

KOMATHI MURUGAN, Ph. D.

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PROFILE

A doctorate in civil engineering, with structural engineering specialization. Executed extensive experimental, analytical and numerical investigations at all degree levels. Interested in a research-cum-teaching oriented career to keep updated knowledge and give back to society.

EDUCATION

Degree	Institution	Examination authority	Year of passing	% of marks / CGPA
Ph.D. Civil Engineering (Structural Engineering)	Indian Institute of Technology Madras, Chennai	Indian Institute of Technology Madras, Chennai	2011-2018 (with 13 months maternity break)	9.71
M.E. Structural Engineering	College of Engineering Guindy, Chennai	Anna University Chennai	2009-2011	9.96
B.E. Civil Engineering	S.R.M. Engineering College, Kattankulathur	Anna University Chennai	2002-2006	92.0%
H.S.C. (12 th)	Anna Gem Science Park Matriculation Higher Secondary School, Chennai	Tamil Nadu State Board	2002	96.1%
S.S.L.C. (10 th)	Shrine Vailankanni Senior Secondary School, Chennai	Central Board of Secondary Education	2000	88.4%

THESIS / PROJECT

- **Ph.D. Thesis**

Title: Seismic Strengthening of Shear-Critical Short Columns in Reinforced Concrete Buildings

Advisor: Dr. Amlan Kumar Sengupta

Summary: Examined the shear strength and behaviour of reinforced concrete jacketed short columns, through experimental, analytical and numerical investigations. Proposed guidelines and suggestions to improve the existing Indian codal provisions on seismic strengthening of reinforced concrete buildings.

- **M.E. Dissertation**

Title: Vulnerability Index for Mid-rise Buildings Using Performance-based Seismic Design Concept

Advisor: Dr. Jaya K. P.

Summary: Conducted numerical studies on seismically weak reinforced concrete mid-rise buildings of Indian context. Developed damage indices and fragility curves using ductility characteristics, adopting performance-based seismic design concept.

- **B.E. Project (Final)**

Title: Design of Cost Effective Steel Intensive Highway Inn

Advisor: Mrs. Santhana Selvi S.

Summary: Designed a commercial steel structure from roof to foundation, dodecagonal in plan, with three-dimensional tetrahedral space truss assembly as roof.

- **B.E. Project (Pre-final)**

Title: Design of an Industrial Shed

Advisor: Mrs. Santhana Selvi S.

Summary: Designed a steel structure for industry applications, with all the components from roof to foundation, including gantry girders.

PUBLICATION

JOURNAL

- **Komathi M.** and Sengupta A.K. (2018), Investigation of the Behaviour of Shear-Critical Reinforced Concrete Columns, *The Indian Concrete Journal*, Vol. 92, No. 2, pp. 10-24.
- **Komathi M.** and Sengupta A.K. (2018), An Investigation on Shear Strength of Reinforced Concrete Columns Strengthened by Concrete Jacketing, *Journal of Structural Engineering*, Council of Scientific and Industrial Research-Structural Engineering Research Centre, Vol. 45, No. 4, pp. 312-333.
- **Komathi M.** and Sengupta A.K. (2020), Performance of High-Strength Concrete as Jacket Material in Strengthening Applications, *The Indian Concrete Journal*, Vol. 94, No. 5, pp. 5-15.
- **Komathi M.** and Sengupta A.K. (2020), Seismic Performance of Strengthened Reinforced Concrete Columns, *Structures*, Elsevier, Vol. 27, pp. 487-505.
- **Komathi M.** and Sengupta A.K., Formulation of a Generalized Truss Analogy for the Analysis of Shear Behaviour of Short Jacketed Columns. (Under review with *Structural Engineering and Mechanics*, Techno Press, since September 2019)
- **Komathi M.** and Sengupta A.K., Modelling of Non-Linear Shear Hinges in Pushover Analysis of Buildings with Jacketed Columns. (Under review with *Journal of Earthquake Engineering*, Taylor & Francis, since October 2020)

- **Komathi M.** and Sengupta A.K., Utilization of special concrete to repair and strengthen reinforced concrete columns. (In draft for *Construction and Building Materials*, Elsevier)
- **Komathi M.** and Sengupta A.K., Guidelines to Design Reinforced Concrete Jacketed Sections using Generalized Truss Analogy and Transverse Reinforcement Index. (In draft for *Structural Engineering and Mechanics*, Techno Press)
- Stephen S. J., **Komathi M.** and Gettu R., Fracture Performance of Steel Fibre Reinforced Concrete Beams and its Application in Lining of Tunnels. (In draft for *Tunnelling and Underground Space Technology*, Elsevier)
- Paul S., **Komathi M.**, Gettu R. and Arnepalli D.N., A Proposed Methodology for the Flexural Design of Textile Reinforced Concrete Members. (In draft for *Journal of Materials Science*, Springer)
- **Komathi M.**, Paul S. and Gettu R., Examination of Textile Overlaps in Textile Reinforced Concrete. (In draft for *Composites Part B: Engineering*, Elsevier)

CONFERENCE

- Heins K., Dittel G., **Komathi M.**, Raina M., Gopinath S., Hentzschel O., Gettu R. and Gries T., Modular Lightweight Wastewater Treatment Plants made from TRC - Means to a Reliable Wastewater Treatment in Rural Areas, 75th RILEM Annual Week & International Conference on Advances in Sustainable Construction Materials and Structures, 29 August - 3 September 2021, Merida, Mexico. (Submitted and under review)
- **Komathi M.** and Sengupta A.K., Nonlinear Static Analysis for Shear of Short Columns in Buildings Strengthened by Concrete Jacketing, 17th World Conference on Earthquake Engineering, 27 September - 2 October 2021, Sendai, Japan. (Accepted and to be presented) (Published in proceedings with Paper ID 3b-003)
- **Komathi M.** and Sengupta A.K., Guidelines on Reinforced Concrete Jacketing of Columns and Performance of Special Concrete as Jacket Material, International Conference on Condition Assessment, Rehabilitation and Retrofitting of Structures CARRS 2020, 13-15 December 2021, IIT Hyderabad, India. (Submitted and under review)
- **Komathi M.**, Paul S. and Gettu R., Effect of Reinforcement Overlap on the Tensile Behaviour of Textile Reinforced Concrete, *Proceedings*, 74th RILEM Annual Week & 40th Cement and Concrete Science Conference, 30 August - 4 September 2020, University of Sheffield, United Kingdom, pp. 140.
- **Komathi M.**, Stephen S. J. and Gettu R., Influence of Fibre Geometry on the Fracture of Steel Fibre Reinforced Concrete, *Proceedings*, International Conference on Materials, Mechanics and Structures ICMMS 2020, 14-15 July 2020, NIT Calicut, India, Vol. 936, pp. 1-6. (Won Best Paper Award in the theme “Fracture Mechanics”) [Published in *IOP Conference Series: Materials Science and Engineering*]
- Paul S., **Komathi M.**, Gettu R. and Arnepalli D.N., Proposed Design Approach for Textile Reinforced Concrete Based on Ferrocement Concepts, *Proceedings*, 5th National Convention on Innovations in Ferrocement “Acceptance in Construction Sector”, 7-9 November 2019, Nashik, India, pp. 103-112. (Chaired a Technical Session)
- **Komathi M.** and Sengupta A.K., A Generalized Truss Analogy for the Analysis of Shear Behaviour of Short Columns, *Proceedings*, 16th Symposium on Earthquake Engineering, 20-22 December 2018, IIT Roorkee, India, pp. 234.
- **Komathi M.** and Sengupta A.K., A Study on Shear Behaviour of Short Jacketed Columns with Different Interfaces, *Proceedings*, 3rd R. N. Raikar Memorial International Conference, 15-16 December 2018, Mumbai, India, pp. 113-119.

- **Komathi M.** and Sengupta A.K., Investigation of Shear Strength and Interface of Columns Strengthened by Concrete Jacketing, *Proceedings*, 5th Annual International Conference on Civil Engineering, Structural Engineering and Mechanics, 25-28 May 2015, Athens, Greece, pp. 42.
- **Komathi M.** and Sengupta A.K., Evaluation of Shear Strength of RC Columns Strengthened by Concrete Jacketing, *Proceedings*, Structural Engineering Convention, 22-24 December 2014, IIT Delhi, India, pp. 483-494. [Published in *Advances in Structural Engineering*, Springer]
- **Komathi M.** and Sengupta A.K., Strengthening of Columns for Shear in Reinforced Concrete Buildings, *Proceedings*, International Conference on Structural Engineering and Mechanics, 20-22 December 2013, NIT Rourkela, India, pp. 222-229.
- **Komathi M.** and Jaya K.P., Vulnerability Index for Mid-rise Buildings Using Performance-based Seismic Design, *Proceedings*, National Conference on Latest Advancements in Civil Engineering, 23 April 2011, Tiruvallur, India.
- **Komathi M.** and Jaya K.P., Vulnerability Index for Mid-rise Buildings Using Performance-based Seismic Design Concept, *Proceedings*, National Conference on Advances and Innovations in Civil Engineering, 30 March 2011, Sivakasi, India, pp. 1-7.

POSTER PRESENTATION

- **Komathi M.**, Sengupta A.K. and Gettu R.G., Application of Special Concrete to Strengthen Reinforced Concrete Columns, 5th *Concrete Research in India (CRI) Symposium*, conducted at Indian Institute of Technology Madras in co-ordination with International Union of Laboratories and Experts in Construction Materials, Systems and Structures (RILEM) and Indian Concrete Institute (ICI), 14 September 2019, Chennai, India.

AWARD / ACHIEVEMENT

- Grant from UGC-DAAD for a one-month Research Team Mission visit to RWTH Aachen, Germany, under the Indo-German Strategic Partnership Program (IGP) during November-December 2020.
- “Outstanding Doctoral Thesis in the Field of Concrete” for the extensive experimental, analytical and numerical investigations accomplished during Doctoral research (Ph.D.) at Indian Institute of Technology Madras, awarded by Indian Concrete Institute - Chennai Centre and Ultratech Cement Limited, 2019.
- Ministry of Human Resource Development, Government of India fellowship to pursue Ph.D. from July 2011 till July 2016.

- “Prof. P. C. Verghese Endowment Prize” for the best outgoing student in M.E. Structural Engineering, bestowed by College of Engineering Guindy, Anna University Chennai, 2012.
- “First rank and gold medal” for securing highest CGPA in M.E. Structural Engineering, awarded by Anna University Chennai, 2011.
- “First rank and university gold medal” for securing highest marks in B.E. Civil Engineering among all non-autonomous institutions in Tamil Nadu, awarded by Anna University Chennai, 2006.
- “Second position” for *Efficient Design Solution of an Aesthetic Steel Intensive Dhaba - Design of Earthquake Resistant Structure*, presented by Institute for Steel Development and Growth, Kolkata, India (a national level design competition involving design, three-dimensional numerical modelling and analysis of a steel structure), 2006.
- “Second position” for *Design and Modelling of Earthquake Resistant Multi-Storeyed Structure*, presented by Indian Institute of Technology Madras, Chennai, India (a national level Master Builder event of SHAASTRA 2005 involving design, assembly and shake table test of a reduced-scale physical model), 2005.

WORK EXPERIENCE

SENIOR PROJECT OFFICER (POSTDOC)

March 2019 - Present:

Engaged as Senior Project Officer (Postdoctoral position) at Building Technology and Construction Management Division, Department of Civil Engineering, Indian Institute of Technology Madras, under the Mentorship of Prof. Ravindra Gettu, Dean, Industrial Consultancy and Sponsored Research and Prof. V.S.Raju Chair Professor. Executing projects in the following domains:

- Characterization of Fibre Concretes for Possible Use in the Tunnel Lining of the Mumbai Metro, Funded by Bekaert Industries, March - July 2019
- Testing of Shaktiman Fibres for Use in Concrete Tunnel Linings, August - November 2019
- Characterization of Civil Engineering Materials in Common Code Project, December 2019 - February 2020
- Project on the Science / Technology / Processes for Cement, Concrete and Other Construction Materials, March - April 2020
- Modular Lightweight Wastewater Treatment Units Made with Textile Reinforced Concrete for Rural and Periurban Dwellings (2+2 Project CleanWater with Indo-German Science and Technology Centre), April 2020 - till present

- Study of the Deterioration Mechanisms in Glass Textile Reinforced Concrete and Improvement of Its Durability (Project with Department of Science and Technology - Science and Engineering Research Board - Core Research Grant), March 2020 - till present
- Study of Potential Applications of Non-structural Textile Reinforced Concrete Panels in Buildings (Project with Saint Gobain Research India), January 2020 - till present
- Mechanical Characterization of Textile Reinforced Concrete under Tension, Flexure and Pull Out, in the Presence of Overlaps; Durability on Exposure to Acid and Alkali

TEACHING

February 2019 - March 2019:

Worked as Teaching Fellow at Division of Structural Engineering, Department of Civil Engineering, College of Engineering Guindy, Anna University, Chennai. Handled courses and laboratory sessions, in co-ordination with Faculty members.

TEACHING ASSISTANCE

July 2011 - July 2016:

Assisted the Course Instructors at Indian Institute of Technology Madras, in the courses such as Advanced topics in structural concrete, Design of concrete structural systems etc., in conducting exams and grading assignments.

January 2020 - May 2020:

Assisted the NPTEL online course Modern Construction Materials, in preparing question papers for assignments and assessment, and verifying transcripts.

RESEARCH

July 2011 - May 2018:

Conducted doctoral research at Structural Engineering Laboratory, Indian Institute of Technology Madras, involving extensive experimental studies on large reinforced concrete jacketed column specimens along with the allied analytical investigations and numerical simulations.

INDUSTRY

June 2006 - November 2008:

Worked in Jain Housing, Chennai as Structural Design Engineer, involved in the projects related to residential structures in the fields of estimation, planning and design.

CURRICULAR ENGAGEMENT

PARTICIPATION IN CONFERENCE / WORKSHOP / TRAINING

- “The next generation of building materials - Thermal conductivity performance testing”, Workshop conducted by C-Therm Technologies Limited, Canada, 11 February 2021.
- “Value from waste in construction”, Webinar hosted by Applied Materials Chemistry Group, Royal Society of Chemistry, United Kingdom, 23 October 2020.
- “Resilient infrastructures to boost the Blue Economy”, Webinar hosted by two research projects funded by the EU Horizon 2020 programme - EnDurCrete and ReSHEALience, 08 October 2020.
- “Towards greener and more durable concrete”, Webinar hosted by two research projects funded by the EU Horizon 2020 programme - EnDurCrete and ReSHEALience, 07 October 2020.
- “Sustainable water and waste management in villages”, Webinar conducted by Indian Institute of Technology Madras, 04 October 2020.
- “Wastewater management in the 21st century”, Webinar conducted by Indian Institute of Technology Madras, 03 October 2020.
- “Opportunities and challenges with BuildTech textiles for construction sector”, Webinar conducted by CSIR - Structural Engineering Research Centre Chennai, 25 September 2020.
- “12th carbon and textile reinforced concrete days”, Digital conference conducted by Technische Universitat Dresden, 22-23 September 2020.
- “Challenges and remedies in various fields of civil engineering construction”, One week online short-term training program conducted by Vellore Institute of Technology Chennai, 21-26 September 2020.
- “Use of recycled aggregates in concrete”, Online Indo-South African SPARC workshop conducted by Indian Institute of Technology Madras, 21 August 2020.
- “Protective coatings for concrete structures”, Webinar conducted by Kerala Highway Research Institute, 1 August 2020.

- “Resilience of concrete construction”, Online one-day workshop conducted by Indian Institute of Technology Madras, 23 May 2020.
- “Sophisticated test equipment for advanced creep testing”, Webinar conducted by Zwick / Roell, 22 May 2020.
- “Recent advances in science and technology of concrete”, Online workshop conducted by Indian Institute of Technology Madras, 2 May 2020.
- “Durability-based design of advanced cement-based materials in aggressive environments: a holistic approach”, Online MOOC lectures of ReSHEALience H2020 EU Project, May 2020.
- “Sustainability and durability of concrete structures with by-products and recycled materials”, SPARC workshop conducted by Indian Institute of Technology Madras, 17-18 January 2020, Chennai, India.
- “Use of alternative aggregates for sustainable concrete construction”, conducted at Indian Institute of Technology Madras in co-ordination with Indian Concrete Institute (ICI) Chennai Centre, 26 November 2019, Chennai, India.
- “Guidelines on ground supported concrete slabs for industrial flooring applications”, conducted at Indian Institute of Technology Madras in co-ordination with Indian Concrete Institute (ICI), 24 October 2019, Chennai, India.
- “5th concrete research in India (CRI) symposium”, conducted at Indian Institute of Technology Madras in co-ordination with International Union of Laboratories and Experts in Construction Materials, Systems and Structures (RILEM) and Indian Concrete Institute (ICI), 14 September 2019, Chennai, India.
- “Design of anchorages in concrete construction and their role in structural strengthening”, a Global Initiative on Academic Networks (GIAN) 10-day course conducted at Indian Institute of Technology Hyderabad, 22-31 July 2019, Hyderabad, India.
- “Corrosion control in concrete structures (C³S)”, 3rd one-day seminar conducted by Indian Institute of Technology Madras in co-ordination with NACE Gateway India Section - NIGIS South Zone, 15 June 2019, Chennai, India.
- “Structural and durability performance of post-tensioned bridges and buildings”, One-day ICI-IMPRINT seminar conducted by Indian Institute of Technology Madras, 12 April 2019, Chennai, India (ICI - Indian Concrete Institute; IMPRINT - Impacting Research Innovation and Technology).

- “Earthquake engineering literature survey workshop”, conducted by National Information Centre of Earthquake Engineering, Indian Institute of Technology Kanpur, 17-26 June 2013, Kanpur, India.
- “ICI-FEST 2013”, National level technical camp for civil engineering students conducted by Indian Concrete Institute (ICI) and ICI Students Chapter of Indian Institute of Technology Madras, 14-15 March 2013, Chennai, India.
- “Seismic design and testing”, Tutorial program conducted by Central Power Research Institute, 27-28 February 2012, Bangalore, India.
- “Repair, restoration and rehabilitation of concrete structures”, One-day conference conducted by Indian Concrete Institute (Tamil Nadu Chennai centre) and Building Technology Centre (Anna University, Chennai), 20 September 2011, Chennai, India.
- “Conservation of heritage buildings and precincts in Chennai metropolitan area”, Seminar conducted by Chennai Metropolitan Development Authority (CMDA), 8 October 2010, at Taj Connemara Hotel, Chennai, India.
- “Modelling, analysis and design of multi-storeyed structures - correlating theory with field experience”, Technical training in Larsen & Toubro - Engineering, Construction and Contracts Division, 19 May-18 June 2010, Chennai, India.
- “Good construction practices and usage of construction chemicals”, Workshop conducted by S.R.M. Engineering College and Pidilite Industries limited, 10 September 2004, Chennai, India.
- “Water and sewage treatment processes”, Practical training conducted by Chennai Metropolitan Water Supply and Sewerage Board, 4-18 June 2004, Chennai, India.
- “Cost effective techniques in foundations for problematic soils”, Workshop conducted by S.R.M. Engineering College, 24 January 2004, Chennai, India.

INVITED LECTURE

- “Design for Shear based on IS 1343 Code (Course: CE6702 Prestressed Concrete Structures)”, 6-days Faculty Development Training Programme conducted by Department of Civil Engineering, Rajalakshmi Engineering College (jointly sponsored by Anna University Chennai), 6 June 2019, Chennai, India.
- “Textile Reinforced Concrete - Principles and Applications”, One-week Programme for Civil Engineers promoted as General Manager, Coal India Limited, Indian Institute of Coal Management, 5 November 2020.

PROFESSIONAL MEMBERSHIP

- RILEM (Senior Member #36423)
[Member of Technical Committee “Mechanical Characterization and Structural design of Textile Reinforced Concrete” (Code: MCC)]
- Ferrocement Society (Life Member #LM-217)
- American Concrete Institute (Membership No #1612512)
- The Institution of Structural Engineers (Graduate Member #78400659)
- India Chapter of American Concrete Institute (Student Member #SM.2018.006)

CONFERENCE ORGANIZATION

Member of the organizing committee of

- RILEM-ICI Doctoral Course on Advanced Concrete Technology 2019, Indian Institute of Technology Madras
- 5th Concrete Research in India (CRI) Symposium 2019, Indian Institute of Technology Madras
- C3S Seminar 2019, Indian Institute of Technology Madras
- ICI-IMPRINT Seminar 2019, Indian Institute of Technology Madras
- ICI-FEST 2013, Indian Institute of Technology Madras
- Faculty Development Programmes, College of Engineering Guindy, Anna University Chennai
- Training Programmes for Engineers in Government Sectors, College of Engineering Guindy, Anna University Chennai

REVIEW OF JOURNALS

- Academic Journals - Athens Journal of Technology and Engineering, Engineering and Architecture Division, Athens Institute for Education and Research (ATINER) - from July 2019
- Journal of Materials in Civil Engineering, American Society of Civil Engineers - from September 2019

ADDITIONAL INFORMATION

RESEARCH / TEACHING INTERESTS AND AREAS OF EXPERTISE

- Reinforced concrete
- Earthquake engineering
- Retrofitting and rehabilitation
- Experimental techniques
- Non-linear analysis
- Computational mechanics
- Textile and fibre reinforced concrete

SOFTWARE SKILLS

AUTOCAD, STAAD PRO, SAP, ETABS, ANSYS, ABAQUS, MATLAB, TNO DIANA

SOCIAL ENGAGEMENT

Active member of 1 Lab - 1 School Project, a brainchild of Dr. Pijush Ghosh, Associate Professor, Department of Applied Mechanics, Indian Institute of Technology Madras, where one lab from the institute is connected to one rural government school, to provide structured mentorship to the 9th grade students, on science and engineering, experiments and demonstrations, career guidance, personality development, teacher guidance etc.

PERSONAL INFORMATION

Gender : Female
Date of Birth : 10th September 1985
Nationality : Indian
Disability Status : None
Marital Status : Married
Languages Known : English, Tamil, French, Hindi

REFEREES

- Dr. Amlan Kumar Sengupta
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Indian Institute of Technology Madras
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- Dr. Ravindra Gettu
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and the Prof. V. S. Raju Chair Professor
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DECLARATION

I do hereby declare that the particulars of information and facts stated herein are true, correct and complete to the best of my knowledge and belief.

Dr. Komathi Murugan