



GOVERNMENT OF KARNATAKA
VISION GROUP ON SCIENCE AND TECHNOLOGY

Karnataka Science and Technology Promotion Society
Department of Electronics, Information Technology, Biotechnology and
Science & Technology

Application No. **VRN/002533/21-22**

A. GENERAL INFORMATION

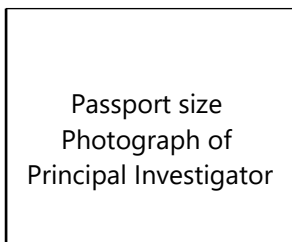
1	Scheme Applied (CESEM, CISEE, K-FIST L1 & L2 and RGS/F)	K-FIST L2 : Karnataka Fund for Infrastructure Strengthening in Science & Technology (K-FIST L2)
2	About the project	
a)	Title of the project	Utilization of Waste Materials (Waste Foundry Sand, Plastic Waste, Agro-Waste) for making Sustainable Green Bricks/Blocks
b)	Subject area as per instruction (Please refer serial No.26 under Annexure-II)	Civil Engineering
	Subject category area	Building Materials and Construction technology

3	Details of Principal Investigator	
a)	Name	P N JYOTHI
b)	Date of Birth & Gender	27/10/1977 (Female)
c)	Age	44
d)	Qualification	Ph.D.
e)	Designation	Professor
f)	Department	Mechanical Engineering
g)	Years of teaching/research experience	Teaching : 21.00 ; Research : 7.00
h)	Email ID	jyothi.p.n@kssem.edu.in
i)	Cell Number / Alternate Cell Number	9663080471 /
j)	Residential Address	Flat No 105, Gangothi Sapthagiri pearl Apt, Maruthi Layout , Naggappa Block, Vasanthapura, Bangalore -560061
k)	Ph.D Degree holder	Yes
l)	Alternate Email ID	pnjyothi77@gmail.com

4	Details of Co-Principal Investigator	
a)	Name	Amrutha D Shenoy
b)	Date of Birth & Gender	19/05/1984 , Female
c)	Age	37
d)	Qualification	M.S, Ph.D (Pursuing)
e)	Designation	Asst. Professor
f)	Department	Civil Engineering
g)	Years of teaching/research experience	Teaching : 6.00 ; Research : 2.00
h)	Email ID	amrutha@kssem.edu.in
i)	Cell Number / Alternate Cell No	9886443351 / 7975218143
j)	Residential Address	C-104, GR Heights, 80 Feet Road, Royal County, 8th Phase, J. P. Nagar, Bengaluru, Karnataka 560083
k)	Alternate Email ID	d.amrutha@gmail.com

5	Details of the Head of the Department		
a)	Name of the Head of the Department	Dr. B Balaji	
b)	Email ID	hod.mech@kssem.edu	
c)	Cell Number	9845496309	
6	Details of the Institution		
a)	Name of the College/Institution with address	K.S. SCHOOL OF ENGINEERING AND MANAGEMENT Address : #15/1, MALLASANDRA, OFF KANAKAPURA ROAD , BENGALURU , Bangalore North , Bangalore - 560063	
b)	Type of the Institution (as per the instruction in SI.No.29)	Private Institution	
c)	Accredited year by NAAC/NBA	3	
d)	Name of the Head of the Institution	Dr. K. RAMANARASIMHA	
e)	Designation of the Head of the Institution	Principal / Director	
f)	Phone Number (Landline) and college website	080 28425012 Website : http://kssem.edu.in/	
g)	Cell Number	9900633688	
h)	Email ID	principal@kssem.edu.in	
i)	Student strength		
Sno.	Department	UG	PG
1	Mechanical Engineering	100	0
2	Civil Engineering	110	30
	Total	210	30
	Whether the project involves collaboration with research institution / industry? If yes , please enclose a letter to this effect	No	
7	If your proposal is selected,		
a)	Cheque/DD to be written in favour of	Kammavari Sangham school of Engineering and Management	
8	If, amount to be credited to your bank		
a)	Name of the Account holder	Kammavari Sangham school of Engineering and Management	
b)	Name of the Bank	Axis Bank	
c)	IFS Code	UTIB0001513	
d)	SB A/c Number	911010055761116	
e)	Address of the Bank	JP Nagar, 6th phase Branch, No 75-A, Ganapathy Raja Enclave, 100 Ft ring road, Bangalore -78	

- a) We are aware of all instructions and directions indicated in Guidelines, Terms and Conditions (GTC) present in GRD – Book of VGST.
- b) We undertake to utilize the VGST grant by strictly adhering to the GTC of VGST.
- c) We undertake the responsibility of purchasing/procuring the equipment only within the VGST approved cost/price.
- d) If we purchase the equipment more than the VGST approved cost the college management will meet the extra cost.
- e) In case of transfer/ retirement/ deputation/ termination/ change of work place from this Grantee Institution, we shall obtain NOC from VGST office by suggesting another responsible & suitable faculty member as PI who belongs to the grantee Dept. of this College/ Institution.
- f) We will procure the equipment within the allowed cost as approved by VGST in the Budget Estimate (PART - A of GRD).
- g) We will not procure any equipment which is not approved by VGST. If such procurement of Equipment/Item is made without the VGST's approval, the College Management/ Grantee Institution will bear the cost of the equipment/Item.
- h) While procuring the equipment, Purchase Committee will follow the procurement procedure as per the KTPP Act 1999 & 2000.
- i) We will obtain the VGST approval of the Budget Estimate (both Non-recurring & Recurring) indicated in PART-A of GRD only once in a Financial Year (FY) & we will not submit for the revised Budget Estimate. We will submit to VGST all the necessary Purchase documents (PART-B) within the 4 months period from the date of issue of grant. We will submit quarterly progress report and consolidated report at the end of the project.

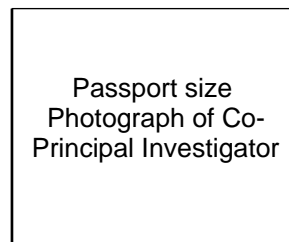


Passport size
Photograph of
Principal Investigator

(P N JYOTHI)

Signature of the
Principal Investigator

Signature of Head of
the Department
(with seal)



Passport size
Photograph of Co-
Principal Investigator

(Amrutha D Shenoy)

Signature of Co-
Principal Investigator

Signature of the Head
of the Institution
(with seal)

Attached documents

S No.	Document Name	File Name	Document Description
1			

B. DETAILS OF THE PROJECT PROPOSAL

1. Title of the Project Proposal	Utilization of Waste Materials (Waste Foundry Sand, Plastic Waste, Agro-Waste) for making Sustainable Green Bricks/Blocks
2. Project Keywords	Brick, Waste Foundry Sand, Plastic Waste, Agro Waste
3. Objectives of the proposal (Not more than six points)	<ol style="list-style-type: none"> 1. To select plastic waste that can use as a sand binder and act as additives to improve properties of bricks/blocks. 2. Collect foundry waste sand from casting industries. 3. Brick/Block Making 4. Testing the Quality of Bricks/Blocks 5. Results are compared and good quality bricks/blocks are given to construction industries.
4. Background of the project	<p>Foundry sand is a by-product from metal casting industries and gets accumulated in large quantities during the manufacturing of various mechanical components. As the sand is unsuitable for use even as back-up sand material, it remains unutilized and gets dumped as solid waste. Also, industrial and consumer plastic waste that cannot be reprocessed or recycled such as high-density polyethylene (HDPE) used in shampoo and milk bottles; polypropylene used for flip-top lids, buckets etc., and low-density polyethylene (LDPE) used as bags are thrown as solid waste which create havoc on the environment. Our project aims to overcome this problem of environmental pollution by utilizing the foundry and plastic wastes for manufacturing sustainable bricks. The aim of our project is to develop light-weight, low-cost, eco-friendly bricks with adequate strength and durability using waste foundry sand (WFS), plastic waste and agro-waste.</p>
5. Methodology (Graphs, designs, charts, may be attached as a separate file in the list of attachments by selecting Document Type 'Others')	<ol style="list-style-type: none"> 1. To select plastic waste and agro-waste that can be used as a sand binder and act as additives to improve properties of bricks/blocks. <ol style="list-style-type: none"> a) Collect different plastic and agro waste available such as paddy husk, bagasse, waste shampoo bottles, water bottles, plastic covers & milk covers etc. b) Convert the waste into tiny pieces using a shredder. 2. Collect foundry waste sand from casting industries. 3. Brick/blocks Making <ol style="list-style-type: none"> a) Bricks/blocks are manufactured using different weight percentages of waste foundry sand, waste plastic and agro waste as additives. b) These mixtures are blended, molded and heated to optimum temperature to gain strength. 4. Testing the Quality of Bricks/blocks <p style="margin-left: 20px;">Quality of the bricks/blocks is measured by performing the following tests:</p> <ol style="list-style-type: none"> a) Brick/block Weight and Water Absorption Capacity b) Soundness Test c) Structure Test d) Compressive Strength e) Efflorescence Test f) Hardness Test g) Dimensional Stability test 5. Results are compared and good quality bricks/blocks are given to construction industries.
6. Milestones with time schedule & work plan	<p>Total Project duration is 2 Years</p> <p>1st Objective: 0-3 Months</p> <p>2nd Objective: 3- 6 Months</p> <p>3rd Objective: 6- 12 Months</p> <p>4th Objective:12-20 Months</p> <p>5th Objective: 20-24 Months</p>
7. List of equipment available in your Institute/College for the project implementation	Compressive testing machine (3000 kN capacity), Cement Autoclave, Los-Angeles abrasion testing machine, CBR apparatus, Marshall stability testing apparatus, Compaction Apparatus, Concrete mixer etc.
8. List of equipment required for 1st instalment & 2nd instalment for Project Implementation	<p>1st Installment</p> <p>Plastic shredder: 3 Lakhs</p> <p>Heater: 2 Lakhs</p> <p>Brick and block making Machine: 5 Lakhs</p> <p>Total =10 Lakhs</p> <p>2nd Installment:</p> <p>Nil</p>

<p>9. Relevance, importance & application of the project</p>	<p>Bricks and Blocks are the most commonly used material in building construction. As India's infrastructure is developing rapidly, the scale of production of bricks and blocks has increased. Traditional methods used for manufacturing bricks/blocks results in energy-inefficiency and contributes to environmental pollution. Use of clay in making bricks consumes non-renewable resources in large quantities and results in emission of harmful gases like carbon dioxide and carbon monoxide. To overcome this problem of pollution, it is necessary to have an energy-efficient manufacturing process along with usage of waste materials in order to achieve sustainable construction.</p> <p>Our focus is to use waste materials from industries, agriculture and plastic waste which form the major polluting elements in nature. In the manufacturing industry, sand casting is one of the major techniques used to make mechanical components that are used for various applications. Other than metal scrap, molding sand used in foundry also remains unutilized as a waste material. Many researchers have worked on using these wastes in making concrete and the results are motivating. As the properties of strength, hardness etc. in the used up foundry sand will be reduced, additives can be used to enhance the properties. From literature it is observed that agro-wastes such as paddy husk, bagasse, groundnut shell etc. can also be used to improve various properties.</p> <p>Another major threat to our environment is used/waste plastic which has no value and results in uncontrolled disposal in landfills causing havoc. Management of waste plastic is currently a major issue our Government is dealing with, as it is a hazard to both the environment as well as to humans.</p> <p>The main objective of this study is to manufacture low-cost sustainable bricks with adequate strength and durability and contribute towards effective waste management and sustainable construction.</p>
<p>10. Novelty/Uniqueness of the project</p>	<ol style="list-style-type: none"> 1. Helps in effective way of managing wastes, which otherwise cause harm to the environment. 2. Reduction in carbon foot print as waste materials are used. 3. Use of waste foundry sand, plastic waste and agro-waste results in eco-friendly/sustainable construction. 4. Non-renewable resources such as clay is not used, also resulting in less water absorption by bricks. 5. Production of light-weight, eco-friendly bricks/blocks which have high compressive strength and good durability.
<p>11. Whether this project leads to innovations and patents, if yes explain</p>	<p>Yes. Making Light weight bricks/blocks which are more durable than the traditional bricks is unique and this process and materials selected can be patented.</p>
<p>12. Whether this project leads to a Startup, if yes explain</p>	<p>Yes . Because construction field and materials used in construction will always be in demand due to the rapid growth in infrastructure. Usage of Bricks/blocks like concrete will always be in boom. With an initial investment of about 7-8 Lakhs, a person can have a start-up in making economical bricks from waste materials. The potential utility of this project will last for years.</p>
<p>13. Whether this project leads to cost effective Technology, if yes explain</p>	<p>Yes, Because the raw materials used for making bricks are waste materials which ultimately get dumped in land fills, causing environmental pollution.</p>
<p>14. Highlight reasons in FIVE sentences or less, what is special, unique or novel in your project that makes it an attractive proposition</p>	<ol style="list-style-type: none"> 1. Helps in effective way of managing the waste 2. Since waste plastic is used as the binder, use of water can be avoided. 3. Use of waste foundry sand, plastic waste and agro waste results in green efficient construction material 4. Nonrenewable source like clay is not used resulting in less water absorption by bricks 5. Expected to make bricks which are light in weight and has high compressive strength
<p>15. Deliverables of the project (Precise and in bullet form)</p>	<p>Economical green efficient bricks and blocks. Quality of the sustainable green bricks and blocks will be higher when compared to that of traditional ones.</p>
<p>16. Please state willingness of your Institute to give partial financial support to this proposal. If yes, state percentage of the total cost that will be supported by your Institute. Include a signed letter from the head of the institute assuring the said support</p>	<p>Nil</p>
<p>Information about Principal Investigator, Research track record, Innovation in the proposed work</p>	

a) List of Publications (For the last 5 years) i) Journal Publications listed @ SCImago Journal Rank (Rating . Q1 OR Q2 OR Q3 OR Q4). Specify rating by referring the website: https://www.scimagojr.com/journalsearch.php	
ii) Journal publications -Not listed in SCImago Journal rating rank	
	Jyothi P N, Jagath M.C, Channakeshavalu K, "Influence of Aluminium on melt flow behaviour of ZA alloys processed through Centrifugal Casting Process", Advanced Materials Manufacturing & Characterization Vol 6 Issue 2, ISSN 2347-1891, Sept 2016 ,PP.6-11
	PN Jyothi, AS Rao, et.al,"The Effect of Increase in Aluminium Content on Fluidity of ZA Alloys Processed by Centrifugal Casting", World Academy of Science, Engineering and Technology, International Journal of Industrial and Manufacturing Engineering,Volume-1, Issue-4, 2014.
	Jyothi P N, M.C.Jagath , K.Channakeshavalu, " Optimization and Prediction of Mechanical Properties of ZA-27/Al ₂ O ₃ MMC Processed By Centrifugal Casting Using Multiple Regression Analysis", International Journal of Engineering Journal of Engineering Studies and Technical Approach,ISSN.2395-0900, Volume 01, No. 10, October 2015,PP 77-84
iii) Conference Presentations	
	P.N. Jyothi, Dr. A Shailesh Rao, Dr. M.C. Jagath, K. Channakeshavalu, "Influence of Refiner Aluminum Titanium Boride on the ZA alloys Processed through Centrifugal Casting" ASME 2013 International Mechanical Engineering Congress and Exposition, IMECE2013, November 15-21, 2013, San Diego, California, USA.
	P.N. Jyothi, Dr. A Shailesh Rao, Dr. M.C. Jagath, K. Channakeshavalu. "Processing of ZA-27 Based MMC Reinforced with Al ₂ O ₃ by Centrifugal Casting", October 25-26, 2014, Int. Conf on AMRE 2014, Zurich, Switzerland.
iv) Google Impact factor of journal	nil
b) Patent(s) filed/granted with details	nil
c) Give details of commercialization status for the granted patents	nil
d) Books published/chapter contributed with details	nil
e) Industrial consultation (given/undertaken) provide details (past 5 years)	nil
f) Other details if any You may state willingness of your Institute to financially support this proposal. If yes, what percentage of the cost will be supported by your institute. Include a signed letter from the head of the institute reflecting the same.	Nil
g) Highlight reasons in FIVE sentences, why your project must be chosen over many other proposals received by VGST?	Because the idea is unique and recycle plastic and produce cost effective bricks
h) Have you tested your concept/innovation? If yes indicate supporting results that makes you to believe in the succusses of the proposal	Yet to start
Information about Co-Principal Investigator, Research track record, Innovation in the proposed work	
a) List of Publications (For the last 5 years) i) Journal Publications listed @ SCImago Journal Rank (Rating . Q1 OR Q2 OR Q3 OR Q4). Specify rating by referring the website: https://www.scimagojr.com/journalsearch.php	
	My ongoing research work is related to development of natural plasticizer for use in concrete and study its effect on the various properties of cement mortar and concrete.

ii) Journal publications -Not listed in SCImago Journal rating rank	
	Effect of rain tree pod extract as plasticizer on properties of concrete, International Conference on Advances in Materials and Manufacturing Applications, Materials Today Proceedings, Volume 46, Part 10, April 2021, pp 5182-5186, https://doi.org/10.1016/j.matpr.2021.03.442 .
iii) Conference Presentations	
	"Effect of Rain Tree Pod Extract as Plasticizer on Properties of Concrete", National Conference on Civil Engineering-New and Effective Innovations, Technologies and Key Challenges 2020, NCCE-NITK 2020, January 30th to January 31st 2020.
iv) Google Impact factor of journal	
b) Patent(s) filed/granted with details	
c) Give details of commercialization status for the granted patents	
d) Books published/chapter contributed with details	
e) Industrial consultation (given/undertaken) provide details (past 5 years)	
Details Of Industrial Collaboration	

Signature of PI and Co-PI

Signature from Industry/Collaborative Institute

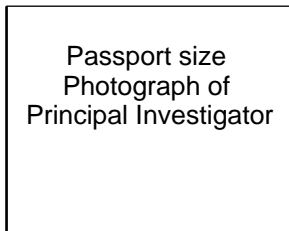
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C. UNDERTAKING FROM THE PRINCIPAL INVESTIGATOR AND CO-PRINCIPAL INVESTIGATOR

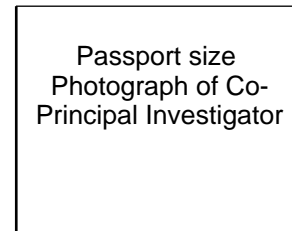
Project Title:	Utilization of Waste Materials (Waste Foundry Sand, Plastic Waste, Agro-Waste) for making Sustainable Green Bricks/Blocks
VGST Name:	K-FIST L2 : Karnataka Fund for Infrastructure Strengthening in Science & Technology (K-FIST L2)

- 1) We have carefully read the terms and conditions of VGST Scheme and we agree to abide by them and complete the project by fulfilling all the formalities.
- 2) We have not submitted or obtained any financial support for this or a similar project proposal.
- 3) We shall ensure that the equipment shown in the project proposal which will be procured under this project are not available in our institution/college.
- 4) The equipment procured under VGST Scheme will be made available to other faculty and students, as needed by them.



(P N JYOTHI)

Name and Signature of
the Principal
Investigator



(Amrutha D Shenoy)

Name and Signature of
Co-Principal
Investigator

Date