CENTRE FOR ADVANCED CONCRETE RESEARCH (CACR)

About the Centre

Centre for Advanced Concrete Research (CACR) at SRM Institute of Science and Technology, Kattankulathur was started in the year 2010, to carry out interdisciplinary research in the field of concrete, a most common material of construction in any built environment and a basic necessity for accelerated economic development. At present, Portland cement is very widely used as binder in concretes. But, the high content of 'Embodied Carbon Dioxide' (ECO₂) and 'Embodied Energy' in the cement are the major reasons for recent laboratory studies all over the world to find alternate binders, as there is an urgent need for making the constructions more eco-friendly and sustainable.

The Research and Development activities in this area are therefore taken as main focus of the newly formed Centre. Towards this, use of industrial wastes (such as slags, fly ash, etc.,) along with modern materials (such as nano-silica, nano-cellulose fibres, nano-alumina, etc.,) would be explored using recent developments occurring in the fields of science and technology such as nano-technology, bio-technology, chemical engineering, including usage of modern analytical instruments such as XRD, various spectroscopes, DTA/TGA, etc.,

Objective of Centre

The main objectives of our center are,

- ✓ To identify the improvements/modifications desired in the existing conventional concrete construction practices.
- ✓ To develop new materials of construction with lower 'carbon foot prints' and reduced 'embodied energy contents'.
- \checkmark To formulate guidelines for ecofriendly constructions.
- ✓ To undertake sponsored investigation studies to find solutions for specific field problems in construction industry from considerations of selection of appropriate materials and disposals of waste/by-products from industry.
- ✓ To perform all type of consultancy works on concrete especially mechanical studies, durability studies, non-destructive testing studies etc.,
- ✓ To conduct seminars/workshops/advanced courses to disseminate the latest knowledge in the field of concrete composites.

Team Members

S.No	Name	Qualification	Specialization	Designation
1	Dr. P.R. Kannan Rajkumar	M.E., Ph.D	High Performance Concrete, Fibre Reinforced Concrete, Hybrid Fibre Reinforced Concrete, Numerical Modelling of Concrete	Associate Professor, Civil Engineering and Coordinator CACR
2	Mr. J. Baskara Sundararaj	M.Tech.,	Concrete Technology, Geopolymer Concrete, Structural Engineering	Project Officer
3	Dr. M. Sivasakthi	M.Sc., M.Phil., Ph.D	Chemistry of materials, Geopolymer, Analytical Equipment usage	Project Officer
4	Mr. M. Jegan	М.Е.,	Cementitious Composites, Geopolymer Concrete, Concrete Technology, Structural Engineering	Project Officer
5	Mr. B. Dinesh Kumar	DCE	Carrying out laboratory works related to testing, casting, etc., equipment installation, maintenance and operation, as per instruction of staff	Technical Assistant
6	Mr. M. Selvam	HSC	Assistance in laboratory works related to testing, casting, etc., equipment installation, maintenance and operation, record keeping, etc.,	Lab Helper
7	Mr. D. Venkatesan	HSC	Assistance in laboratory works related to testing, casting, etc., equipment installation, maintenance and operation, record keeping, etc.,	Lab Helper

- 1. Dr. P.R. Kannan Rajkumar (Check the file name Kannan Rajkumar)
- 2. Mr. J. Baskara Sundararaj (Check the file name Baskara Sundararaj)
- 3. Dr. M. Sivasakthi (Check the file name Sivasakthi)
- 4. Mr. M. Jegan (Check the file name Jegan)

Research

The following area of research are undergoing in our centre,

- ✓ Concrete technology, high performance concretes (HPCs), mix design methodologies
- Repair techniques/materials for resisting corrosion of embedded steel and for enhanced durability of concrete
- ✓ Use of wastes such as fly ash, silica fume, blast furnace slag, rice husk, etc
- ✓ Fly ash aggregates (replacements for crushed stone aggregate concretes)
- ✓ Low energy intensive geopolymeric cement concretes
- ✓ Ultra high performance concretes (reaction powder concretes)
- Paver/building blocks with special properties such abrasion resistance (for industrial floorings and container handling areas of harbours/ports)
- Nanotechnology in constructions (nanosilica, nanocellulose fibres, nanocarbon fibres, etc for enhanced structural and durability of concretes)
- ✓ Ferrocement elements with conventional resistant geopolymer concrete
- ✓ High temperature resistant geopolymer and Portland cement concretes
- ✓ Zero-Portland cement constructions using inorganic alumino silicate binders
- ✓ Bacterial concretes or bio-concretes (for improving durability of existing and new concrete constructions, repair/strengthening of deteriorated/damaged monuments
- ✓ Natural fibre reinforced concretes (bamboo, coconut fibres, etc)
- ✓ Special concretes for nuclear waste disposal systems
- ✓ Use of special industrial wastes such as copper slag in nuclear concretes
- ✓ Self curing concretes for constructions
- \checkmark Carbonation studies on cement concrete and geopolymer concrete
- ✓ Electrical characterizations in geopolymer and Portland cement composites
- ✓ Corrosion residence special cement containing specially identified chemical admixture
- ✓ Early traffic worthy concretes for fast construction and repair of roads
- ✓ Self curing and acid resistant new concretes for floorings/linings/tiles etc
- ✓ Self curing ecofriendly concretes for quick repair/strengthening

- ✓ Shock/blast/vibration resistant structural components
- ✓ Development of Electrical equipment for characterisation/evaluation of concrete microstructure
- ✓ Ferrocement technology with new reinforcements and binder systems
- ✓ Carbon/glass fibre reinforced plastic rods for aggressive environments
- ✓ Aerated/foamed lightweight concretes with new binder systems
- ✓ Quick mould release concretes for precast components
- ✓ Prestressed concrete sleepers for railways with new binders

Constituent Laboratories

- 1. Concrete and Highway Laboratory, Civil Engineering,
- 2. Strength of Materials Laboratory, Civil Engineering,
- 3. Structural Engineering Laboratory, Civil Engineering

Equipment and Instrument

(The equipment and instruments photos are available in side by side and names of instruments are given below each photos)



Thermal Conductivity Apparatus



Computerised Dilactometer (1000°C)



Rebound Hammer



Digital pH Meter



Corrosion Monitoring System



Ultrasonic Pulse Velocity (UPV)



Resistivity Meter



Concrete Penetrometer Spring Type



Box Furnace (1000°C)



Rapid Chloride Permeability Test (RCPT)



Infrared Thermometer



Serological Water Bath



Laboratory Ball Mill



Compression Testing Machine (2000 kN)



Hot Air Oven (400°C)



Muffle Furnace



Digital High Speed Mortar Mixer



Accelerated Curing Tank



Buoyancy Balance



Weighing Balance (0.001g Accuracy)



Compressometer



Marsh Cone

Funded Projects

S.No	Year	Organisation / funding agency	Project Title	Members Involved	Amount (in Lakhs)
1	2017- 2020	DST-WMT	Field demonstration of geopolymerisation of fly ash and GGBS in the manufacturing processDr.N.P.Rajam Dr.R.Jeyalaks Dr.R.Jeyalaks products for construction of utility buildings		107.00
2	2017	CASHUTECH Nirmithi Kendra, Raichur	Field trials of geopolymer precast panels for housing sector	Dr.N.P.Rajamane Dr.R.Jeyalakshmi	MoU Signed
3	2017- 2018	M/s Kuttuva Silicates, Madurai	Development of One- part Alkali Activator used for the production of geopolymer products	Dr.N.P.Rajamane Dr.R.Jeyalakshmi	7.00
4	2016	M/s Greenscape Geopolymer Products, Chennai	Development of Geopolymer precast panels	Dr.N.P.Rajamane Dr.R.Jeyalakshmi	3.00
6	2015	SRM University	Pilot scale demonstration of geopolymer concrete road at SRMU, Kattankulathur campus	Dr.N.P.Rajamane Dr.R.Jeyalakshmi SRM University	0.75
7	2014- 2016	Transtonnelstroy –AFCONS Joint Venture	Technical advice on corrosion of steel in soil around diaphragm walls of underground stations for CMRL, Chennai, India	Dr.N.P.Rajamane Dr.R.Jeyalakshmi	14.00
8	2014- 2017	DST -TDP	Development of high temperature resistant Geopolymeric composites	Dr.N.P.Rajamane Dr.R.Jeyalakshmi	52.90
9	2013- 2014	M/s Kiran Global Chems Limited	Geopolymer Concretes	Dr.N.P.Rajamane Dr.R.Jeyalakshmi	10.6
10	2013- 2014	M/s Vinay Concrete and Aggregate Pvt. Ltd., Kolkata	Technical and scientific advisory project for the development centre for building materials	Dr.N.P.Rajamane Dr.R.Jeyalakshmi	3.03

11	2012- 2013	M/S Jayajothi Cements, Chennai	Evaluation studies on CORROSINO cements (newly developed 'no- corrosion cement')	Dr.N.P.Rajamane Dr.R.Jeyalakshmi	4.85
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Consultancy

Consultancy

S.No	Year	Client	Project	Amount in Rs.	Members Involved
1	2020	J.Manigandan and M.Vijayalakshmi	Analysis and Design of Residential Building	13,000	Dr.K.S.Satyanarayanan Dr.P.R.Kannan Rajkumar C.Sudha J.Baskara Sundararaj
2	2020	R.Thamil selvan, Kaveri Builders, Chennai	Analysis and Design of Residential Building	30,000	Dr.K.S.Satyanarayanan Prof.G.Augustine Maniraj Pandian Dr.P.R.Kannan Rajkumar M.Jegan
3	2020	Er.S.Rajesh, Globe Infra	NDT Test	4,720	Dr.P.R.Kannan Rajkumar J.Baskara Sundararaj M.Jegan B.Dinesh Kumar
4	2020	Er.S.Rajesh, Globe Infra, Kattupalli Port	Paver Blocks	2,360	Dr.P.R.Kannan Rajkumar J.Baskara Sundararaj
5	2019	Er.Deepika Ravindran	Geopolymer Concrete	4,130	Dr.P.R.Kannan Rajkumar J.Baskara Sundararaj
6	2019	Er.G.Jayarajan	Geopolymer Concrete	53,100	Dr.P.R.Kannan Rajkumar J.Baskara Sundararaj
7	2019	Mr.J.Kannan, SRM HiTech Concrete	NDT Test	3,540	Dr.P.R.Kannan Rajkumar J.Baskara Sundararaj

Workshop/ Events Organized

S.No	Workshop/Event Name	Organized by
	Virtual One Day Workshop on "Fibre	Department of Civil Engineering and
1	Reinforced Concrete And Its	Centre for Advanced Concrete Research,
	Applications"	SRMIST, Kattankulathur

2	CONCRETUS'20	Department of Civil Engineering,
	(Organized Davidovits – Geo polymer	SRMIST, Kattankulathur
	concrete, Aitcin – High Performance	
	Concrete Events)	
3	Geopolymer Workshop	Centre for Advanced Concrete Research,
		SRMIST, Kattankulathur

Achievements

(The photos are available in side by side and names of each photo is given below each photo. By clicking on the each name, the details of photos and their construction photos can be viewed)



Geopolymer Demo Building at Raichur, Karnataka

(By clicking the above name, the following details and construction photos are to be displayed)

Project Name: 'Field Demonstration of Geopolymerisation of Flyash and GGBS in the manufacturing of process of precise building projects for construction of utility buildings' – DST No DST/TDT/WMT/2017/101

Dimension of Building: 8 m x 8 m

Columns and Beams: 9 Columns and 7 Beams

Type of Concrete: Geopolymer Concrete





Precast Geopolymer Toilet Block at SRM IST, Kattankulathur

(By clicking the above name, the following details and construction photos are to be displayed)

Project Name: 'Field Demonstration of Geopolymerisation of Flyash and GGBS in the manufacturing of process of precise building projects for construction of utility buildings' – DST No DST/TDT/WMT/2017/101

Date of Casting: 23/10/2019

Date of Erection: 20/11/2019

Time for Erection: 30 Minutes

Type of construction: Precast Construction

Type of Concrete: Geopolymer concrete







Demo Geopolymer Pavement for ACCE Program at Pandian Hotel, Madurai



Geopolymer Paver Block Production at ASR Bricks, Coimbatore



Geopolymer Road constructed in RKM Powergen Limited, Chhattisgarh in Small Scale



Geopolymer Road constructed in SRM Medical College and Hospital, Kattankulathur in Small Scale

Contact Us

For any details, contact

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