



# KAKATIYA INSTITUTE OF TECHNOLOGY & SCIENCE

Opp : Yerragattu Gutta, Hasanparthy (Mandal), WARANGAL - 506015, TELANGANA, INDIA

काकतीय प्रौद्योगिकी एवं विज्ञान संस्थान, वरंगल - ५०६०१५, तेलंगाना, भारत

కాకతీయ సాంకేతిక విజ్ఞాన శాస్త్ర విద్యాలయం, వరంగల్ - ౫౦౬, ౦౧౫ తెలంగాణ, భారతదేశము

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Name of the Department: CIVIL ENGINEERING

Name of Research and Education center:

## Research & Education Center **Advanced Construction Materials**

**About the Center:** The Advanced Construction Materials Centre in Concrete Technology Laboratory at the Department of Civil Engineering, Kakatiya Institute of Technology and Science, Warangal, consistently showcases excellence by offering cutting-edge facilities, resources, and expertise. These contributions significantly enhance research endeavors and consultancy services.

The laboratory has been acknowledged as a Research Facilitator for the academic year 2022-23, highlighting its dedication to advancing research initiatives and cultivating a collaborative environment for innovative exploration. As part of this commitment, a dedicated section within the Concrete laboratory has been established, known as the Advanced Construction Materials Centre.

At the core of the Advanced Construction Materials Centre mission is the exploration of advanced materials that promise to revolutionize the construction industry. Researchers within the lab focus on developing materials with enhanced properties, including strength, flexibility, and resilience, to meet the evolving demands of modern infrastructure projects. From high-performance concrete to novel composites, the lab is at the forefront of discovering and optimizing materials that offer superior performance and sustainability. One of the key strengths of the center lies in its innovative testing methods, which enable researchers to rigorously evaluate the performance and durability of construction materials under various conditions. Through advanced testing protocols, such as non-destructive testing and accelerated aging simulations, researchers can assess the long-term behavior of materials and identify potential weaknesses or areas for improvement. These insights inform the development of new materials and construction techniques that are both robust and cost-effective.

The research center places a strong emphasis on researching materials and practices that minimize the ecological footprint of construction projects. By exploring alternative binders, recycled aggregates, and carbon-neutral production methods, researchers aim to develop construction materials that reduce energy consumption, carbon emissions, and waste generation. Through life cycle assessments and environmental impact analyses, the lab evaluates the sustainability credentials of emerging materials and guides decision-makers towards more eco-friendly construction practices.

Looking ahead, the research center continues to push the boundaries of construction materials research, tackling emerging challenges such as climate change, urbanization, and digitalization. By harnessing emerging technologies such as artificial intelligence, additive



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manufacturing, and nanotechnology, researchers aim to unlock new possibilities in material design, construction processes, and structural performance. However, achieving these goals will require sustained investment, collaboration, and interdisciplinary cooperation to overcome technical barriers and societal constraints.

## The primary functions of the center:

- To carry out Academic Laboratory and Research work of B.Tech. and M.Tech. Students.
- To carry out Regular Consultancy works
- To Support Research and Academic Laboratory work of Allied Branches like Mechanical Engineering
- To carry out Research work of Ph.D scholars

## Major equipments: (along with description / Cost/ photographs)

S.No.	List of the Equipment and its purpose considered as a part of Research Facility	Cost of the Equipment	Photo of the Equipment
1.	100-ton Loading Frame with Data Acquisition System used to apply load on different type of materials	741000.00	
2.	RCPT Test apparatus Setup for testing the durability of concrete	146124.00	



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3.	Concrete Permeability Test Setup for testing the durability of concrete	90034.00	
4.	Ultrasonic pulse velocity test apparatus, which offers non-destructive method for evaluating the quality, integrity, and performance of concrete structures	439822.00	

### Minor equipment details:

- Hydraulic Jack 1000kN capacity with guage and hand pump
- Integral type compression Proving ring (1000kN)
- Dial gauges (0.002x12mm)
- Data Acquisition system for strain(50 channel)
- Proving ring 100 T capacity
- Compression testing machine3000kN (300T)
- Compression testing machine (200 T)
- Needle vibrator 1” dia (Engine Driven)
- Vibrating machine electrical HC 42.135
- Vibrating table apparatus(Variable speed pully)
- Concrete Mixer of 1 bag cement capacity
- Concrete Core Drilling Machine(Diesel)
- Rebound Hammer

Major software list with description: NIL

### Types of projects / research carried out with description:

The research center is actively working towards expanding its scope and capabilities in the upcoming days. This initiative aims in ensuring that the center remains as Dynamic and adaptive to the ever-growing challenges.





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## Photographs of working models / application software developed with description:



### Ultrasonic Pulse Velocity Test on Concrete Specimens:

An ultrasonic pulse velocity test is an in-situ, nondestructive test to check the quality of concrete and natural rocks. In this test, the strength and quality of concrete or rock is assessed by measuring the velocity of an ultrasonic pulse passing through a concrete structure or natural rock formation.

This test is conducted by passing a pulse of ultrasonic through concrete to be tested and measuring the time taken by pulse to get through the structure. Higher velocities indicate good quality and continuity of the material, while slower velocities may indicate concrete with many cracks or voids.

Ultrasonic testing equipment includes a pulse generation circuit, consisting of electronic circuit for generating pulses and a transducer for transforming electronic pulse into mechanical pulse having an oscillation frequency in range of 40 kHz to 50 kHz, and a pulse reception circuit that receives the signal.



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## Rapid Chloride Permeability Test on Concrete:

The Rapid Chloride Permeability Test (RCPT) is a crucial assessment method in civil engineering, specifically employed to determine the permeability of concrete and other construction materials. This test provides valuable insights into the durability and quality of concrete structures.



## Behaviour of RCC Beams:

100T Loading frame with 40 Channel Data Acquisition system and strain gauges are used to measure various parameters like stress, strain, load applied, deflection, dynamic modulus of elasticity and flexural shear behavior etc.



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## Details of Faculty Publications:

S.No.	Title of paper	Name of the author/s	Name of journal	Year of publication	ISSN number
1	Durability Studies on Self Compacting Recycled Aggregate Concrete Using GGBS	Dr. L. Sudheer Reddy, Dr. M. Srikanth, Dr. D. Harikrishna, Dr. S. Sunil Pratap Reddy	YantuGongchengXuebao /Chinese Journal of Geotechnical Engineering	2022-23	ISSN: 1000 - 4548
2	Performance of Cement Composite with GGBS and Alccofine as Partial Replacement	S. Sunil Pratap Reddy, L. Sudheer Reddy, M. Srikanth	The Indian Concrete Journal	2022-23	ISSN: 00194 5 65
3	Recent Advances In Self-Healing Concrete For Sustainable Construction Sector	Dr. S. Sunil Pratap Reddy	European Chemical Bulletin	2022-23	ISSN: 2063 - 5346
4	Experimental Investigation on Fly Ash and Ground Granulated Blast Furnace Slag-Based Geopolymer Corbels	Dr. B. Sumanth Kumar	Lecture Notes in Civil Engineering, vol 277. Springer, Singapore.	2022-23	ISSN:2 366- 2557

S.No.	Title of paper	Name of the author/s	Name of journal	Year of publication	ISSN number
1	Fracture parameters of flyash and GGBS based Alkali activated concrete	Ms. K.Manasa, Dr. M. Andal	Materials Today: Proceedings	2022-23	ISSN: 2214 - 7853
2	An experimental study on the interface shear strength of reinforced geopolymer concrete corbels	Dr. B. Sumanth Kumar	Australian Journal of Civil Engineering	2021-22	ISSN No.1448- 8353





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3	Parameter to assess the strength of fly ash and GGBS based GPC	Dr. B. Sumanth Kumar	Lecture Notes in Civil Engineering,	2021-22	ISSN:236 6-2557
4	Perfunctory performance of self-compacting concrete using recycled coarse aggregate with and without processing, 307-318.	Sri. N. Srikanth	Journal of Structural Engineering	2021-22	ISSN 0970 - 0137

S.No	Title of paper	Name of the author/s	Name of journal	Year of publication	ISSN number
1	Durability Studies on Bacterial Concrete Embedded with Bacillus Subtilis, Design Engineering	S. Sunil Pratap Reddy, L. Sudheer Reddy	Design Engineering (Toronto)	2020-21	ISSN:0011-9342
2	Comparative study on Shear performance of Blended Pozzolonic R.C beams with Fly Ash & Recycled Aggregates	Dr. D. Hari Krishna	Journal of Structural Engineering	2020-21	ISSN: 0733-9445
3	Mechanical and durability studies on blended pozzolonic concretes with fly ash & recycled aggregates, Pages 1522-1529	Dr. D. Hari Krishna	Science Direct Elsevier Materials Today Proceedings	2020-21	ISSN: 2214-7853
4	Comparative Study of Shear friction on Monolithic Geo polymer Concrete	Dr.B. Sumanth Kumar	Int. Journal of Cement WapnoBeton	2020-21	ISSN: 1425812 9

S.No	Title of paper	Name of the author/s	Name of journal	Year of publication	ISSN number
1	A Quantitative Approach to Prioritize Sustainable Concrete	Dr. L. Sudheer Reddy, Dr. S. Sunil Pratap Reddy, Dr. A. Suchith Reddy	Civil Engineering Journal (Iran)	2019-20	ISSN:267 6-6957



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2	Behaviour of multi layered Hybrid Fibrous Ferrocement	Sri. K. Srujan Varma	Springer Proceedings in Materials	2019-20	ISSN266 2- 3161
3	Preference - based Multi-criteria framework for developing a Sustainable Material Performance Index (SMP I)	Dr. A. Suchit h Reddy	International Journal of Sustainable Engineering	2019-20	ISSN: 1939-7038
4	Developing a Material Sustainable Performance Score (MSPS)to select an alternative Cementitious Material	Dr. A. Suchit h Reddy	Cement WapnoBeton	2019-20	ISSN: 1425812 9
5	A Qualitative and Quantitative approach to prioritize Sustainable Concrete usi ng TOPSIS	Dr. A. Suchit h Reddy	Lecture Notes in Civil Engineering	2019-20	ISSN:236 6-2557

S.No	Title of paper	Name of the author/s	Name of journal	Year of publication	ISSN number
1	Experimental studies on blended pozzolonic concrete with RCA in acidic environment	Dr. D. Hari Krishna	Indian Concrete Journal	2018-19	ISSN: 0019-4565
2	Effect Of Polypropylene And Steel Fibres On Compressive Strength Of Concrete	Dr. M. Veera Reddy	International Journal of Technical Innovation in Modern Engineering & Science (IJTIMES)	2018-19	ISSN: 2455-2585





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3	Experimental Study on strength parameters of recycled Aggregate concrete using GGBS and Flyash. march 2019., volume-5, issue -3., Pp 269-276	Dr. M. Veera Reddy	International journal of Technical Innovation in modern Engineering & Science		ISSN: 2455-2585
4	Experimental Study On Partial Replacement Of Fine Aggregate (Sand) By Bottom Ash In Recycled Aggregate Concrete	Dr. M. Veera Reddy	Global journal of engineering science and researches	2018-19	ISSN 2348 - 8034
5	A Study on Mechanical Properties of The Waste-Plastic-Banner-Fiber Reinforced Concrete	Dr. S. Sunil Pratap Reddy	International Journal of Technical Innovation in Modern Engineering & Science (IJTIMES)	2018-19	ISSN: 2455-2585

## Details of Faculty incharge for Research and Education Center :



**Faculty I/c:** Sri. A Bhaskar

**Designation:** Assistant Professor

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