May 2009 | Guide (main) |
| **M.Tech** | Mr. V. Suriyamoorthy | Structural Uncertainty and Safety Analysis by | May 2009 | Guide (main) |

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|---|---|---|---|---|
| | (CE07M108) | Perturbation Techniques | | |
| **M.Tech** | Mr. S. Varun Babu (CE06M063) | Numerical Simulation of Concrete Target Under Ballistic Impact | May 2008 | Guide (main) |
| **M.Tech** | Mr. T. Hari Krishna (CE05M107) | Fatigue Life of Autofrettaged Pressurized Cylinder | May 2007 | Guide (main) |
| **M.Tech** | Mr. K. Purushotam Reddy (CE05M112) | Fracture Analysis of Functionally Graded Piezoelectric Materials | May 2007 | Guide (main) |
| **M.Tech** | Mr. R. Manikandan (CE05M109) | Fatigue Life Prediction Methodology for Automotive Spot-Welded Joints | May 2007 | Guide (main) |
| **M.Tech** | Mr. M. S. Majunath (CE05M110) | Reliability Analysis of Flip Chip Electronic Packages | May 2007 | Guide (main) |
| **M.Tech** | Ms. K. Aravinda Priyadrashini (CE04M053) | Coupled Finite Element-Moving Least Squares Technique for Stochastic Structural Response of Cracked Structures | May 2006 | Guide (main) |
| **M.Tech** | Ms. T. Meenakshi (CE04M064) | Dynamic Fracture Analysis of Cracks in Functionally Graded Materials | May 2006 | Guide (main) |
| **M.Tech** | Mr. Rajesh Ashokkumar (CE04M115) | Effect of Blow-Holes on the Reliability of a Cast Component | May 2006 | Guide (main) |
| **M.Tech** | Mr. Sayantan Paul (CE04M117) | A Modified Quarter Point Element for Fracture Analysis of Cracks | May 2006 | Guide (main) |

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| **B.Tech** | Praveen Kumar Aradhyula (CE10B009) | Design and Analysis of Tensegrity Structure – Pedestrain Bridge | May 2014 | Guide (main) |
| **B.Tech** | Mr. M. Abhimanyu Reddy (CE08B020) | Optimal Design of Water Tanks | July 2012 | Guide (main) |

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| **B.Tech** | Mr. N. V. Subba Rao (CE08B028) | Design Study of Tensegrity Based Pedestrian Bridge | May 2012 | Guide (main) |
| **B.Tech** | Mr.Sunder Prakash (CE05B043) | Optimum Design of Space Truss Systems using Fuzzy Sets | May 2009 | Guide (main) |
| **B.Tech** | Mr. Raj Kumar Yadav (CE02B027) | Numerical Analysis of Cracks in Structures | May 2006 | Guide (main) |
| **B.Tech** | Mr. P. Vamsi Krishna (CE02B038) | Study on Choice of *q* Function in stress Intensity Factor Evaluation | May 2006 | Guide (main) |

**Current M.S. thesis guidance (2 Students)**
Avinash N M G, CE14S007
Abishek A, CE15S002

**Current Ph.D. thesis guidance (6 Students)**
Prabhu Muthuganeisan, CE10D013, Co-Guide: Dr. S T G Raghukanth
Bennet Kuriakose, CE11D003, Co-Guide: Dr. G R Dodagoudar
P. Kurinjivelan, CE11D021
Sagadevan R, CE13D051
Sarathkumar T, CE14D056
Shereena O A, CE14D020

**Current M.Tech. & Dual Degree in Civil Engineering thesis guidance (2 Students)**
A. Thenamudhan, CE13M102
U. Ravi Kanth, CE10B097

**Current B.Tech. thesis guidance (0 Students)**

**Honors, Prizes, and Awards:**

DAAD German–Indian STAR for Study visit at TU Hamburg–Harburg, Germany [2010]
Alexander von Humboldt Research fellowship [2006]
6th World Congress on Computational Mechanics, Beijing, China, young investigator fellowship [2004]
7th US National Congress on Computational Mechanics, Albuquerque, USA, young investigator fellowship [2003]
Finalist in Student Paper Competition at ASME-PVP 2001 Conference, Atlanta, GA, USA [2001]
Graduate College Travel Awards, The University of Iowa [2001]
Department of Civil & Environmental Engineering Travel Awards, The University of Iowa [2000]
Research Assistantship, The University of Iowa [1998-2002]
Teaching Assistantship, The University of Iowa [1999-2000]
Scholarship for Post Graduate Studies in Engineering, Ministry of Human Resources Development, Government of India, India [1992-1994]
Merit Scholarship for Under Graduate Studies, Government of Andhra Pradesh, India [1988-1992]

**Professional Memberships & Service Activities:**

Life Membership of IndACM & Member of ASME, ASCE
Member of ASME Pressure Vessels and Piping Materials and Fabrication Technical Committee & Computer Technology Committee [2005-Present]
Editorial Board Member - Structural Monitoring and Maintenance [2014-Present]
Editorial Board Member - Civil-Comp Conference Series [2013-Present]
Research Funding Proposal Reviewer for Czech Science Foundation [2012, 2013, 2014]
Research Funding Proposal Reviewer for ARDB, India [2014]
Session developer, chairman, contributing editor and conference papers reviewer for "Fractal Finite Element Method" session at 9th World Congress on Computational Mechanics and 4th Asian Pacific Congress on Computational Mechanics, July 19-23, 2010, Sydney, Australia [2010]
Session developer, chairman, contributing editor and conference papers reviewer for "New and Emerging Computational Methods" session at 2007 ASME Pressure Vessels and Piping Conference, San Antonio, Texas, USA [2007]
Primary Organizer for "Fracture and Durability of Heterogenous Materials" minisymposium at International Conference on Computational & Experimental Engineering and Sciences–2005, IIT Madras, India [2005]
Primary Organizer for "Fracture and Durability of Heterogenous Materials" minisymposium at 8th US National Congress on Computational Mechanics, Texas, USA & 7th World Congress on Computational Mechanics, Los Angeles, CA, USA [2005 & 2006]
Session developer, chairman, contributing editor and conference papers reviewer for "Fracture and Durability of Heterogenous Materials" session at ASME Pressure Vessels and Piping Conference [2005 & 2006]
Session developer, chairman, contributing editor and conference papers reviewer for "New and Emerging Computational Methods" session at 2004 ASME Pressure Vessels and Piping Conference, La Jolla, San Diego, California, USA [2004]
Session developer, chairman, contributing editor and conference papers reviewer for "New and Emerging Computational Methods" session at 2003 ASME Pressure Vessels and Piping Conference, Ohio, USA [2003]
Research Funding Proposal Reviewer for National Science Foundation, USA [2003]
Research Funding Proposal Reviewer for Naval Research Board, India [2006, 2007]
Research Funding Proposal Reviewer for Broad of Research in Nuclear Sciences, India [2008]
Funding Proposal Reviewer for INDO-US SCIENCE & TECHNOLOGY FORUM, India [2008]
Conference papers reviewer for Interquadrennial conference of the International Congress on Fracture, Indian Institute of Science, 3-7 August 2008 [2008]
Conference papers reviewer for the first African Conference on Computational Mechanics (www.africomp.com), Africomp'09, Sun City, South Africa, 7-11 January 2008 [2008]

**Journal Article Reviewer for:**

Advances in Engineering Software; ASCE Journal of Structural Engineering; ASME Journal of Mechanical Design; ASME Journal of Pressure Vessel Technology; Applied Mathematics and Mechanics; Composite Structures; Composites Part B; Computer Methods in Applied Mechanics

and Engineering; Computers and Structures; Corrosion Science; Earthquake Engineering and Engineering Vibration; Engineering Computations; Engineering Fracture Mechanics; Engineering Structures; Finite Elements in Analysis and Design; Georisk; IEEE Transactions on Instrumentation and Measurement; International Journal of Fatigue; International Journal of Fracture; International Journal of Heat and Mass Transfer; International Journal of Solids and Structures; International Journal of Structural Changes in Solids; International Journal of Thermal Sciences; International Journal of Reliability and Safety; Inverse Problems in Science & Engineering; Journal of Agricultural Science and Technology, Islamic Republic of Iran; Journal of Computational Physics; Journal of Materials in Civil Engineering; Journal of Zhejiang University-SCIENCE A; Materials and Structures; Mathematical Problems in Engineering; Neural Computing and Applications; Probabilistic Engineering Mechanics; Proceedings A – Royal Society; Reliability Engineering & System Safety; Results in Physics; Sadhana; Science and Engineering of Composite Materials; Structural Engineering and Mechanics; Indian Geotechnical Journal; Indian Journal of Engineering & Materials Sciences

**Invited Lectures and Seminars:**

- Delivered an invited talk titled on "Finite Element Method" as part of two-day workshop on 'Computational Mechanics', at Civil Engineering Department of RVR & JC College of Engineering, Guntur,15th and 16th July 2014.
- Delivered an invited talk titled on "Finite Element Analysis" as part of "Staff Development Programme" in "Recent and Future Trends in Industrial Mathematics for Engineers", at National Institute Science & Technology, Palur Hills, Berhampur, Orissa, 24th March 2012.
- Delivered a guest lecture titled "Structural Analysis" at RMK Engineering College, 25th February 2012.
- Delivered an invited talk titled "Coupled Meshfree-Fractal Finite Element Method for Fracture Mechanics and Unbounded Domain Problems" in the Weekly seminar 8th September, 2011, Department of Mathematics, IIT Madras, 8 September, 2011.
- Delivered an invited talk titled "Application of Nanotechnology in Civil Engineering" in the "National Conference on Application of Nanotechnology in Construction Materials (NACONMA 2011)", Periyar Maniammai University, Periyar Nagar, Vallam Thanjavur - 613 403, Tamil Nadu, India, 25-26 August 2011.
- Delivered a guest lecture titled "Finite Element Analysis" at Vel Tech Dr.RR & Dr.SR Technical University Avadi, Chennai-62, 16 July, 2011.
- Delivered a guest lecture titled "Introduction to Stochastic FEM", in the Numerical Methods for Optimal Designs in Geotechnical Engineering short term training program in the Civil Engineering Department, IIT Madras (January 17-22, 2011).
- Delivered a guest lecture titled "FEM modeling on electro-magneto mechanical systems", in the Introduction to Smart Materials and Structures short term training program in the Applied Mechanics Department, IIT Madras (January 5-8, 2011).
- Delivered an invited talk in the Topical Meeting of the "Advanced Facility for Research in Reliability Engineering-BARC", IIT Kharagpur, India, Feb 7-9, 2010.
- Delivered an invited talk titled "Finite Element Analysis" in the "Faculty Development Programme", Vel Tech Technical University, Avadi, Chennai Tamilnadu, India, 7-9 January 2010.
- Delivered an invited talk titled "Finite element Method" & "Plates and Shells" in the "Faculty Development Programme", Meenakshi Sundararajan Engineering College, Chennai, Tamilnadu, India, 18 December 2006.
- Delivered an invited talk titled "Meshfree Methods for Solving Boundary Value Problems" in the National Conference on Advanced Computing Techniques in Civil Engineering (ACTCE), St. Peter's Engineering College, Avadi, Chennai, Tamilnadu, India, 1-2 March 2006.
- Delivered an invited talk titled "Meshfree Methods: An Alternative to Finite Element Method" in the National Conference on Composite Component Construction, JNTU College of Engineering, Kakinada, India, Sep 12-13, 2005.
- Delivered an invited seminar talk titled "Functionally Graded Materials" in the Department of Civil Engineering, NIT Warangal (February 2005).
- Delivered an invited seminar talk titled "Fracture Analysis of Functionally Graded Materials" in the Applied Mechanics Department, IIT Madras (July 2004).
- Delivered an invited seminar talk titled "Stochastic Meshless Methods in Computational Solid Mechanics" in the Civil Engineering Department, IIT Madras (August 2004).

- Delivered an invited seminar talk titled "A Meshfree Method for Computational Stochastic Mechanics" in the Civil Engineering Department, IISc Bangalore (August 2004).
- Delivered a guest lecture titled "Efficient Methods for Fracture Analysis of Cracks", in the Fracture Mechanics of Concrete short term training program in the Civil Engineering Department, IIT Madras (29 November-3 December 2004).

**Short Term Training Courses Coordination:**

| Sl. No. | Title of Course | Funding Agency |
|---|---|---|
| 1 | Finite Elements in Earthquake Engineering (4-8, July 2005) | MHRD under NPEEE |
| 2 | Probability Methods in Earthquake Engineering (11-15, July 2005) | MHRD under NPEEE |
| 3 | Introduction to the Finite Element Method (November 4-6, 2005) | Short Term Training Programme under QIP |
| 4 | Advanced Mechanics of Solids and Structures (December 26-30, 2005) | Short Term Training Programme under QIP, AICTE, New Delhi |
| 5 | Finite Element Seismic Analysis (20-24 March, 2006) | MHRD under NPEEE |
| 6 | Computational Techniques for Seismic Analysis (18-22 December, 2006) | MHRD under NPEEE |
| 7 | Random Vibration and Fuzzy Logic in Earthquake Engineering (25-29 December, 2006) | MHRD under NPEEE |
| 8 | A First Course in the Finite Element Method (21–25, May 2007) | CEP course |
| 9 | Basics of Matrix and Finite Element Analysis of Structures (5–10, October 2009) | Short Term Training Programme under QIP |
| 10 | Finite Element Modelling of Concrete Structures (12–16, October 2009) | CEP course |

**Sponsored Research Project Funding:**

**Completed:**

| Sl.No. | Title | Date of start & Date of completion | Value of Project | Agency & Ref. No. |
|---|---|---|---|---|
| 1 | Development of extended Finite Element Method (XFEM) Software for Fracture Analysis of Cracks (Co-PI: Prof. A Meher Prasad) | 07/07/2009 to 06/07/2011 | Rs. 1132100 | Board of Research in Nuclear Sciences (BRNS), DAE Sanction No: 2008/36/13-BRNS/191 Project No: CIE0910156BRNSBNAE |
| 2 | Structural Reliability of Reactor Vault Cooling System | 10/11/2005 to 09/02/2007 | Rs. 320400 | Indira Gandhi Center for Atomic Research Project No: CIE0506105IGCABNAE |
| 3 | Reliability Analysis of Reinforced and Pre-Stressed Concrete Structures (Co-PI: Prof. A Meher Prasad) | 09/03/2005 to 31/07/2008 | Rs. 2522600 | Board of Research in Nuclear Sciences (BRNS), DAE Sanction No: 2004/36/39-BRNS/2332 Project No: CIE0405095BRNSBNAE |
| 4 | Multiscale Fracture Analysis of Functionally Graded Materials | 08/04/2005 to 31/10/2008 | Rs. 1016400 | Department of Science & Technology (DST) under Fast Track Proposals for Young Scientists scheme Project No: CIE0506097DSTXBNAE |
| 5 | Studies on Fatigue Crack Growth Bahaviour under Multi-Axial Stress State (PI: Dr. S. R. Satish Kumar) | 23/03/2006 to 31/10/2009 | Rs. 1527600 | Indira Gandhi Center for Atomic Research Project No: CIE0506104IGCASRSA |
| 6 | Simulation of Ballistic Impact on Amour Plates (PI: Prof. C Lakshmana Rao, AM) | 01/09/2006 to 31/07/2008 | Rs. 976000 | Proof & Experimental Establishment (PXE), Balasore Project No: RB0607APM001PXEXCLAK |
| 7 | Dynamic fracture | 16/08/2004 to | Rs. 500000 | IC & SR, IIT Madras |

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| | analysis of functionally graded materials | 31/03/2009 | | Sanction No: CIE0405112NFSCBNAE |

**Ongoing:**

| Sl.No. | Title | Date of start & Date of completion | Value of Project | Agency & Ref. No. |
|---|---|---|---|---|
| 1 | Reliability Based Optimal Design of FBR Base Raft (Co-PIs: Dr. G. R. Dodagoudar, & Prof. Devdas Menon) | 24/12/2010 to 23/12/2012 | Rs. 2994341 | Indira Gandhi Center for Atomic Research Project No: RB1011CIE008IGCABNAE |
| 2 | Experimental and Analytical Studies on Two-Way Hollow Core slabs (Co-PI: Dr. Amlan K Sengupta) | 12/02/2013 to 11/02/2016 | Rs. 3850000 | Department of Science & Technology (DST) Project No: CIE1213203DSTXBNAE |
| 3 | Development of robust data assimilation techniques for nonlinear dynamical systems (Co-PI: Prof. A Meher Prasad) | 17/03/2014 to 31/03/2016 | Rs. 2328000 | Board of Research in Nuclear Sciences (BRNS), DAE Sanction No: 2013/36/45-BRNS Project No: CIE1314216BRNSBNAE |
| 4 | Experimental study on CICABLOC WALL | 27/03/2014 to 26/03/2015 | Rs. 561800 | CICABLOC Construction Private Limited, Vadodara, Gujarat Project No: RB1314CIE020CICABNAE |
| 5 | 3rd Party Quality Control of APMSIDC Works - (1) Construction of College building for Sri Padamavathi Medical College for Women at Tirupathi in Chittoor District (2) Construction of Hospital building in | 01/12/2014 to 30/11/2017 | Rs. 4000000 | Andhra Pradesh Medical Services Infrastructure Development Corporation, Hyderabad Project No: RB1415CIE011APMSBNAE |

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| | the premises of Govt. Medical College at Nellore in SPSR Nellore District | | | |
| 6 | (1) Finite Element Analysis & Design Check of Aeration Tank; and (2) Rebound Hammer Testing of Concrete Foundation of Aeration Tank | 05/03/2015 to 01/09/2015 | Rs. 147360 | DFE Pharma India LLP, Cuddalore<br>Project No: RB1415CIE015DFEPBNAE |
| 7 | Centre for finite element analysis and design (CFEAD)<br>(PI: Prof. A Meher Prasad) | 01/08/2012 to 31/12/2013 | Rs. 3000000 | Tata Consultancy Services<br>Project No: RB1213CIE009TATCAMEH |
| 8 | National Centre for Safety of Heritage Structures(NCSHS)<br>(PI: Prof. CVR Murty) | 04/07/2013 to 31/03/2018 | Rs. 89092000 | MHRD Sanction No: 5-62013-TS-1<br>Project No: CIE1314210MHRDCVRM |

**Consultancy Project Funding:**

**Completed:**

| Sl.No. | Title | Date of start & Date of completion | Value of Project | Agency & Ref. No. |
|---|---|---|---|---|
| 1 | Proof-Checking of the Structural Design and Modifications of Building no. 7, BHEL, Bangalore (Joint with Prof. Devdas Menon) | 16/02/2006 to 31/10/2006 | Rs. 275500 | BHEL, Bangalore. Project No: IC0506CIE155BHELBNAE |
| 2 | Proof Checking the Design Calculation of Civil Structural Drawing of STP 100 KLD (Joint with Dr. G. R. Dodagoudar) | 08/02/2010 to 31/08/2010 | Rs. 30000 | Reva Project Engineers Project No: IC0910CIE156REVABNAE |
| 3 | FEA Validation of Display Booth | 10/03/2010 to 31/12/2010 | Rs. 55150 | Silicon Valley Auto Components Private Limited, Chennai Project No: IC0910CIE182SILIBNAE |
| 4 | Assessment of Strength of Dock Floor & Issue of Safety Certificate (Joint with Prof. R Sundaravadivelu) | 05/03/2010 to 31/12/2010 | Rs. 600000 | Cochin Shipyard Limited, Cochin Project No: IC0910CIE175COCNBNAE |
| 5 | Testing of Biaxial Hollow Slab (Joint with Dr. A. K. Sengupta) | 04/01/2010 to 31/12/2010 | Rs. 600000 | Soundarya Decorators Pvt. Ltd. Project No: IC0910CIE141SOUDBNAE |
| 6 | Proof Checking of Structural Design of PEB Hangar for INS GARUDA at Kochi (Joint with Prof. R Sundaravadivelu) | 25/10/2010 to 25/01/2011 | Rs. 220600 | Naval Base, Kochi Project No: IC1011CIE128NAVPBNAE |
| 7 | Certification of FE Analysis of 55 ft/113 ft | 1/12/2011 to 1/5/2012 | Rs. 220600 | Namakkal Transport Carriers Private Ltd., Chennai |

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| | Low/Flat Bed Trailer | | | Project No: IC1112CIE152NAMABNAE |
| 8 | Vetting of structural design calculations and drawings for 15MLD water treatment plant at HAL | 10/05/2012 to 10/02/2013 | Rs. 337080 | Megha Engineering and Infrastructure Ltd., Hyderabad Project No: IC1213CIE026MEGHBNAE |

**Ongoing:**

| Sl.No. | Title | Date of start & Date of completion | Value of Project | Agency & Ref. No. |
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| 1 | Design proof checking of steel PEB hanger & foundation for BSF at Naval Air Station Arakkonam | 09/10/2012 to 08/04/2013 | Rs. 500000 | Vardhman Precision Profiles & Tubes Pvt. Ltd., New Delhi Project No: IC1213CIE087VARDBNAE |
| 2 | Verification of Design calculation and Certification for Spreader Beam | 13/05/2013 to 12/05/2016 | Rs. 500000 | Namakkal Transport Carriers Private Limited Project No. IC1314CIE016AAAABNAE |
| 3 | Anchorage Efficiency, Load Transfer, Sheating Pipe Testing | 18/11/2013 to 17/11/2014 | Rs. 216443 | GVR Infra Projects Limited Project No. IC1314CIE100GVRIBNAE |
| 4 | HTS Strands - Mechnaical & Relaxation testing | 01/01/2014 to 31/12/2016 | Rs. 500000 | Simplex Infrastructures Limited, New Delhi Project No. IC1314CIE126AAAABNAE |
| 5 | Proof Checking of Civil Design for 2x660 MW Suratgarh STPS Stage - V | 20/01/2014 to 19/01/2015 | Rs. 1980345 | BHEL - PEM /Noida Project No. IC1314CIE129BHELBNAE |
| 6 | Calibration of Proving Ring | 01/03/2014 to 28/02/2017 | Rs. 500000 | NFA Nungambakkam, Chennai 600 034 Project No. IC1314CIE152AAAABNAE |
| 7 | Vetting of structural Design of Swimming Poll and Allied works at INS Agrani Coimbatore | 17/04/2014 to 16/10/2014 | Rs. 168540 | Kochi Naval Base Project No. IC1415CIE016KOCIBNAE |
| 8 | Structural Vetting of | 17/04/2014 to | Rs. 168540 | Kochi Naval Base |

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| | "Baffle Range" | 16/10/2014 | | Project No. IC1415CIE017KOCIBNAE |
| 9 | Validation of the Mill Bay Structure design | 23/06/2014 to 22/12/2014 | Rs. 112360 | Tractebel Consulting Engineers Pvt Ltd<br>Project No. IC1415CIE053TRAEBNAE |
| 10 | Strain,Deflection & Vibration Measurement on Chasis of a 2 Axle Semi Trailer | 03/07/2014 to 02/01/2015 | Rs. 168540 | SIGT Private Limited<br>Project No. IC1415CIE057SIGTBNAE |
| 11 | Strength and condition assessment of 300 M high RCC TV tower at HPT TV Rameswaram | 15/11/2014 to 14/05/2015 | Rs. 200000 | All India Radio<br>Project No: IC1415CIE137AIRXBNAE |
| 12 | Vibration Analysis of Shopping Mall in Kochi | 01/01/2015 to 30/06/2015 | Rs. 200000 | Lulu International Shopping Mall Pvt Ltd<br>Project No: RB1415CIE012LULUBNAE |
| 13 | Vetting of structural designs drawings and providing structural stability certificates for 3 residential towers in Coimbatore, Tamilnadu 641035 | 12/01/2015 to 05/07/2015 | Rs. 750000 | Alliance Mall Developers Co Pvt Ltd<br>Project No: IC1415CIE146ALLIBNAE |
| 14 | Proof Checking of Civil Design for 2x660 MW Suratgarh STPS Stage - V | 20/01/2014 to 19/07/2015 | Rs. 1980345 | BHEL - PEM /Noida<br>Project No: IC1314CIE129BHELBNAE |
| 15 | Structural Stability Assessment of Fire Affected Building (Godown) at Bangalore | 11/02/2015 to 10/08/2015 | Rs. 112360 | Rank Surveyors Pvt Ltd, Chennai<br>Project No: IC1415CIE159RANKBNAE |
| 16 | Testing of Geogrids | 12/02/2015 to 11/08/2015 | Rs. 150000 | Z-Tech (India)<br>Project No: IC1415CIE157ZTECBNAE |
| 17 | Vetting design & drawings of ROB structural design at KM55/228 of NH226 | 13/02/2015 to 12/08/2015 | Rs. 168540 | National Highway Authority of India<br>Project No: IC1415CIE152NATHBNAE |

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| 18 | Design validation of existing structure for solar panel fixing | 13/02/2015 to 12/08/2015 | Rs. 168540 | Asahi India Glass Ltd<br>Project No: IC1415CIE155ASAHBNAE |
| 19 | Design and vetting of road crossing culvert at Arakkonam | 17/02/2015 to 16/08/2015 | Rs. 337080 | MRF Private Limited, Chennai<br>Project No: IC1415CIE161MRFLBNAE |
| 20 | Inspection and structural testing of Kendriya Vidyalaya Coimbatore school building | 01-09-2014 to 01-09-2015 | Rs. 168540 | Kendriya Vidyalaya, Coimbatore<br>Project No: IC1415CIE124KENDBNAE |
| 21 | Design vetting of substructure & foundation of major bridge-New BG line-Southern Railway for major bridge at Ch. 16.424 m, Pandavaiyaru (Span 3×12.2 m) with bored piles of 1 m diameter | 10/09/2014 to 09/09/2015 | Rs. 112360 | GVR Infra Projects Ltd, Chennai<br>Project No: IC1415CIE092GVRIBNAE |
| 22 | Design proof checking & vetting for civil structural design of natural draught cooling tower for 2×660 MW Suratgarh Super Thermal Power Station | 10/09/2014 to 09/09/2015 | Rs. 842700 | BGR Energy Systems Ltd, Chennai<br>Project No: IC1415CIE094BGREBNAE |
| 23 | Proof Checking of Design for the Multi Level car Parking at Infosys Campus in Mahindra Industrial Park Ltd, Mahindra City in Maraimalai Nagar | 16/03/2015 to 11/09/2015 | Rs. 800000 | Consolidated Construction Consortium Ltd, Chennai<br>Project No: IC1415CIE177CONSBNAE |
| 24 | Structural Stability testing of cold storage unit is located at Mundrigi, KIADB Indl. Area, Bangalore Road, Bellary | 19/03/2015 to 15/09/2015 | Rs. 600000 | Rank Surveyors Pvt Ltd, Chennai<br>Project No: IC1415CIE182RANKBNAE |

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| 25 | Proof checking of design & drawings of bridges related to Kharsia to Dharamjaygarh railway project, Chattisgarh | 18/09/2014 to 17/09/2015 | Rs. 1235960 | IRCON International Limited, New Delhi<br>Project No:<br>IC1415CIE096IRCOBNAE |
| 26 | Validation of Mill Bay Structure design by M/s Cethar Limited, Trichy considering the need for access and safe & reliable power plant design of 30 years – 2 × 350 MW coastal thermal power plant at Thamminapattinam Village, SPSR Nellore District, Andhra Pradesh | 23/06/2014 to 22/10/2015 | Rs. 112360 | TRACTEBEL Consulting Engineers Private Limited, Chennai<br>Project No:<br>IC1415CIE053TRAEBNAE |
| 27 | Approval and Vetting of Design and drawing of 80T ELL crane at Naval Shipyard, Visakhapatnam | 28/10/2014 to 27/10/2015 | Rs. 320000 | McNally Bharat Engineering Co. Ltd., Kolkata<br>Project No:<br>IC1415CIE117MCNABNAE |
| 28 | Design vetting and certification of 80 MT lifting spreader beam | 13/05/2013 to 12/05/2016 | Rs. 500000 | Namakkal Transport Carriers (P) Limited, Chennai<br>Project No:<br>IC1314CIE016AAAABNAE |
| 29 | HTS Prestressing Strands - Mechanical & Relaxation Testing | 18/11/2013 to 19/02/2018 | Rs. 3000000 | Consolidated Construction Consortium Ltd, Chennai<br>Project No:<br>IC1314CIE099AAAABNAE<br>IC1314CIE126AAAABNAE<br>IC1415CIE027AAAABNAE<br>IC1415CIE085AAAABNAE<br>IC1415CIE147AAAABNAE<br>IC1415CIE158AAAABNAE |
| 30 | Calibration of Proving Ring | 01/03/2014 to 28/02/2017 | Rs. 500000 | ITD Cementation India Limited, New Delhi 110034<br>Project No:<br>IC1314CIE152AAAABNAE |
| 31 | Testing of Heavy | 23/06/2014 to | Rs. 500000 | Nig Enterprise, Mumbai |

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| | Duty Tower for Ultimate Load Carrying Capacity | 22/06/2017 | | Project No: IC1415CIE049AAAABNAE |
| 32 | Hydraulic Jack Calibration | 01/08/2014 to 31/07/2017 | Rs. 1000000 | L&T Construction, Chennai Project No: IC1415CIE072AAAABNAE IC1415CIE115AAAABNAE |

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- **Books/Monographs**

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3. Reddy, R.M., and Rao, B.N., Fractal Finite Element Method, LAP Lambert Academic Publishing AG & Co. KG, 2010, ISBN-NR.: 978-3-8383-9483-1.
4. Arun, O. C., Rao, B.N., and Sivakumar, S.M., Stochastic Meshfree Method: For elasto-plastic damage analysis, LAP Lambert Academic Publishing AG & Co. KG, 2010, ISBN 978-3-8383-8297-5.
5. Balu, A.S., and Rao, B.N., Structural Reliability Bounds: Under Mixed Uncertainties, LAP Lambert Academic Publishing AG & Co. KG, 2012, ISBN 978-3-8484-0488-9.

- **Book Chapters**

1. Balu, A.S., and Rao, B.N., Multicut-High Dimensional Model Representation for Reliability Bounds, Numerical Methods for Reliability and Safety Assessment, Multiscale and Multiphysics Systems Kadry, Seifedine, Elhami, Abdelkhalak (Eds.), 2015, XII, 596 p., Springer; 2015 edition (14 October 2014), ISBN 978-3-319-07166-4.
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- **Refereed National Journals (Published / Accepted)**

1. Muthulingam, S., and Rao, B.N., "Effects of Rebar on Chloride Ingress in Steel Reinforced Concrete Components," SERC Journal of Structural Engineering, 2014 (In Press).
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