



NANDHA ENGINEERING COLLEGE

(AUTONOMOUS)

(Affiliated to Anna University, Approved by AICTE, Accredited by NAAC (A+ Grade)

ERODE - 638052TAMILNADU

DEPARTMENT OF CIVIL ENGINEERING

MSME Hackathon 6.0 (2026-27)

S.No.	Faculty Name	Designation	Title	Reference No.
1.	Mr.V.Aravind	AP/Civil	TexBrick Development of Advanced Composite Building Blocks from Recycled Textile Waste for Sustainable MSME Manufacturing	26INC06TN045585
2.	Mr.K.L.Ravisankar	AP/Civil	Smart Weave FRP Reinventing Carbon Fibre Reinforcement for Affordable Infrastructure Strengthening	26INC06TN049398

S.No.	Student Name	Year	Title	Reference No.
1.	Ms.S.Sarankokila	PhD Scholar	Eco pave: Sustainable Geopolymer Paver Blocks using Sugarcane Bagasse Ash and Industrial By-products	26INC06TN031187
2.	S.Suventhiran	III Year	EcoPave: Sustainable Paver Blocks from Shredded Plastic & Steel slag	26INC06TN048095
3.	N.Dharanish	II Year	Smart Modular Housing System for Tribal Communities	26INC06TN049342
4.	S.Mugunthan	II Year	Composite Reinforced Smart Protective System for Fire-Resistant Industrial Infrastructure	26INC06TN049326



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5.	P.Saraswathi	III Year	HydraGuard AI – Autonomous Smart Irrigation System	26INC06TN052590
6.	M.Saranya	III Year	Smart renewable energy system	26INC06TN053412
7.	K.Rithika	III Year	Solar Bloom – Smart Biomimicry Solar System	26INC06TN053857
8.	S. Isravel Jaba Chryson	III Year	AUSS Adaptive Universal Sink System	26INC06TN056568
9.	M. Madhavan	III Year	GreenBale – Solar Powered Recycling Compactor	26INC06TN063323
10.	D. Manisankar	III Year	Smart Concrete Mixing Tray	26INC06TN057234
11.	S.Kavinessh	III Year	Smart Stair Climbing Material Carrier	26INC06TN061981


28/7/26
Dept. CiPD Coordinator
(Mr. V. Aravind, AP/Civil)


HoD/Civil
23/07/2026



NANDHA ENGINEERING COLLEGE, ERODE -52

(AUTONOMOUS)

Innovation & Incubation

MSME IDEA Hackathon 6.0

Department of Civil Engineering



Expected Proposals: 2

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9	K.Rithika	Student (III Civil)	6379010613	rithikavarshna@gmail.com	Renewable Energy	26INC06TN053857
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11	M. Madhavan	Student (III Civil)	7418025351	madhavan4849@gmail.com	Other Frontier Technologies	26INC06TN063323
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HoD/Civil

23/07/20

MSME IDEA HACKATHON 6.0Reference No. :- **26INC06TN045585**

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6. Theme	Other Frontier Technologies
7. Idea Sector	Miscellaneous Sector (Environment, Forests, Water & Sanitation; Foods, Beverages, FMCG, Consumer Goods; Infrastructure, Construction, Housing; IT, ITES, Electronics, White Goods, Telecommunication; Metals, Engineering, Machinery, Automation and Transportation, Automotive, E Vehicles, Railways, Aviation, UAV and any other sub-sector)
8. Title of proposed idea/innovation	TexBrick Development of Advanced Composite Building Blocks from Recycled Textile Waste for Sustainable MSME Manufacturing
9. Briefly explain newness/uniqueness of the innovation	TexBrick is an innovative advanced composite building material developed by converting post-consumer and industrial textile waste into durable, lightweight construction blocks using specially formulated binders and additives. Unlike conventional clay bricks that consume fertile soil and require energy-intensive kiln firing, TexBrick utilizes difficult-to-recycle textile waste through a low-energy manufacturing process, thereby reducing environmental pollution and conserving natural resources. The uniqueness of the innovation lies in combining waste management with advanced material engineering to produce sustainable construction products suitable for MSME manufacturing. The proposed technology follows a circular economy approach by transforming textile waste into high-value construction materials with improved thermal insulation, reduced weight, and lower carbon emissions. The manufacturing process requires comparatively low investment, making it suitable for small and medium enterprises. TexBrick has significant commercialization potential due to the increasing demand for sustainable construction materials, affordable housing, and environmentally responsible manufacturing practices.
10. Concept & Objective	Concept: TexBrick aims to establish an MSME-friendly manufacturing process for producing advanced composite building blocks from recycled textile waste. Textile waste collected from garment industries, textile mills, tailoring units, and households is sorted, shredded, blended with eco-friendly binders and reinforcing additives, moulded into bricks, and cured under controlled conditions to obtain lightweight, durable, and sustainable construction products. Objectives: • To convert textile waste into value-added composite construction materials. • To develop lightweight, thermally efficient, and eco-friendly building blocks suitable for non-load-bearing and partition applications. • To promote sustainable MSME manufacturing using locally available waste resources. • To support circular economy practices and create employment opportunities through decentralized production units.

11. Specify the potential areas of application in industry/market in brief	TexBrick can be utilized across multiple sectors of the construction industry where lightweight and sustainable materials are preferred. Major applications include: • Interior partition walls in residential and commercial buildings. • Affordable housing initiatives. • Decorative wall panels and architectural cladding. • Landscaping products such as garden edging, planters, and walkways. • Eco-tourism resorts and environmentally conscious infrastructure. • Prefabricated modular construction systems. • Disaster-relief and temporary housing structures requiring lightweight components. The technology can also be adopted by MSMEs engaged in brick manufacturing, precast concrete products, waste recycling, and eco-friendly building material production.
12. Briefly provide the market potential of idea/innovation	• India generates nearly 70.73 lakh tonnes of textile waste annually, while Tamil Nadu is one of the countrys largest textile manufacturing states, ensuring abundant raw material availability for large-scale TexBrick production. • The Tiruppur–Erode textile cluster is one of Indias largest textile ecosystems. Tiruppur alone contributes around 55 of Indias knitwear exports with an annual business turnover of over Rs.70,000 crore, generating significant quantities of recyclable textile waste suitable for TexBrick manufacturing. • Tamil Nadu has over 53,000 registered MSMEs in textile and apparel-related sectors, creating strong opportunities for decentralized production, technology adoption, and commercialization of TexBrick through existing industrial networks. • With increasing investments in affordable housing, green buildings, and sustainable infrastructure, TexBrick offers a cost-effective, eco-friendly construction material with high commercialization potential while supporting circular economy practices and employment generation across Tamil Nadu.
13. Uploaded Block diagram/ flow chart/ Circuit Diagram/Pictures	View/Download

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HACKATHON MSME IDEA HACKATHON 6.0

Reference No. :- 26INC06TN049398

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6. Theme	Industry 4.0 and 5.0
7. Idea Sector	Miscellaneous Sector (Environment, Forests, Water & Sanitation; Foods, Beverages, FMCG, Consumer Goods; Infrastructure, Construction, Housing; IT, ITES, Electronics, White Goods, Telecommunication; Metals, Engineering, Machinery, Automation and Transportation, Automotiva, E Vehicles, Railways, Aviation, UAV and any other sub-sector)
8. Title of proposed Idea/innovation	Smart Weave FRP Reinventing Carbon Fibre Reinforcement for Affordable Infrastructure Strengthening
9. Briefly explain newness/uniqueness of the innovation	The proposed innovation introduces SmartWeave FRP, an Engineered Hybrid Fibre Architecture (EHFA) for cost-effective structural strengthening applications. Unlike conventional Carbon Fibre Reinforced Polymer (CFRP) fabrics, which use expensive carbon fibres in both the warp and weft directions with fixed fabric configurations, SmartWeave-FRP strategically places high-strength carbon fibre only in the primary load-bearing warp direction, while the weft is engineered using application-specific indigenous high-performance fibres such as basalt, glass, flax, banana, sisal, or other sustainable fibres. This optimized fibre architecture significantly reduces carbon fibre consumption without compromising structural efficiency, resulting in a lightweight, durable, and economical reinforcement system. A key innovation is the capability to manufacture reinforcement fabrics in multiple thicknesses ranging from 2 mm to 5 mm, enabling engineers to select the appropriate strengthening material based on structural requirements, damage severity, and design loads. This customizable platform allows optimization of fibre combinations, weave density, and sheet thickness for different civil engineering applications. The technology promotes indigenous manufacturing, import substitution, sustainable engineering, and MSME-based production while offering strong potential for patent protection, technology licensing, and commercialization.
10. Concept & Objective	Concept The proposed innovation aims to develop SmartWeave FRP, an indigenous hybrid composite reinforcement platform based on an Engineered Hybrid Fibre Architecture (EHFA) for strengthening reinforced concrete structures. The technology strategically utilizes carbon fibre in the warp (primary load-bearing direction) and engineered indigenous fibres in the weft (transverse direction) to achieve an optimal balance between structural performance, durability, sustainability, and cost. A key innovation is the capability to manufacture reinforcement fabrics in multiple thicknesses (2 mm to 5 mm), enabling application-specific solutions for light, moderate, and heavy structural strengthening. The hybrid fabrics will be produced using an optimized weaving process and compatible polymer resin systems, ensuring scalable manufacturing suitable for MSMEs and large-scale infrastructure rehabilitation. Objectives Develop an optimized Engineered Hybrid Fibre Architecture (EHFA) for structural reinforcement fabrics. Reduce carbon fibre consumption while maintaining superior mechanical performance. Manufacture reinforcement fabrics in 2 mm, 3 mm, 4 mm, and 5 mm thicknesses for diverse strengthening applications. Evaluate tensile, bond, durability, and structural strengthening performance. Establish an indigenous, MSME-compatible manufacturing process. Commercialize SmartWeave FRP as an affordable alternative to imported CFRP strengthening systems.
11. Specify the potential areas of application in brief industry/market in brief	SmartWeave FRP is designed for the rapidly expanding structural rehabilitation and infrastructure maintenance sector. The product can be used for strengthening reinforced concrete buildings, bridges, flyovers, metro structures, industrial plants, water tanks, chimneys, silos, retaining walls, tunnels, marine structures, and heritage buildings. It is also suitable for seismic retrofitting, corrosion rehabilitation, impact-damaged structures, and life extension of aging infrastructure. Potential customers include Public Works Departments (PWD), National Highways, Railways, Metro Rail Corporations, Smart City projects, construction companies, structural rehabilitation contractors, infrastructure consultants, NDT service providers, defence engineering organizations, and industrial maintenance agencies. In addition to civil engineering, the engineered fibre architecture can be adapted for prefabricated construction systems, modular infrastructure, and lightweight composite products. SmartWeave FRP can be commercialized as reinforcement fabric rolls, retrofit kits, and customized strengthening systems for both domestic and international markets. The availability of multiple sheet thicknesses (2-5 mm) enables SmartWeave FRP to be customized for various applications, including crack repair, flexural strengthening, shear strengthening, column confinement, bridge rehabilitation, seismic retrofitting, and strengthening of heavily distressed structural members.
12. Briefly provide the market potential of Idea/innovation	The global demand for structural strengthening materials is rapidly increasing due to aging infrastructure, urbanization, stricter safety standards, and the need for sustainable rehabilitation solutions. Although conventional Carbon Fibre Reinforced Polymer (CFRP) systems provide excellent structural performance, their widespread use is limited by high cost and dependence on imported carbon fibre products. SmartWeave FRP addresses this gap by introducing an indigenous, cost-effective hybrid reinforcement platform based on an Engineered Hybrid Fibre Architecture (EHFA) that optimizes carbon fibre usage while maintaining superior mechanical performance. The technology supports Make in India, Atmanirbhar Bharat, and sustainable infrastructure initiatives by enabling MSME-based manufacturing of advanced composite reinforcement products. A unique commercial advantage is the ability to manufacture reinforcement fabrics in standardized thicknesses of 2 mm, 3 mm, 4 mm, and 5 mm, allowing application-specific solutions for buildings, bridges, highways, railways, industrial structures, and seismic retrofitting. This product diversification expands market opportunities and enables a single manufacturing platform to serve multiple infrastructure sectors. With strong domestic demand, export potential, and opportunities for technology licensing, SmartWeave FRP offers a scalable and commercially viable solution for the growing structural rehabilitation market.
13. Uploaded Block diagram/ flow chart/ Circuit Diagram/Pictures	View/Download

MSME IDEA HACKATHON 6.0Reference No. :- **26INC06TN031187**

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6. Theme	Other Frontier Technologies
7. Idea Sector	Miscellaneous Sector (Environment, Forests, Water & Sanitation; Foods, Beverages, FMCG, Consumer Goods; Infrastructure, Construction, Housing; IT, ITES, Electronics, White Goods, Telecommunication; Metals, Engineering, Machinery, Automation and Transportation, Automotive, E Vehicles, Railways, Aviation, UAV and any other sub-sector)
8. Title of proposed idea/innovation	Eco pave Sustainable Geopolymer Paver Blocks using Sugarcane Bagasse Ash and Industrial By-products
9. Briefly explain newness/uniqueness of the innovation	EcoPave is an innovative geopolymer interlocking paver block developed by utilizing Sugarcane Bagasse Ash (SCBA) and Fly Ash as the primary binder materials, completely replacing Ordinary Portland Cement (OPC). The innovation converts agricultural and industrial waste into a high-value construction product, reducing landfill disposal and carbon emissions. Compared to conventional paver blocks, EcoPave offers improved compressive strength, abrasion resistance, durability, and lower water absorption. The product promotes sustainable construction through efficient waste utilization and resource conservation while supporting the circular economy. EcoPave provides a cost-effective, low-carbon, and environmentally friendly paving solution suitable for modern infrastructure applications.
10. Concept & Objective	Concept: Eco pave the collected Sugarcane Bagasse Ash (SCBA) and Fly Ash will be processed and mixed with fine aggregate, coarse aggregate, and an alkaline activator solution (NaOH and Na ₂ SiO ₂) to prepare the geopolymer mix. The fresh mix will be cast into interlocking paver block moulds and compacted using a vibration table. After 24 hours, the paver blocks will be demoulded and cured under ambient conditions for 28 days. Finally, the EcoPave blocks will be light weight, reduced environmental impact, converts agricultural and industrial waste into durable, low-carbon paving products with improved engineering performance and sustainable conditions. Objective: • To develop sustainable geopolymer paver blocks using SCBA and Fly Ash. • To improve strength, durability, and abrasion resistance. • To reduce cement consumption and CO ₂ emissions. • To promote sustainable construction through waste utilization.
11. Specify the potential areas of application in industry/market in brief	EcoPave can be utilized across multiple sectors of the construction industry where durable, sustainable, and low-carbon paving materials are required. • Pedestrian walkways, footpaths, and public parks. • Residential layouts, commercial complexes, and parking areas. • Industrial pavements and warehouse flooring. • Smart city, municipal, and highway infrastructure projects. • Landscaping, campuses, and public utility developments. The technology can be adopted by paver block manufacturers, precast concrete product industries, construction companies, municipal bodies, and organizations engaged in sustainable building material production.

12. Briefly provide the market potential of idea/innovation	• India generates approximately 250–300 million tonnes of Fly Ash and 6–10 million tonnes of Sugarcane Bagasse Ash (SCBA) annually. • Erode district, one of Tamil Nadus major sugarcane-producing regions, is estimated to generate approximately 0.15–0.20 million tonnes of Sugarcane Bagasse Ash (SCBA) annually from sugar industries, providing a sustainable raw material source. • Fly Ash is readily available from nearby Mettur thermal Power Stations, which generate several million tonnes of Fly Ash annually, ensuring a continuous supply for geopolymers production. • EcoPave utilizes these locally available waste materials to manufacture sustainable, low-carbon geopolymers paver blocks for infrastructure and urban development. • The technology promotes waste vaporization, resource conservation, and environmentally sustainable construction practices.
13. Uploaded Block diagram/ flow chart/ Circuit Diagram/Pictures	View/Download

MSME IDEA HACKATHON 6.0

Reference No. :- 26INC06TN048095

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6. Theme	Other Frontier Technologies
7. Idea Sector	Miscellaneous Sector (Environment, Forests, Water & Sanitation; Foods, Beverages, FMCG, Consumer Goods; Infrastructure, Construction, Housing; IT, ITES, Electronics, White Goods, Telecommunication; Metals, Engineering, Machinery, Automation and Transportation, Automotive, E Vehicles, Railways, Aviation, UAV and any other sub-sector)
8. Title of proposed idea/innovation	EcoPave - Sustainable Paver Blocks from Shredded Plastic and Steel slag
9. Briefly explain newness/uniqueness of the innovation	EcoPave is an innovative paving solution that converts shredded plastic waste and steel slag into sustainable, high-performance paver blocks. Unlike conventional pavers that depend on natural aggregates and high cement consumption, EcoPave utilizes industrial waste materials to reduce environmental pollution, conserve natural resources, and minimize carbon emissions while maintaining excellent strength, durability, and water resistance. The uniqueness of the innovation lies in its dual-waste utilization approach, promoting a circular economy by transforming difficult-to-dispose waste into value-added construction materials. The technology is cost-effective, scalable, and compatible with existing paver manufacturing units, making it suitable for MSMEs while supporting sustainable infrastructure development and efficient waste management.
10. Concept & Objective	Concept: EcoPave aims to establish an MSME-friendly manufacturing process for producing sustainable paver blocks from shredded plastic waste and steel slag. Plastic waste collected from households, industries, and commercial establishments is cleaned and shredded, then blended with processed steel slag and other required additives. The mixture is moulded and compacted to produce durable, cost-effective, and eco-friendly paver blocks suitable for pavements, walkways, parking areas, and other non-structural applications. Objectives: ? To convert plastic waste and steel slag into value-added sustainable paver blocks. ? To develop durable, water-resistant, and cost-effective paver blocks with good mechanical strength. ? To reduce plastic pollution and promote the utilization of industrial waste through circular economy practices. ? To establish an MSME-friendly manufacturing process that supports the Smart Cities Mission and sustainable infrastructure development in India.
11. Specify the potential areas of application in industry/market in brief	EcoPave can be utilized across multiple sectors of the construction industry where durable, cost-effective, and sustainable paving materials are required. Major applications include: ? Footpaths, pedestrian walkways, and cycle tracks. ? Parking areas, driveways, and residential pavements. ? Parks, gardens, and landscaping projects. ? Smart City and municipal infrastructure development. ? Industrial premises, factory campuses, and warehouse flooring ? Educational institutions, hospitals, and commercial complexes. ? Public infrastructure projects such as bus stops, railway stations, and recreational spaces The technology can also be adopted by MSMEs engaged in paver block manufacturing, waste plastic recycling, steel slag processing, precast concrete products, and eco-friendly construction material production.

12. Briefly provide the market potential of idea/innovation	• India generates approximately 41 lakh tonnes of plastic waste and 19 million tonnes of steel slag annually, ensuring abundant raw materials for large-scale EcoPave production. • Growing urban infrastructure projects, including the Smart Cities Mission, are driving demand for sustainable, durable, and cost-effective paving materials. • States such as Tamil Nadu, Maharashtra, Gujarat, Karnataka, and Telangana offer significant market potential due to rapid urbanization and infrastructure development. • EcoPave is estimated to cost around Rs.12 per block, compared to Rs.20-40 for conventional paver blocks, while achieving a compressive strength of 42 N/mm², making it an economical alternative. • Adoption across 100 Smart Cities could utilize nearly 25,000 tonnes of plastic waste and 1,00,000 tonnes of steel slag, reducing landfill waste and conserving natural resources. • Beyond government projects, EcoPave has strong applications in residential, commercial, educational, industrial, and landscaping sectors. • The innovation offers excellent commercialization opportunities for MSMEs in recycling and paver manufacturing, promoting a circular economy, sustainable construction, and employment generation.
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Reference No. :- 26INC06TN049342

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6. Theme	Industry 4.0 and 5.0
7. Idea Sector	Miscellaneous Sector (Environment, Forests, Water & Sanitation; Foods, Beverages, FMCG, Consumer Goods; Infrastructure, Construction, Housing; IT, ITES, Electronics, White Goods, Telecommunication; Metals, Engineering, Machinery, Automation and Transportation, Automotive, E Vehicles, Railways, Aviation, UAV and any other sub-sector)
8. Title of proposed Idea/Innovation	Smart Modular Housing System for Tribal Communities
9. Briefly explain newness/uniqueness of the innovation	The proposed innovation introduces a Modular EcoSmart Prefabricated Housing System specifically designed for tribal communities residing in remote forest and hilly regions where conventional construction is difficult, expensive, and time-consuming. Unlike traditional prefabricated houses, this system integrates lightweight composite wall panels manufactured using bamboo fibre, recycled industrial by-products, and eco-friendly binders with a galvanized steel modular frame connected through a bolt-based assembly mechanism that eliminates the need for skilled labour and heavy construction equipment. The innovation further incorporates plug-and-play utility modules, including solar-powered lighting, rainwater harvesting, insulated roofing, and IoT-enabled sensors for monitoring structural health, indoor temperature, humidity, and energy consumption. A BIM-based digital model supports efficient design customization, manufacturing, logistics, and lifecycle maintenance. The housing units are transportable in compact modular sections, enabling rapid deployment in inaccessible areas while minimizing environmental disturbance. Compared to conventional rural housing, the proposed system reduces construction time by over 70, lowers lifecycle maintenance costs, improves disaster resilience, and promotes sustainable rural development. The technology has strong commercialization potential for government housing schemes, disaster rehabilitation, eco-tourism, and affordable housing markets.
10. Concept & Objective	The project aims to develop an innovative prefabricated housing technology that provides affordable, durable, environmentally sustainable, and rapidly deployable homes for tribal communities located in remote regions. The concept combines modular structural engineering, eco-friendly composite materials, renewable energy systems, and smart monitoring technologies into a single integrated housing solution. The primary objectives are: • Design lightweight modular housing components suitable for transportation through difficult terrains. • Develop sustainable composite wall and roof panels using locally available renewable materials. • Ensure rapid assembly using bolt-based connections without specialized construction equipment. • Integrate renewable energy systems such as solar lighting and rainwater harvesting. • Incorporate IoT-based monitoring for structural safety and environmental comfort. • Reduce construction cost, time, and carbon emissions compared to conventional buildings. • Develop a scalable manufacturing model suitable for MSMEs. • Promote employment opportunities through decentralized production of prefabricated components. • Support Government initiatives on affordable housing, tribal welfare, sustainability, and disaster-resilient infrastructure.
11. Specify the potential areas of application in Industry/market in brief	The developed prefabricated housing system has extensive application across multiple sectors where rapid, economical, and sustainable construction is essential. Major application areas include: • Tribal Housing Development Programmes • PM JANMAN and PMAY (Gramin Urban) • Disaster Relief and Rehabilitation Housing • Forest Department Residential Quarters • Defence Border Outposts • Eco-tourism and Nature Resorts • Temporary Site Offices and Labour Camps • Rural Health Centres • Anganwadi and Primary School Buildings • Emergency Medical Shelters • NGO Rural Development Projects • Smart Village Development Initiatives • Mining and Infrastructure Project Camps • Portable Government Service Centres • Climate-resilient Housing Projects The technology can be commercialized through MSME-based manufacturing units producing standardized modular panels, structural frames, roofing systems, and utility modules. The increasing demand for affordable, sustainable, and rapidly deployable buildings in India and other developing countries provides a significant market opportunity. The solution also supports green construction practices and contributes to circular economy principles by utilizing recyclable and renewable materials.
12. Briefly provide the market potential of idea/innovation	The proposed technology possesses strong commercialization potential due to the increasing national demand for affordable, sustainable, and rapidly deployable housing. The modular housing components can be mass-produced by MSMEs using standardized manufacturing processes and supplied to government agencies, NGOs, private developers, and disaster management organizations. Potential revenue streams include: • Sale of prefabricated housing kits. • Manufacturing of composite panels. • Structural frame fabrication. • Solar utility module integration. • Annual maintenance and IoT monitoring services. • Licensing of manufacturing technology. • Consultancy for modular housing projects.
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MSME IDEA HACKATHON 6.0

Reference No. :- 26INC06TN049326

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6. Theme	Industry 4.0 and 5.0
7. Idea Sector	Miscellaneous Sector (Environment, Forests, Water & Sanitation; Foods, Beverages, FMCG, Consumer Goods; Infrastructure, Construction, Housing; IT, ITES, Electronics, White Goods, Telecommunication; Metals, Engineering, Machinery, Automation and Transportation, Automotive, E Vehicles, Railways, Aviation, UAV and any other sub-sector)
8. Title of proposed Idea/Innovation	Composite Reinforced Smart Protective System for Fire-Resistant Industrial Infrastructure
9. Briefly explain newness/uniqueness of the Innovation	Unlike conventional fire-resistant buildings that simply use commercially available construction materials, FireShieldX integrates advanced material engineering, modular construction, artificial intelligence, and digital safety technologies into one comprehensive system. Major Innovations • Development of a proprietary fire-resistant composite wall panel. • Lightweight modular construction suitable for MSMEs. • AI-based fire risk prediction and safety assessment. • Digital building layout optimization for fire containment. • Thermal insulation with low heat transfer. • Rapid panel installation and replacement. • Smoke-resistant compartmentalized wall system. • Future-ready IoT fire monitoring integration. • Reduced structural damage during fire exposure. • Scalable design for new and existing factories.
10. Concept & Objective	Concept Develop an innovative modular construction system using advanced fire-resistant composite panels integrated with Artificial Intelligence to improve fire safety in fireworks manufacturing industries. Objectives • Develop lightweight fire-resistant composite wall and roof panels. • Enhance fire resistance and thermal insulation. • Prevent rapid fire propagation inside factories. • Reduce structural damage during fire incidents. • Improve worker safety. • Reduce construction and maintenance costs. • Integrate AI for fire risk prediction. • Develop modular construction suitable for MSMEs. • Improve sustainability through eco-friendly materials. • Enable smart industrial safety monitoring.
11. Specify the potential areas of application in industry/market in brief	The proposed technology can be adopted in: • Fireworks manufacturing industries • Chemical industries • Match Industries • Paint manufacturing plants • Explosive storage facilities • Pharmaceutical warehouses • Battery manufacturing plants • Hazardous material storage buildings • Defence storage facilities • Petrochemical industries
12. Briefly provide the market potential of idea/innovation	India has thousands of MSMEs involved in fireworks, chemicals, explosives, pharmaceuticals, paints, batteries, and hazardous material storage. Increasing emphasis on industrial safety regulations and sustainable infrastructure creates strong demand for advanced fire-resistant construction systems. Potential customers include: • Fireworks manufacturers • Industrial infrastructure developers • Industrial parks • Government safety agencies • Public sector industries • Defence establishments • Private construction companies Commercial opportunities include: • Manufacture of modular fire-resistant panels • Industrial building consultancy • AI-based safety assessment software • Licensing of panel technology • Retrofitting of existing factories
13. Uploaded Block diagram/ flow chart/ Circuit Diagram/Pictures	View/Download

MSME IDEA HACKATHON 6.0

Reference No. :- 26INC06TN052590

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6. Theme	Robotics and Automation
7. Idea Sector	Agriculture, Rivers & Ocean Produce based industries, fertilizers, Agricultural Implements & Agro processing and any related sub-sector
8. Title of proposed idea/innovation	HYDROGUARD AI - Autonomous Smart Irrigation System.
9. Briefly explain newness/uniqueness of the innovation	Conventional drip irrigation systems provides monitoring of water flow and that requires manual inspection, but this system combines both AI, IoT, and Wireless Sensor Networks to continuously detect clogging in real time like the same as the methods we follows by signals and sounds . Specially this added with automatically initiate corrective actions such as self-cleaning. It also provides predictive maintenance alerts, reducing water wastage, labour, and maintenance costs. The solution is designed to be low-cost, solar-powered, scalable, and suitable for small and medium-scale farmers, making smart irrigation technology more accessible and sustainable with goals .
10. Concept & Objective	Concept: An AI IoT-based smart drip irrigation system that detects clogging in real time, automatically performs self-cleaning, and sends instant alerts to farmers, improving water efficiency and reducing manual maintenance. Objectives: Detect drip irrigation clogs in real time. Automate self-cleaning and monitoring. Reduce water wastage and maintenance costs. Provide mobile alerts for quick action. Promote smart, sustainable, and cost-effective farming.
11. Specify the potential areas of application in industry/market in brief	- Agriculture Smart Farming – Automated drip irrigation for farms, orchards, and greenhouses. -Horticulture Plant Nurseries – Efficient irrigation monitoring for high-value crops. -Landscape Garden Management – Smart watering in parks, campuses, and residential layouts. -AgriTech Industry – Integration with IoT-based precision farming solutions - Saves water through real-time monitoring and automatic clog detection. - Reduces labour and maintenance costs with self-cleaning automation. - Improves irrigation efficiency and crop yield. - Provides instant mobile alerts for quick action. - Low-cost, solar-powered, and suitable for small and large farms.

12. Briefly provide the market potential of idea/innovation	At beginning ,this helps to give a well productivity through a supply of clean and secure water and also saves energy efficiency through solar panels.The proposed system has strong market potential due to the increasing adoption of smart farming and precision agriculture. It is suitable for farmers, agricultural companies, greenhouses, and government irrigation projects. Its low cost, water-saving capability, and automation make it a scalable solution for both small and large farms, creating significant opportunities in the AgriTech market. High market potential due to the growing demand for smart irrigation solutions. It helps farmers reduce water usage, labour, and maintenance costs, making it suitable for widespread adoption.With increasing water scarcity and the need for precision agriculture, this solution can be adopted by farms, greenhouses, AgriTech companies, and government irrigation projects.
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MSME IDEA HACKATHON 6.0

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6. Theme	Renewable Energy
7. Idea Sector	Power, Renewables, Electricals, Power Electronics, Energy Efficiency and any related sub-sector
8. Title of proposed idea/innovation	Smart renewable energy system
9. Briefly explain newness/uniqueness of the innovation	The proposed Smart Hybrid Flip Flow Vertical Axis Wind Turbine is a unique renewable energy solution that combines AI-based blade optimization, hybrid wind-solar energy generation, battery storage, and IoT monitoring into a single compact rooftop system. Unlike conventional Vertical Axis Wind Turbines (VAWTs), which have fixed or manually adjusted blades, this innovation uses wind speed and wind direction sensors connected to an Arduino/ESP32 controller to automatically adjust the blade angle for maximum wind energy capture. This improves efficiency under changing wind conditions. The integration of a solar panel ensures continuous power generation even when wind speed is low, while the battery storage system stores excess energy for use during nighttime or power outages. The IoT-enabled mobile application allows users to monitor wind speed, power generation, battery status, and system performance in real time, reducing maintenance.
10. Concept & Objective	The proposed innovation, Smart Hybrid Flip Flow Vertical Axis Wind Turbine with AI-Based Blade Optimization, Solar Integration, Battery Storage, and IoT Monitoring, is an intelligent rooftop renewable energy system designed to improve energy efficiency in educational institutions and urban environments. Unlike conventional Vertical Axis Wind Turbines (VAWTs), the system uses wind speed and wind direction sensors connected to an Arduino/ESP32 controller to automatically adjust the blade angle for maximum wind energy capture. A solar panel is integrated to generate electricity during low-wind conditions, while a rechargeable battery stores excess energy for continuous power supply. The entire system is monitored through an IoT-enabled mobile application, providing real-time information on power generation, battery status, and system performance. Objectives: To design and fabricate a smart hybrid Flip Flow VAWT for rooftop applications. To maximize wind energy capture through automatic AI-based blade optimization. To integrate solar energy for uninterrupted electricity generation. To store renewable energy using a rechargeable battery system. To enable IoT-based remote monitoring and performance analysis. To reduce electricity costs, carbon emissions, and dependence on conventional grid power.

11. Specify the potential areas of application in industry/market in brief	The Smart Hybrid Flip Flow Vertical Axis Wind Turbine has wide application across various sectors due to its compact design, hybrid renewable energy generation, and smart monitoring capabilities. It can be installed in educational institutions such as schools, colleges, and universities to support green campus initiatives and reduce electricity costs. In the residential sector, it is suitable for independent houses, apartments, and gated communities for rooftop power generation and backup energy. Commercial buildings including offices, shopping malls, hotels, hospitals, and IT parks can use the system to lower energy expenses and improve sustainability. It is also applicable in industrial sectors, particularly MSMEs, warehouses, and factories, to power lighting, security systems, and office operations. The system is highly suitable for government buildings, smart city projects, bus stations, railway stations, airports, and public infrastructure where renewable energy adoption is encouraged. It can also be deployed in rural and remote areas, telecom towers, agricultural farms, and disaster-prone regions where reliable electricity supply is limited.
12. Briefly provide the market potential of idea/innovation	The Smart Hybrid Flip Flow Vertical Axis Wind Turbine with AI-Based Blade Optimization, Solar Integration, Battery Storage, and IoT Monitoring has strong market potential due to the growing demand for clean, reliable, and cost-effective renewable energy solutions. Governments, industries, educational institutions, and residential users are increasingly adopting sustainable technologies to reduce electricity costs and carbon emissions. The compact rooftop design makes the system suitable for schools, colleges, apartments, offices, hospitals, industries, hotels, and government buildings where large wind turbines cannot be installed. The hybrid combination of wind and solar energy ensures continuous power generation, while AI-based blade optimization improves energy efficiency. Battery storage and IoT monitoring further enhance system reliability, reduce maintenance costs, and provide real-time performance tracking. The innovation has excellent commercialization opportunities for MSMEs, renewable energy startups, EPC contractors, and smart city projects. Business opportunities include manufacturing, installation, annual maintenance services, energy management, and IoT-based monitoring solutions. With increasing government support for renewable energy, green buildings, and sustainable infrastructure, the demand for such smart hybrid systems is expected to grow rapidly.
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5. HI/BI Name	NANDHA ENGINEERING COLLEGE
6. Theme	Renewable Energy
7. Idea Sector	Power, Renewables, Electricals, Power Electronics, Energy Efficiency and any related sub-sector
8. Title of proposed idea/innovation	Title of proposed idea/innovation Solar Bloom Biomimicry Inspired Self-Opening, Self-Cleaning and Weather Adaptive Solar Energy System
9. Briefly explain newness/uniqueness of the innovation	Solar Bloom is a nature-inspired smart solar energy system based on the blooming mechanism of a flower. Unlike conventional fixed solar panels, it automatically opens during sunlight, tracks the sun for maximum energy generation, closes during rain or strong winds for protection, and includes a self-cleaning mechanism to reduce maintenance. This innovative design improves energy efficiency, enhances panel lifespan, and provides a low-cost, sustainable renewable energy solution.
10. Concept & Objective	The concept of Solar Bloom is inspired by the natural blooming of flowers. The system automatically opens in sunlight, tracks the sun to maximize energy generation, closes during rain or strong winds for protection, and includes a self-cleaning mechanism to reduce maintenance. The objective is to improve solar panel efficiency, reduce maintenance costs, increase panel lifespan, and provide an affordable, eco-friendly renewable energy solution for homes, farms, industries, and public infrastructure
11. Specify the potential areas of application in industry/market in brief	The system can be used in residential buildings, commercial buildings, industries, educational institutions, hospitals, agricultural farms, street lighting, remote villages, smart cities, railway stations, bus stands, and government renewable energy projects.
12. Briefly provide the market potential of idea/innovation	The demand for renewable energy is increasing rapidly. Solar Bloom offers higher efficiency, lower maintenance, and better protection than conventional solar panels. It has strong market potential in the residential, commercial, industrial, and agricultural sectors. The product can support government clean energy initiatives and has good opportunities for commercialization in India and other developing countries.
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S. Isravel Jaba Chryson
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Reference No. :- 26INC06TN056568

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6. Theme	Other Frontier Technologies
7. Idea Sector	Miscellaneous Sector (Environment, Forests, Water & Sanitation; Foods, Beverages, FMCG, Consumer Goods; Infrastructure, Construction, Housing; IT, ITES, Electronics, White Goods, Telecommunication; Metals, Engineering, Machinery, Automation and Transportation, Automotive, E Vehicles, Railways, Aviation, UAV and any other sub-sector)
8. Title of proposed idea/innovation	AUSS ADAPTIVE UNIVERSAL SINK SYSTEM
9. Briefly explain newness/uniqueness of the innovation	AUSS introduces a unique One Sink – Three Modes concept, where a single sink can be transformed to suit three different categories of users: normal adults, wheelchair users, and children. The system combines multiple mechanisms such as height adjustment, Dual mode (Electric + Manual), UV Sterilized, Foldable side platform, Leak proof plumbing, Low cost Easy install, and ergonomic positioning into one integrated product. This enables every user to access the sink comfortably without requiring separate installations. This universal design improves accessibility, comfort, safety, and space while offering a cost-effective solution for homes, hospitals, schools, and public facilities.
10. Concept & Objective	Concept The Adaptive Universal Sink System (AUSS) is an innovative, height-adjustable wash basin based on the One Sink – Three Modes concept. It is designed to serve wheelchair users, children, elderly individuals, and people with mobility challenges through a single adaptable solution. Unlike conventional fixed sinks, AUSS improves accessibility, comfort, and independence while reducing the need for multiple specialized wash basins. The system is durable, cost-effective, easy to install and operate, and can be manufactured using standard engineering materials and fabrication techniques, making it suitable for large-scale production in India. Objectives Develop a universal sink based on the One Sink – Three Modes concept. Improve accessibility for wheelchair users, children, elderly people, and individuals with mobility limitations. Provide a safe, ergonomic, and user-friendly washing experience. Reduce physical strain through an adjustable design. Replace multiple specialized sinks with one adaptive product, saving space and installation costs. Enable economical manufacturing using commonly available materials and processes. Promote Universal Design and accessibility in homes, hospitals, schools, commercial buildings, and public facilities. Establish AUSS as an innovative Indian product with strong commercial, social, and industrial potential through MSME support.

11. Specify the potential areas of application in industry/market in brief	The Adaptive Universal Sink System (AUSS) is designed for widespread adoption across residential, commercial, institutional, healthcare, and public infrastructure sectors. Its innovative One Sink – Three Modes concept provides a single, inclusive solution that improves accessibility while reducing installation costs and space requirements. With increasing emphasis on universal design and barrier-free infrastructure, AUSS has strong commercial potential in both government and private sector projects. Salient Potential Application Areas Residential homes and apartments Hospitals, clinics, and rehabilitation centers Nursing homes and senior citizen care facilities Schools, colleges, and childcare centers Airports, railway stations, and bus terminals Shopping malls and commercial complexes Hotels, restaurants, and hospitality establishments Corporate offices and workplaces Industrial facilities and factories Government buildings and public offices Smart buildings and Smart City projects Accessible public washrooms and community facilities Disability-friendly infrastructure and CSR initiatives
12. Briefly provide the market potential of idea/innovation	Conventional sinks have a fixed height, making them inconvenient for wheelchair users, children, elderly individuals, and people with limited mobility. Adaptive Universal Sink System (AUSS) addresses this challenge with an adjustable-height One Sink – Three Modes design that improves accessibility, comfort, and independence. India has 2.68 crore (26.8 million) persons with disabilities (Census 2011), while the elderly population is rapidly increasing, creating significant demand for accessible products and infrastructure. Government initiatives such as the Accessible India Campaign (Sugamya Bharat Abhiyan) and Universal Design standards are driving the adoption of inclusive infrastructure in public and private sectors. AUSS replaces multiple specialized sinks with a single adaptive solution, reducing installation costs, saving space, and improving user convenience. The product is suitable for homes, hospitals, rehabilitation centres, schools, hotels, offices, industries, transport hubs, and government buildings. Designed using standard engineering materials and conventional manufacturing processes, AUSS is ideal for MSME-led production, large-scale commercialization, and export opportunities. The innovation offers strong commercial potential while delivering long-term social impact by promoting inclusive and accessible infrastructure.
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MSME IDEA HACKATHON 6.0

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TTL year 2012

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6. Theme	Other Frontier Technologies
7. Idea Sector	Miscellaneous Sector (Environment, Forests, Water & Sanitation; Foods, Beverages, FMCG, Consumer Goods; Infrastructure, Construction, Housing; IT, ITES, Electronics, White Goods, Telecommunication; Metals, Engineering, Machinery, Automation and Transportation, Automotive, E Vehicles, Railways, Aviation, UAV and any other sub-sector)
8. Title of proposed idea/innovation	GreenBale - Solar Powered Recycling Compactor
9. Briefly explain newness/uniqueness of the innovation	The proposed Solar Smart Waste Segregation and Compaction System is an innovative solution that automatically separates different types of waste (such as plastic, paper, metal, glass, and biodegradable waste) before compacting the recyclable materials into compressed blocks. Unlike conventional compactors that compress only mixed or single-type waste, this system integrates waste segregation, smart sensing, solar-powered operation, and compaction into one machine. institutions, and MSMEs and After segregation, recyclable waste is compacted individually, making recycling easier, improving material quality, reducing contamination, and lowering transportation and disposal costs. Powered by solar energy. This innovation promotes efficient waste management, supports the circular economy, reduces landfill waste, and contributes to sustainable environmental practices, making it a commercially viable solution for large-scale deployment.
10. Concept & Objective	The Solar Smart Waste Bin with Automatic Segregation and Compaction System (SSWBSCS) is a smart, solar-powered waste management solution developed for MSMEs, industries, institutions, and urban local bodies. It integrates AI/sensor-based waste identification, automatic segregation, hydraulic compaction, IoT monitoring, and renewable energy into a single compact unit. The system automatically separates plastic, paper, metal, glass, and biodegradable waste, preventing contamination and improving recycling efficiency. Recyclable waste is compressed using a hydraulic compactor to reduce storage space and transportation costs, while biodegradable waste is collected separately for composting or further treatment. Powered by solar energy with battery backup, the system operates reliably even in off-grid locations. IoT-enabled sensors monitor fill levels, provide overflow alerts, and enable remote monitoring for efficient waste collection. Its modular, portable, and energy-efficient design minimizes manual handling, improves worker safety, reduces landfill waste, and lowers operational expenses. Suitable for public and commercial spaces, the system promotes sustainable waste management, supports resource recovery, and aligns with the Swachh Bharat Mission, Circular Economy, and SDGs 7, 11, 12, and 13. Objectives Develop a solar-powered smart waste segregation and compaction system. Automatically identify, separate, and compact recyclable waste. Improve recycling efficiency

11. Specify the potential areas of application in industry/market in brief	The Solar Smart Waste Segregation and Compaction System has wide applications across both public and private sectors where efficient waste management is essential. It is suitable for municipal corporations, smart cities, village panchayats, and government waste management projects for effective segregation and volume reduction of solid waste. The system can be deployed in plastic recycling industries, scrap collection centers, waste processing plants, and MSMEs to improve recycling efficiency and reduce transportation costs. It is also ideal for manufacturing industries, factories, warehouses, commercial complexes, shopping malls, hotels, hospitals, airports, railway stations, bus terminals, educational institutions, residential communities, and office campuses where large quantities of mixed waste are generated daily. NGOs, environmental organizations, and sanitation service providers can use the system for community waste management initiatives. Its solar-powered operation makes it especially suitable for remote villages, tourist destinations, parks, beaches, and disaster-affected areas where grid electricity is limited or unavailable. By automatically segregating waste and compacting recyclable materials, the system reduces landfill burden, lowers operational costs, improves recycling rates, and supports sustainable waste management. The product offers strong commercialization potential for MSMEs, equipment manufacturers, local bodies, and environmental service
12. Briefly provide the market potential of idea/innovation	Problem Statement India generates over 170,000 tonnes of municipal solid waste daily, with rapid urbanization increasing the volume each year. A major challenge is the lack of proper waste segregation, causing recyclable materials to mix with biodegradable and hazardous waste. This reduces recycling efficiency, increases landfill disposal, and leads to land, air, and water pollution. Manual segregation is labour-intensive, unhygienic, time-consuming, and exposes workers to health risks. Unsegregated waste also occupies more storage space, increases transportation costs, and most existing compactors rely on grid electricity without automatic segregation, limiting their use in remote areas. Hence, there is a need for an intelligent, energy-efficient waste management system. Proposed Solution The Solar Smart Waste Segregation and Compaction System is an AI/sensor-based solution that automatically identifies, segregates, and compacts plastic, paper, metal, glass, and biodegradable waste into separate compartments. Recyclable waste is hydraulically compacted to reduce storage and transportation costs, while biodegradable waste is collected separately for composting. Powered by solar energy with battery backup, the system operates efficiently even in off-grid locations. IoT-enabled monitoring provides real-time fill-level tracking and overflow alerts for efficient waste collection. The system reduces manual handling, improves recycling efficiency, minimizes landfill waste
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MSME IDEA HACKATHON 6.0

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5. HI/BI Name	NANDHA ENGINEERING COLLEGE
6. Theme	Other Frontier Technologies
7. Idea Sector	Miscellaneous Sector (Environment, Forests, Water & Sanitation; Foods, Beverages, FMCG, Consumer Goods; Infrastructure, Construction, Housing; IT, ITES, Electronics, White Goods, Telecommunication; Metals, Engineering, Machinery, Automation and Transportation, Automotive, E Vehicles, Railways, Aviation, UAV and any other sub-sector)
8. Title of proposed idea/innovation	Smart Concrete Mixing Tray
9. Briefly explain newness/uniqueness of the innovation	The Smart Concrete Mixing Tray with Integrated Digital Weighing System is an innovative solution that combines a conventional concrete mixing tray with a built-in weight measurement system. Unlike traditional trays that require separate weighing equipment and rely on manual estimation, this innovation provides real-time material weight directly during mixing. It improves mix accuracy, reduces material wastage, saves time, minimizes human error, and ensures consistent concrete quality. It's simple, portable, and cost-effective design makes it especially suitable for construction sites, educational institutions, and MSMEs.
10. Concept & Objective	7. Concept Objective Maximum 1500 characters allowed Concept The Smart Concrete Mixing Tray with Integrated Digital Weighing System is designed to simplify concrete preparation by combining a mixing tray and a digital weighing system into a single unit. The tray measures the weight of cement, sand, aggregates, and other materials in real time while mixing, helping users maintain the correct mix ratio without using a separate weighing scale. Objectives • To improve the accuracy of concrete mix proportions. • To reduce material wastage and human errors during mixing. • To save time by eliminating the need for separate weighing equipment. • To ensure consistent concrete quality for better construction performance. • To provide a portable, user-friendly, and cost-effective solution for construction sites, educational institutions, and MSMEs.
11. Specify the potential areas of application in industry/market in brief	8. Specify the potential areas of application in industry/market in brief Maximum 1500 characters allowed The Smart Concrete Mixing Tray with Integrated Digital Weighing System is designed for use in the construction industry to ensure accurate measurement of construction materials, reduce material wastage, and achieve consistent concrete quality. It can be applied in residential, commercial, and infrastructure construction projects, ready-mix concrete (RMC) plants, precast concrete manufacturing units, construction laboratories, educational institutions, and by small contractors and masonry teams. The product improves productivity, minimizes human error, and supports cost-effective concrete mixing

12. Briefly provide the market potential of idea/innovation	9. Briefly provide the market potential of idea/innovation Maximum 1500 characters allowed In the construction industry, manual measurement of concrete materials can result in approximately 5–15 material wastage and increases the time required for weighing and mixing, while also creating higher labour dependency. The proposed Smart Concrete Mixing Tray with Integrated Digital Weighing System addresses these challenges by providing accurate digital measurement, improving quality control, and ensuring consistent concrete mix proportions. Its portable and user-friendly design enables faster on-site operations, reduces material waste, minimizes manual effort, and enhances overall productivity, making it a cost-effective solution for modern construction projects. The product also supports sustainable construction practices by reducing material waste and promoting efficient use of resources, making it a promising innovation with strong market acceptance and long-term commercial viability.
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MSME IDEA HACKATHON 6.0

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6. Theme	Other Frontier Technologies
7. Idea Sector	Agriculture, Rivers & Ocean Produce based industries, fertilizers, Agricultural Implements & Agro processing and any related sub-sector
8. Title of proposed idea/innovation	Smart stair climbing material carrier
9. Briefly explain newness/uniqueness of the innovation	Briefly explain the newness/uniqueness of the innovation: The Smart Stair Climbing Material Carrier is a low-cost, portable solution designed to safely transport construction materials over stairs and uneven surfaces. Unlike conventional trolleys that require significant manual effort, it uses a stair-climbing wheel mechanism with an automatic braking and load-balancing system to improve stability and reduce worker fatigue. Its modular design allows it to carry different types of construction materials such as cement bags, bricks, tiles, and tools. The innovation enhances safety, reduces material handling time, minimizes the risk of accidents, and increases productivity at construction sites, especially where lifts or cranes are not available. It is affordable, easy to manufacture, and suitable for small- and medium-scale construction projects.
10. Concept & Objective	Concept Objective The Smart Stair Climbing Material Carrier is an innovative material handling device designed to transport construction materials safely and efficiently on stairs and uneven surfaces. It uses a stair-climbing wheel mechanism with a load-balancing design to reduce the physical effort required by workers. The objective is to improve worker safety, reduce fatigue, minimize material spillage and handling time, and increase productivity at construction sites. The system is low-cost, portable, easy to operate, and especially useful for buildings under construction where elevators or cranes are not available.
11. Specify the potential areas of application in industry/market in brief	Potential Areas of Application in Industry/Market The Smart Stair Climbing Material Carrier can be used in construction sites, building renovation projects, residential and commercial buildings, warehouses, and hardware/material supply businesses. It is especially useful in places where elevators or cranes are unavailable. The innovation helps transport cement bags, bricks, tiles, tools, and other construction materials safely and efficiently, making it suitable for small, medium, and large construction projects.

12. Briefly provide the market potential of idea/innovation

Briefly provide the market potential of the idea/innovation The Smart Stair Climbing Material Carrier has strong market potential due to the increasing demand for safer and more efficient material handling in the construction industry. It can be adopted by construction companies, contractors, builders, warehouses, hardware suppliers, and equipment rental services. Its low-cost, portable, and easy-to-use design makes it suitable for both small and large projects. By reducing worker fatigue, improving safety, and increasing productivity, the innovation offers practical value and has good commercialization potential in the construction equipment market.

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