

T. Manjari, B.E., M. Tech.

Doctoral Research Scholar

Building Technology & Construction Management (BTCM) Division

Department of Civil Engineering

Indian Institute of Technology Madras, Chennai-600036, India

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Curriculum Vitae – Updated on 14th February 2021



EDUCATION

- **Ph.D. in Building Technology, Civil Engineering (2015-present) [CGPA: 8.42/10]**
Indian Institute of Technology Madras, Chennai
Research field: “Manufacture of artificial lightweight aggregates from overburden soil using pelletization technique with pelletization and strengthening aids”
Guide: Dr. K. Ramamurthy (BTCM)
Committee members: Dr. N. Ramesh Babu (Mechanical), Dr. R. G. Robinson (Geotechnical), Dr. Radhakrishna G. Pillai (BTCM)
- **M. Tech. in Construction Technology And Management (2012-2014) [CGPA: 8.31/10]**
Indian Institute of Technology Madras, Chennai
Thesis title: “Influence of lightweight aggregate on internal curing of concrete”
Guide: Dr. K. Ramamurthy (BTCM)
- **B.E. in Civil Engineering (2008-2012) [CGPA: 8.77/10] {First class with distinction}**
Dr. Mahalingam College of Engineering and Technology, Pollachi, Coimbatore
Mini project: “Alternate bridge designs for Pandavaiyaru river bridge”
Main project: “Investigatory study on rectangular vertical slip-form work”
- **Higher Secondary School {XII Level} (2008) [88%]**
Bharathiya Vidya Mandir Matric Higher Secondary School, Pollachi, Coimbatore
- **Secondary School {X Level} (2006) [90.54%]**
Our Lady of Lourdes Matric Higher Secondary School, Pollachi, Coimbatore

STUDENT PROJECTS

- **Influence of lightweight aggregate on internal curing of concrete**-Under the guidance of Dr. K. Ramamurthy, Professor, Department of civil engineering, IIT Madras (2013-2014)
 - Artificial lightweight aggregate (LWA) manufacture from fly ash
 - Investigation on using alternate binders and varying pelletization parameters in LWA manufacture
 - Cold bonding and sintering of fly ash aggregates
 - Utilization of fly ash LWA as minute water packets for internal curing in concrete
 - Comparative study on the varying curing methods of LWA concrete
- **Alternate bridge design for Pandavaiyaru River bridge**-Under the guidance of Dr. Ranga Palaniswamy, Professor and Dean, Department of civil engineering, Dr. MCET (2011-2012)
 - Data collection on Pandavaiyaru river flow profiles, meandering patterns and hydraulic analysis for designing bridge structure
 - Comparative study on the conventional and post-tension bridge deck design using structural analysis software STADD pro. and plotting tool Auto CAD.
 - Designing of pile foundation as the proposed substructure for the new bridge
- **Investigatory study on rectangular vertical slip-form work**-Under the guidance of Dr. G. Jaisankar, Professor and Head of the Department, Department of civil engineering, Dr. MCET (2011-2012)

- Identification of practical problems and challenges when rectangular slip formwork was employed in construction practices
- Stress and deflection analysis of existing rectangular slip formwork systems using ANSYS software
- Optimized rectangular slip formwork design for damage-free concreting and devising a long-term durable formwork based on stress-deflection analysis

PRESENT RESEARCH

Study of the production of artificial lightweight aggregates from mines overburden soil: An assessment of pelletization-strength enhancing admixtures and sintering characteristics on physicochemical aggregate properties

- To study the suitability of using the processed and unprocessed mines overburden soil as a raw material in the manufacture of lightweight aggregate by pelletization process
- To identify suitable binders and additives to enhance the strength and pelletization efficiency in the manufacturing process
- To investigate the effect of alternate aggregate hardening methods such as microwave sintering and geopolymerization to enhance aggregate properties
- To explore the bloating behaviour of the artificial lightweight aggregates prepared using mines overburden soil

RESEARCH INTERESTS

- Clay-based lightweight aggregate (LWA) using pelletization method
- Microwave sintering and geopolymerization of LWA
- Cold bonded and sintered fly ash LWA
- Internal curing of concrete using pre-wetted LWA
- Autoclave aerated concrete (AAC) with alternate binder system
- Mines overburden and full volume utilization
- Characterization of construction materials
- Microstructural characterization and micro-analytics of building materials

JOURNAL PUBLICATION

E. Muthu Kumar, T. Manjari, and K. Ramamurthy. (2020). “Studies on properties of binary, ternary and quaternary mixes of AAC with low cement content for application as masonry unit.” *Journal of the International Masonry Society Masonry International*, 33(2), 36–63.

STUDENT INTERNSHIPS

- In-plant training at **M/s. Larsen & Toubro Limited, ECC Division** at ESIC Model Hospital Project involving design, planning and construction of hospital buildings, medical college students’ hostels, staff quarters, and accessory buildings, Coimbatore (25.11.2010-05.12.2010)
- Internship at **Highways & Rural works Division, Govt. of Tamil Nadu**, experiencing operation and maintenance activities such as laying bituminous roads, subsoil exploration, investigation of bridges, execution of pile (Kentledge method) & raft foundation construction/testing procedures at Thiruthuraiipoondi, Tiruvarur district (01.05.2011-18.05.2011)
- Student intern at **Water resource organization, Pongalur Public Works Department, Govt. of Tamil Nadu**, experiencing operation and maintenance of irrigation structures and water management practices in the Contour canal project at Aliyar Nagar, Coimbatore district (19.05.11 -19.06.11). The project involves surveying activities for the contour canal, relaying the canal and tunnel surfaces in the interior forest regions of Indira Gandhi Wildlife Sanctuary and National Park

- Student intern at **M/s. Larsen & Toubro Limited**, ECC Division, Procurement & Construction contract for Construction and Commissioning of Dahej water supply scheme for PCPIR at Dahej, Bharuch, Gujarat (20.05.13-06.06.13). The project involved the construction of a well-foundation in the Narmada river, pipeline laying and testing in Dahej Special Economic Zone (SEZ), Gujarat region, and large ground level reservoir construction in Dahej SEZ, Gujarat region

RESEARCH ASSISTANTSHIP

- Assisted in preparing experimental setups, performing the experiment, data analysis, documentation of report and supervised project staff/ teaching assistants for the following projects,
 - Development of alternative materials for pebbled using overburden/ Ash materials, NLCIL CARD, 2017-2020
 - Use of overburden clay as alternate for coarse aggregate, Ministry of mines, 2020-2021
 Part of these projects contribute to my doctoral research work
- Guided a graduate student from NIT Kurukshetra during his summer internship at IIT Madras, 24th May 2017-25th July 2017.
- Guided two M. Tech students on laboratory experiment for their thesis work, 2017-2018
- Engaged in collaborative research works on autoclaved aerated concrete with senior research scholar, April 2017-April 2020
- Sample preparation and analysis for fellow research scholars across all departments in IIT Madras
 - X-ray diffraction (Jan-May 2018)
 - Scanning Electron Microscopy (July-Nov 2018)
 - Transmission Electron Microscopy (Jan-May 2019)

TEACHING ASSISTANTSHIP

- **Construction materials laboratory courses taught in the Department of Civil Engineering**
 - Preparing laboratory schedule and experimental setup
 - Explaining, demonstrating and providing guidance in conducting a laboratory experiment
 - Prepared and graded question papers
 - Coordinated the course across BTCM, Geotech and Transportation divisions

Undergraduate Course: CE 3410 (B. Tech) <ul style="list-style-type: none"> ○ July- Nov 2015 ○ July- Nov 2016 ○ July- Nov 2017 ○ July- Nov 2019 	Graduate courses: CE 5090 (M. Tech, M.S. and Ph.D. Scholars) <ul style="list-style-type: none"> ○ Jan- May 2016 ○ Jan- May 2017 ○ Jan- May 2018 ○ Jan- May 2019 ○ Jan- May 2020
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- **Practical Transmission Electron Microscopy graduate-level (M.S. and Ph.D. Scholars) course taught in Department of Metallurgical and Materials Engineering: ID6103 (July-Nov 2018)**
 - Explaining, demonstrating, and providing guidance for carrying out material-specific sample preparation techniques
 - Providing demo cum hands-on training sessions for handling CM 12 TEM instrument
- **Supervising exams for the course Building services (M. Tech, M.S. and Ph.D. Scholars) CE5110 in Department of Civil Engineering (July-Nov 2015)**
 - Supervision of quizzes, mid-semester, and end semester examinations

SPECIAL PROFESSIONAL TRAINING

- **Pedagogy: Teaching Learning Assistant Program (TATP) (1-3rd April 2016)**
Completed training on TATP organized and conducted by the Teaching Learning Centre of IIT Madras
- **Mechanical Testing of Materials using Zwick (27th June 2017)**
Hands-on training on mechanical testing of materials using Zwick-50 KN UTM, MPCEM Laboratory, Department of Civil Engineering, IIT Madras
- **Transmission Electron Microscopy (24-28th October 2017)**
Hands-on training on TEM sample preparation, sample handling, instrument operation (CM 12 TEM), Department of Metallurgical and Materials Engineering, IIT Madras
- **Patent Search/ analytics (28th October 2017)**
Hands-on training in patent search, treatment, and analytics on Orbit express and Orbit intelligence tool of Questel, organized by Intellectual Property cell, ICSR, IIT Madras
- **X-ray diffraction (20-22nd December 2017)**
Hands-on training on XRD sample preparation, sample handling, instrument operation (Bruker's D8 Discover XRD) and analysis using X'Pert HighScore software, Department of Metallurgical and Materials Engineering, IIT Madras
- **Scanning Electron Microscopy (2-6th July 2018)**
Hands-on training on SEM sample preparation, sample handling, instrument operation (Quanta 200 FEG SEM), Department of Metallurgical and Materials Engineering, IIT Madras
- **XLPAT-Novelty Checker (19-20th September 2019)**
Hands-on training in patent/ non-patent search, and novelty check on XLPAT AI tool, organized by Intellectual Property cell, ICSR, IIT Madras

RESEARCH LEVEL COURSES

- Data Analysis for Research
- Advanced Concrete Technology
- Modern construction materials
- X-ray Diffraction Techniques
- Environmental Impact Assessment
- Principles and techniques of Transmission Electron Microscopy
- Characterization of Construction Materials
- Advanced Materials Characterisation Lab
- Modern Techniques of Material Characterization
- Non-destructive Evaluation of Structures
- Practical Transmission Electron Microscopy

GRADUATE-LEVEL COURSES

- Construction planning & control
- Construction contracts & specifications
- Construction, Methods & Equipment
- Construction Quality & Safety Management
- Construction Economics & Finance
- Sustainable construction
- Maintenance and Rehabilitation of construction facilities
- Global Construction Engineering and Management
- Lean construction Concepts, Tools & Practices
- Building services
- Advance Foundation engineering
- Soil Exploration & Field Tests
- Organizational Behaviour
- Construction Materials Lab
- Construction Software Lab

PROFESSIONAL EXPERIENCE

Senior engineer in the Water and Renewable Energy (W&RE) Independent Company (IC) of L&T, ECC Division, Manapakkam, Chennai Head Quarters. Worked in Management of Information Systems (MIS) team, direct reporting to the Water & Effluent Treatment (WET) Strategic Business Group (SBG) head, 1st August 2014-13th June 2015

• Financial Roles

- Assisting the team lead in the budget allocation and target fixation. Assisting in hosting monthly, quarterly, half-yearly and annual budget reviewing for the FY 2014-15 and FY 2015-16, for all projects under WET SBG, inviting project managers, construction managers, and the business development team head
- Constant monitoring of working capital parameters like job cost report margin, gross margins, sales, PAT, PBIT, ROCE, accepted cost estimate, estimate to cost, overheads, inventory, contingencies, order inflow, cost over invoice, billing, and payment collections for about 800 projects all over India and abroad for net worth of not less than Rs. 350 crores
- Assisting and participating in budget auditing visit to L&T Bangalore cluster office, Karnataka, 27-29th January 2015 and site inspection visit to Kharkhai Barrage construction site, Jharkhand, 20-25th March 2015

• Non-Financial roles

- Quantitative and qualitative analysis of project execution under WET SBG all over India
- Key team player in organizing meetings at different administrative hierarchical levels such as Independent Company (IC), Strategic Business Group (SBG), three Business Unit (BU), eight cluster divisions across India each having a North and a South Segments, Project Review Meeting (PRM), Business Development (BD) meeting and other board meetings
- Strategic business analysis of the pre-bid, post-bid, pre-tender, post-tender, and tender status. Competitor analysis both on winning and losing projects. Review on client, sub-contractor, and special technique specialists for pilot/ task force projects

EVENTS ORGANIZED/ VOLUNTEERSHIP/ PARTICIPATION

• ICI Fest 2013 volunteer

A key member of the organizing committee of the ICI-FEST held at IIT Madras, 14-15 March 2013

• Achieving Durable Concrete Construction Through Performance Testing workshop 2015

Attended 1-day workshop on Achieving Durable Concrete Construction Through Performance Testing, Organized by IIT Madras, IIT Bombay and Indian Concrete Institute (ICI) held at IIT Madras, 3rd February 2014

• ICI-IITM National Concrete Canoe Competition (NCCC) volunteer

Key member in the canoe testing committee of first National Concrete Canoe Competition with participants from six Indian states forming 19 teams, hosted by Civil Engineering Association (CEA), Department of Civil Engineering, IIT Madras, 21-23rd August, 2015

• Advanced Concrete Technology Workshop 2015 organizer

Active organizer in the team conducting a 5-days workshop on concrete technology for faculty and students from universities across India, 29th November-04th December 2015

• M.S. and Ph.D. admission assistance

Key member in credentials verification for M.S. and Ph.D. admission process for all divisions, Department of Civil Engineering, IIT Madras, 11-13th May 2017 and 7-9th December 2017

• ICACMS 2017

A 6-days International Conference on Advances in Construction and Material Systems organized during the 71st RILEM Annual Week, 3-8th September 2017, Chennai, India

- **ICACMS Poster session organizer**
Organized the entire poster session of the ICACMS international conference, 6-7th September 2017
- Attended workshop on Limestone Calcined Clay Cements (LC³), 3rd September 2017
- Attended the Carmen Andrade Workshop on Corrosion Control in Concrete Structures (C³S), 8th September 2017
- **Virtual online workshops**
 - Attended a 1-day online medley workshop for researchers, organized by the workshop and skill-building team, IIT Madras, 17th December 2020
 - Attended a 5-day online workshop on preparing technical documents using LaTeX, organized by the workshop and skill-building team, IIT Madras, 4-9th February 2021
- **Lab visit coordinator**
Actively organized pep talks on the various experimental setups and research carried out in BTCM laboratory, during division (workshops), department (CEA fest), institute (Shaastra open house) and occasional lab tours, IIT Madras, 2015-2021

CO-CURRICULAR AND EXTRA-CURRICULAR ACTIVITIES

- **Doctorate level (2015-present)**
 - Coordinator in Disaster Management Committee (DMC), a student body of IIT Madras, July-Nov 2015 and Jan-May 2016
 1. Organizing various training for the students of IIT Madras on Krav Mag martial arts, fire extinguishing and Cardiopulmonary resuscitation (CPR) procedure
 2. Working closely with National Disaster Response Force (NDRF) during Chennai flood relief works in Taramani region supplying the affected with potable water and food packets from student mess (Himalayas mess)
 3. Organizing and coordinating in setting up medical camps, taking support from IIT Madras institute hospital to the Chennai flood-affected regions in Taramani
 4. Special invitee to share views on the need for the formation of a Society of Emergency Volunteers Associations (SEVA) under a team lead by Retd. Air Vice-Marshal in response to the Chennai flooding 2015
 - Coordinator in Research Affairs Council (RAC), a student body of IIT Madras, July- Nov 2015 and Jan-May 2016
 1. Coordinating the design team of RAC for designing posters, flyers, placement profiles and academic yearbook.
 2. Data acquiring for the institute research scholar yearbook and placement profile for the academic year 2016-2017.
 - Student volunteer for the 7th edition of Terry Fox Run, Chennai organized by Rotary club of Madras East and supported by IIT Madras, started at Open Air Theater (OAT), IIT Madras, 22nd August 2015
 - Completed Basic Life Support course by Personal Empowerment in Emergency Response (PEER) program by ALERT Simulation Lab, Chennai, 22nd October 2015
 - Student volunteer for The Wipro Chennai Marathon organized by the Chennai Runners club, started at Westin Velacherry, 24th October 2015
 - Secured 1st position in rangoli competition held at Sabarmati hostel, IIT Madras, 2015-2016
 - Completed professional education course on Corrosion Mitigation for Reinforced Structures 2.0PDH by Vector Corrosion Technologies Inc., IIT Madras, 4th October 2018
 - Active in intramural competitions conducted by Institute Gymkhana, IIT Madras 2015-2018

1. Throwball: Secured 2nd position (2015-2016, 2016-2017) and secured 1st position (2017-2018)
 2. Cricket: Secured 1st position {2016-2017 (team captain), 2017-2018 (team captain)}
 3. Football: Secured 2nd position (2016-2017) and secured 1st position (2017-2018)
 4. Basketball: Secured 3rd position (2017-2018)
 5. Badminton Secured 1st position in PG league women's doubles (2017-2018)
- **Professional level (2014-2015)**
 - Attended a seminar on the new planning module in L&T, August 2014
 - Attended Quality Management System (QMS) orientation workshops, August 2014
 - Lead player in the event management team for the safety walkathon organized as a part of 26th Road safety week celebrations, 11-17th Jan'15
 - Active participation in International Women's day celebration, March 2015
 - **Masters level (2012-2014)**
 - Key team member in projects with global students involving BIM-Revit Architecture and Visual basic
 - Key team member in projects with global students from North Carolina state university, U.S.A., University of Calgary, Canada, and Tianjin University, China
 - **Undergraduate level (2008-2012)**
 - Organized Technical symposium, Dr. MCET Techsym 2008-2012. Conducting various competitions and events on behalf of civil engineering association during the symposium
 - Class representative for a semester during the undergraduate program
 - Active member and organizer of Dr. MCET civil engineering group, The Beavers association. Organizing and active participation in hosting lectures, guest lecture and other academic events at the department
 - An active member of the Gyan quiz club Dr. MCET. Quizmaster for the Intra college quiz competition
 - Public speaking in many Dr. MCET college functions with a mass audience of around 3000 people

DISTINCTIONS AND AWARDS

- Half-Time Research Assistantship (HTRA), MHRD, Govt. of India
- Awarded 'Build India Scholarship -XV' for pursuing masters in Indian Institute of Technology Madras by (2012) by M/s. Larsen & Toubro Limited
- Overall proficiency rank holder in the undergraduate program and gold medalist securing the third rank in class for the Anna University Chennai examinations (2008-2012)
- Proficiency rank holder in the undergraduate program: Third Rank (2011-2012)
- Proficiency rank holder in the undergraduate program: First Rank (2009-2010)

SKILL SET SUMMARY

- **Research requisites:**
 - Confident in experimental, instrumentation and simulation works
 - Good command over written English and presentation skills
 - Team player with collaborative leadership skills
- **Micro-analytical skills:** Transmission Electron Microscopy (TEM), Scanning Electron Microscopy (SEM), X-ray Diffraction spectroscopy (XRD), Thermal analysis (TGA/ DSC), Mercury Intrusion Porosimetry (MIP)

- **Software skills:** Versatile at handling software packages including MS Office, LaTeX, Auto CAD, Visual Studio, Autodesk Revit, MSP, ANSYS, STAAD Pro., Fiji Image J, X'Pert High Score, Design Expert, Sigma Plot, and Origin Pro
- **Linguistic skills:**
 - Native /Bilingual proficiency : Tamil
 - Full Professional Proficiency : English
 - Limited working proficiency : Telugu, Hindi
 - Elementary proficiency : Malayalam, French

REFERRALS

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