

Issue 6

A Bulletin from NCRMI on Kerala Coir

COIR VOX

2023 September

ALAPPUZHA-VAIKOM
COIR CONSORTIUM

COIR-POLYMER
COMPOSITES FOR
ACOUSTIC
APPLICATIONS

ENHANCING
PRODUCTIVITY AND QUALITY
IN COIR YARN
PRODUCTION

RETAINING WALL
USING **COIR BAMBOO**
COMPOSITES

COIR
BHOOVASTHRA
Coir Geotextiles

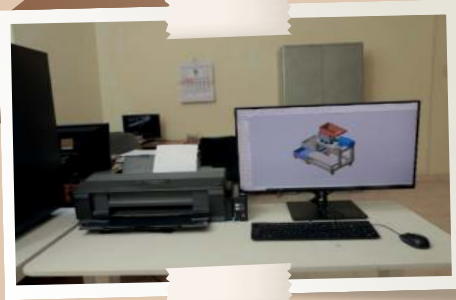
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NCRMI INFRASTRUCTURE

DESIGN AND DEVELOPMENT DIVISION OF NCRMI



High-End Workstation for Precision Design and Analysis



3d Printer for Instant Prototyping

In a world increasingly focused on sustainable materials and eco-friendly solutions, NCRMI stands as a beacon of innovation. Nestled in the heart of a lush coir-producing region, NCRMI has emerged as a pioneer in coir research and development. At the core of its operations lies a state-of-the-art design and development division equipped with a diverse array of machinery that fuels groundbreaking research and supports the coir industry.

The design and development division at NCRMI is a testament to the institution's commitment to technological advancement

and sustainability. This well-equipped facility houses a range of cutting - edge machines designed to facilitate research and development in coir-based products. Here, engineers and researchers work tirelessly to harness the incredible potential of coir fibers, transforming them into innovative and eco-friendly solutions.

NCRMI's success in designing and analysing coir machinery lies in its sophisticated workshop, equipped with advanced tools and technology that cater to every aspect of the development process.



CNC Milling and Lathe for Precision Mass Production



Recognising the importance of preserving traditional craftsmanship while embracing modern technology, NCRMI's workshop is also equipped with a range of conventional machinery. This includes a universal milling machine, radial drilling machine, grinding machine, ironworker, and sheet metal processing machines.



EXPERT FEATURE

COIR INDUSTRY IN THE DIGITAL ERA: NAVIGATING TRADITION AND INNOVATION

The Coir Industry of Kerala, steeped in a millennium-old heritage, faces a critical juncture in the digital age. Traditionally renowned for its eco-friendly products, this industry now needs to rapidly embrace digital innovations to stay relevant in a fast-paced world. It must expand its global reach and adapt to shifting market dynamics.

Sustainability is a key asset, as coir products are eco-friendly and biodegradable, standing out in a world grappling with plastic waste. In an era profoundly concerned with sustainability and the preservation of our planet for future generations, coir products play a pivotal role. Digital technologies can amplify coir's sustainability message. Digital marketing, social media campaigns, and online education can raise awareness and encourage consumers across the globe to choose coir over less eco-friendly alternatives.

e-commerce storefronts make it easier for potential customers to discover, evaluate, and purchase coir products. Targeted online advertising and social media campaigns empower coir businesses to tailor their messages and promotions to specific demographics and precise market segments. This precision in marketing efforts help market expansion to capture consumers seeking sustainable products. It further enables diligent monitoring of performance and swift strategic adjustments, enhancing **marketing efficiency**.

Digital channels further enable direct engagement with customers, fostering **stronger relationships** based on trust and transparency. Customer feedback refines products and services, enhancing satisfaction and loyalty. This **customer - centric approach** not only strengthens the coir industry's market presence but also ensures its products remain in harmony with the evolving demands and expectations of consumers. This digital outreach also influences policymakers and industries to embrace coir as a responsible, eco-conscious material.

The integration of digital technologies has ushered in a transformative era for coir manufacturers. It offers them a spectrum of opportunities to refine their operational processes and bolster their competitiveness. Digital technologies can optimize supply chain management, reducing resource wastage, and enhancing efficiency. **Data driven decisions** can minimize overstocking and stockouts, forecast demand better, and effectively set production schedules, creating efficient supply chains, which in turn makes coir products more accessible and affordable.

The **Virtual Coir Fair -2021** was a successful virtual event during the COVID-19 pandemic highlighted the potential of digital platforms in promoting coir products. Considering the positive reception and the ability to connect with a wider and more diverse audience, the concept of a permanent Virtual Coir Fair is certainly worth exploring.

The various bodies within the Department of Coir in Kerala are currently pursuing individual e-commerce initiatives. However, a more coordinated and unified approach could greatly benefit the entire Coir industry in the region. Establishing a **centralized virtual marketplace** where all coir producers and aggregators can showcase and sell their products is a forward-thinking and inclusive strategy. Such a virtual marketplace would create a level playing field, allowing even small-scale coir manufacturers in Kerala to access a wider customer base, both domestically and internationally. By pooling resources and products on a single platform, these businesses can collectively amplify their presence and reach.

Regulating price bands within the marketplace is a prudent measure to ensure fair competition and maintain product quality. By establishing transparent pricing guidelines, international buyers and customers can confidently engage with the marketplace without the uncertainty of price fluctuations. This regulation would not only instill trust but also facilitate smoother transactions and long-term relationships.

THE CHALLENGES

- ✦ **Technology Adoption:** The industry has been slow to adopt digital technologies due to factors such as a lack of digital skills, resource constraints, or a reluctance to depart from traditional practices.
- ✦ **Investment on Technology:** Implementing digital solutions can be costly, particularly for small-scale businesses.
- ✦ **Limited Digital Infrastructure:** Limited access to reliable internet and digital infrastructure can hinder digitalization.
- ✦ **Increased Competition:** The ease of entry into online markets can lead to increased competition.

The coir industry, rooted in tradition and sustainability, must embrace digital transformation to stay relevant. While challenges exist, by combining heritage with digital innovation, the industry can expand its global presence, enhance efficiency, and promote eco-friendly practices, securing its relevance and contributing to a sustainable future.

Joy Sebastian

Techgentsia Software Technologies Pvt. Ltd.

COIR - POLYMER COMPOSITES FOR ACOUSTIC APPLICATIONS



Figure. Acoustic panels from coir composites



Figure. Sound absorption characteristics of polylactide / coir composites with respect to panel thickness with 50 mm air gap

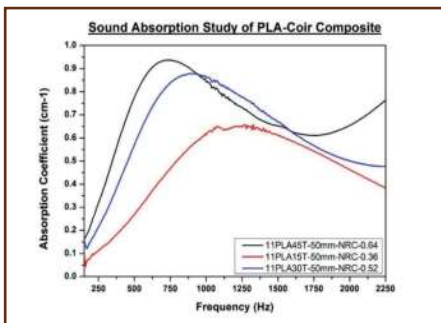


Figure. Sound absorption characteristics of polylactide/coir composites with respect to panel thickness with 50 mm air gap

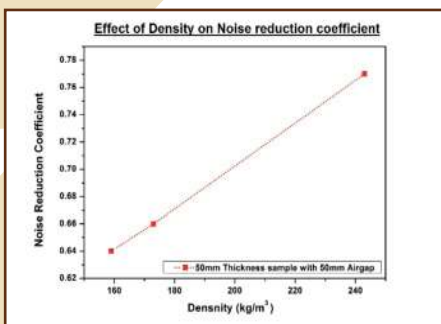


Figure. Density of coir composite panel versus noise reduction coefficient

The fast pace of urbanisation and transport development in the modern world leads to serious side effects, including health risks associated with noise pollution. Using sound absorption materials in house construction, household machines, and automobiles effectively reduces this problem to some extent. Available commercial sound absorption materials could be divided into resonant sound absorption materials and porous sound absorption materials. Resonant absorption materials are generally single Helmholtz resonators, perforated panels, and membrane absorbers. They often suffer from the disadvantage of a narrow frequency band of sound absorption. Porous materials have been widely used in noise reduction due to their airflow characteristics. They are composed of channels, cracks, or cavities, allowing sound waves to enter the materials. Sound energy is dissipated by thermal loss caused by the friction of air molecules with the pore walls and viscous loss brought by airflow resistance within the materials. This energy consumption principle makes the porous materials with broad frequency band sound absorption.

Porous and absorption materials with low cost, easy molding, and reduced weight are ideal for controlling noise in fields such as buildings and transportation. Generally, the commonly used porous sound absorption materials can be classified as sound absorption foam and fibrous sound absorption materials. These foams are composed of cellular structures connected with each other. At the same time, fibrous sound absorption materials contain lots of channels between the constructed fibers, and these fibers may be continuous filaments or staple fibers. The primary raw materials used in the current market for panelling for sound absorption are glass wool and microporous plates of gypsum or metals. Polyurethane foam-based panels are used in satellite systems for sound absorption. With increased awareness of the toxicity and hazardous effects, the industry is looking for alternative materials that are green and eco-friendly without compromising the fire safety aspects.

A collaborative project with the CSIR-National Institute for Interdisciplinary Science and Technology (CSIR-NIIST) proves how to design and develop coir-polymer composites for acoustic applications. Natural fibers especially coir, which are hard and of large diameter, having a high bulk density that is sustainable and non-toxic, can be utilised as a suitable replacement for mineral fibers for obtaining good sound absorption coefficient, particularly at mid to low frequencies. We developed a process for making low-density acoustic panels from coir/polymer composites using different layers of coir mats, which are flame-resistant (FR) and have good sound absorption properties at low frequencies with a noise reduction coefficient (NRC) 0.8. These hybrid coir composites produced with tailor-made sound absorption and physical properties showed prospects for applications as cost-effective, acoustic panels for noise control. The NRC can be fine-tuned by controlling the thickness and density of utilising air cavities or Helmholtz resonators, surface design, and a porous top plate. The polylactide/coir composites using FR-treated coir mat showed prospects for utilisation as green acoustic panels.

RETAINING WALL USING COIR BAMBOO COMPOSITES

A retaining wall is a structure that holds back soil or rock from a building, structure or area. Retaining walls prevent downslope movement or erosion and support vertical or near-vertical grade changes. It has been one of the significant geotechnical applications for centuries. Thousands of retaining walls are under construction worldwide for roads, railways, protection works, etc.

Reinforced earth walls use flexible metallic or synthetic strips as reinforcement to restrain lateral expansion of soil fill through the stiffness of the reinforcement and frictional transfer of stress to the earth mass. Currently, geosynthetic products are widely used as reinforcement materials. Coir fibres have the maximum durability among natural fibres because of their high lignin. Woven coir geotextile made from coir fibre can be used as reinforcement in strengthening retaining walls. Bamboo is also a natural fibre having a modulus of elasticity equal to one-twentieth of steel. Combining coir geotextile and bamboo has the potential to capture the commercial market. To use these inherent qualities in the best manner possible, bamboo with a coir

interface can be used as reinforcement for the construction of retaining walls, embankments and consequent improvement on bearing capacity.

Taking cue of the huge scope of this application, NCRMI has implemented a series of free trials at its campus showcasing the effectiveness of the combination of coir geotextile bamboo reinforcement in retaining wall construction. The field trial depicted that the backfill was well retained and stabilised by incorporating coir-bamboo material. Various facing elements, like thin panel facing, gabions, etc., can be used to construct retaining walls. Trials with retaining walls incorporating coir geotextile-bamboo composites up to a height of 2m were evaluated, and it was found to be effective as reinforcement.

Thus, the coir geotextile can effectively be used to construct retaining walls. The added advantage of bamboo-coir composite is the high strength-to-weight ratio for fabrication cost and reduced maintenance. Similarly, bamboo with a coir interface can efficiently carry a retaining wall of moderate height.



PRODUCTIVITY AND QUALITY IN COIR YARN PRODUCTION

A STUDY OF ASM INSTALLED BY
KSCMMC

The coir industry, deeply rooted in Kerala's heritage, has significantly contributed to the state's economy for decades. One pivotal element of this industry is the Automatic Spinning Machine (ASM), designed to streamline the production of high-quality coir yarn. As part of the ongoing efforts to revitalise the coir sector, the Kerala State Coir Machinery Manufacturing Company (KSCMMC) introduced the Double-Headed ASM. This article delves into the findings of a comprehensive productivity study conducted on ASMs installed by KSCMMC in coir co-op societies across the state.

1 ASM Technology: An Overview

The Double Headed ASM unit, manufactured by KSCMMC, boasts remarkable capabilities. This versatile machine produces yarns with running lengths ranging from 120 to 300 meters per kilogram. The machine operates at a productivity rate of 40 to 70 kilograms within an 8-hour shift. However, manual supervision by skilled ASM operators remains vital to ensure the removal of hard pieces and foreign matter from the fibers, thus enabling seamless yarn production.

2 The KSCMMC Initiative

In the wake of the second Reorganization Package in Kerala's Coir Sector, KSCMMC took the initiative to install 1,500 ASMs in Coir Co-op Societies across the state. This endeavour aimed to foster the coir industry's growth by facilitating efficient coir yarn production. The ASMs, under the claim of producing 40-70kg of 130-210 runnage coir yarn in an 8-hour shift, were strategically placed to drive productivity in the coir sector.

3 Conducting the Productivity Study

A committee was formed, comprising representatives from the Project Office (Coir), Coirfed, KSCC, KSCMMC, and NCRMI, to conduct a comprehensive productivity study of the ASMs installed by KSCMMC. The study evaluated 12 coir co-op societies under the Alappuzha and Kayamkulam Project Offices. These societies represented varying production capacities, providing a comprehensive view of the ASM's performance.

The study considered several vital parameters, including the quality of coir fiber used, continuous operation of the machine, operator skill set, electricity consumption, runnage of coir yarn, working atmosphere, and production capacity. These factors collectively contributed to a holistic assessment of the ASM's productivity and efficiency.

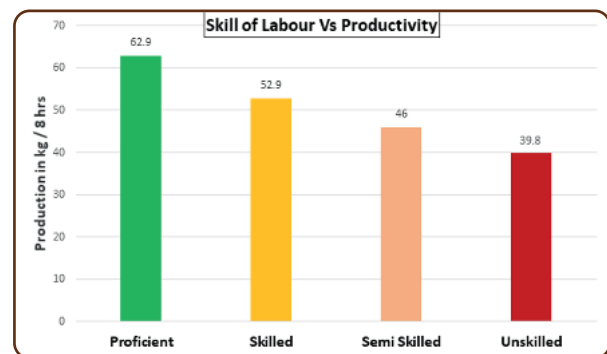
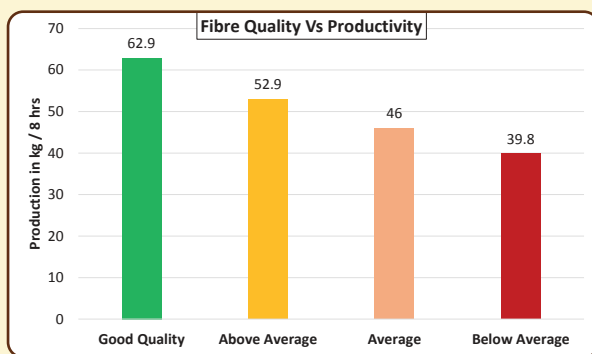
4 In-depth Analysis of Findings

The study's findings illuminated several critical aspects affecting the productivity and quality of coir yarn production using the ASMs. Some key findings included:

- ✦ Insufficient attention to the quality of coir fiber and inadequate removal of impurities.
- ✦ Variability in runnage due to factors like low-quality fiber, improper feeding, machine wear and tear,
- ✦ Reduced productivity due to frequent fiber breakage.
- ✦ Inadequate lighting, ventilation, and basic amenities in co-op societies.
- ✦ Operators prioritise quantity over quality.

5 Observed data

SL. NO.	SOCIETY NAME	FIBRE QUALITY	PRODUCTIVITY	RUNNAGE
1	Chenganda CVCS No.A555	Below Average	40.5	220
2	Cherthala vadakkumuri CVCS no.659	Above Average	53.6	195
3	Chingoli North CVCS. 207	Below Average	41.6	170
4	Aarattupuzha CVCS No.325	Above Average	52.2	171
5	Vayalar CVCS No A568	Average	46.8	171
6	Chethy North CVCS No. A1321	Below Average	38.4	160
7	Mangalam CVCS No 483	Average	47.8	202
8	Kandalloor CVCS No.323	Below Average	41.6	148
9	Kallapuram CVCS No.A 734	Below average	40.8	161
10	Varanam CVCS No.A 734	Average	46	172
11	Kumarapuram CVCS No.70	Good	62.9	148
12	Aarattupuzha CVCS No.550	Below Average	36.2	177



6 Recommendations and Conclusion

The study concluded with actionable recommendations for enhancing productivity and quality in coir yarn production using ASMs. These recommendations included:

- ✦ Ensuring consistent fiber quality and proper removal of impurities.
- ✦ Standardizing fiber preparation practices.
- ✦ Addressing runnage variation through quality control measures.
- ✦ Improved maintenance strategies and timely part replacements.
- ✦ Incorporating mechanisms to reduce fiber breakage.
- ✦ Enhancing working conditions and amenities for operators.
- ✦ Establishing proper testing facilities for quality assessment.
- ✦ Aligning compensation structures with yarn runnage.
- ✦ Focusing on both quantity and quality in production.



In conclusion, the productivity study conducted on ASMs installed by KSCMMC shed light on critical areas of improvement for the coir industry. By addressing the identified bottlenecks, the coir sector in Kerala can rejuvenate its productivity, ensure better quality yarn, and secure a brighter future for this time-honoured industry. Immediate interventions and concerted efforts from stakeholders are pivotal to achieving these objectives and paving the way for sustainable growth in the coir sector.

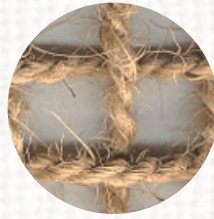
COIR GEOTEXTILES (COIR BHOOVASTHRA)

Coir geotextiles (Coir Bhoovastra) is a geosynthetic fabric made from the coconut fibre extracted from the husk of the coconut fruit. Coir geotextiles are planar, permeable fabrics made from coir fibre that, when used in association with soil, can separate, filter, reinforce, protect or drain. Coir fibres can be converted into fabric both by woven and non-woven processes.

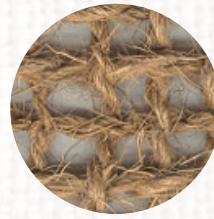
Types Of Coir Geotextiles

1. Woven coir geotextiles

Woven coir geotextiles are made from coir yarn in which the warp and weft strands are positioned at a distance to get a mesh effect of ¼", ½" and 1" square. The common types of woven coir geotextiles available are 400 GSM, 700 GSM, and 900 GSM, where GSM refers to the weight of coir geotextile (in grams) per meter square area.



400 GSM



700 GSM



900 GSM

2. Non-woven coir geotextiles

Non-woven coir geotextiles are manufactured as sheets or webs of directionally or randomly oriented fibres.

- ✦ **Coir needle felt:** This non-woven fabric is made from randomly packed coir fibres that are needled. The fibre is bonded mechanically, forming a continuous sheet, and is devoid of bonding material in its manufacture.
- ✦ **Cocologs:** This non-woven fabric is tubular netting with compact rolls of coir fibre web covered by coir mesh. It stabilises and re-vegetates erosion-prone seashores, vertical drains for groundwater recharge, and trench and horizontal drains in roads. Its diameter ranges from 15 to 50 centimetres, and its length varies from 2 to 6 meters.



ADVANTAGES

- ✦ The coir geotextiles give the grass plenty of room to grow while providing a large number of "Check Dams" per square meter of soil media.
- ✦ Due to high resistance to saltwater action, the coir geotextiles remain virtually unaffected when used against erosion.
- ✦ Holds the seeds and saplings in place.
- ✦ Allows sunlight to pass through.
- ✦ The high tensile strength of coir fibre protects steep surfaces from heavy flows and debris movement.
- ✦ Easy to install
- ✦ Environmentally friendly, aesthetically pleasing and non-polluting.
- ✦ The thick and protruding fibres from the yarn provide extra protection against soil erosion and roughness to the surface floor and hold the soil particles in place.

APPLICATION

- ✦ Slope stabilisation and erosion control
- ✦ Riverbank protection
- ✦ Stabilization of pond
- ✦ Mulching
- ✦ Geocell /Agri cell for slope land cultivation
- ✦ Stabilization of road using coir geotextile
- ✦ Retaining wall construction
- ✦ Bund strengthening or mud wall reinforcement

KERALA COIR WORKER'S WELFARE FUND BOARD

Grasping the deplorable situation in which the Coir Workers toiled and contributed their might to the betterment of the State's economy, the Government of Kerala enacted the Kerala Coir Workers Welfare Fund Act 1987, which provided for the constitution of a Fund to grant relief to, promote the welfare of, and pay pension to the Coir Workers and self-employed persons in Coir Industry in the State of Kerala and for certain other matters incidental to it. Kerala is the only state with an organisation for the coir worker's welfare and well-being. The Board started functioning on 2.02.1989. The board provides a variety of welfare assistance to coir workers.

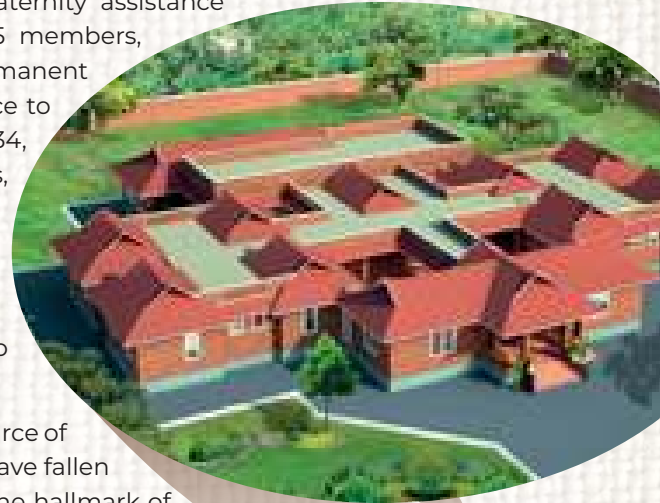
About 1,02,274 Coir workers and 79,272 pensioners are on the roll of the Board as of 31.8.2023. The Govt. of Kerala provides this entire pension amount as a grant. During the financial year 2022-2023, the Board disbursed pension to 76,834 pensioners, Marriage assistance to 2112 members, Maternity assistance to 193 members, medical aid to 5 members, Temporary disability to 5 members, Permanent disability to 302 members, Funeral assistance to 465 members, educational assistance to 1734, Fatal Accidental assistance to 120 members, Retirement benefit to 263 pensioners, Covid-19 Assistance to 476 members etc. The board runs the Rajive Gandhi Memorial Old Age Home, which was instituted to look after aged coir workers who are destitute with no one to look after them.

The Coir Worker's Welfare Fund Board is a source of solace for the coir workers in the state who have fallen to rough times. The Welfare Fund Board is the hallmark of Kerala's humanitarian and empathetic approach towards the Coir Sector.

MANAGERIAL PROGRAMS AT NCRMI

NCRMI has contributed to the sector by attracting newer people to the industry by conducting Seminars and exhibitions demonstrating various research projects and showcasing diversified coir products, hi-tech machinery, and latest trends in both the furnishing industry and other natural fibre industries. NCRMI has also stepped on the marketing side by introducing the "Oru veetil oru kayar ulpannam campaign" and conducting periodic road shows, exhibitors meets, International stalls, and Coir Carnival.

The Management division of NCRMI carries out all the above activities of the Institute. The division also provides residential and non-residential training programmes for officials from the Coir, Agriculture, PWD, other departments, PSUs officials, and private entrepreneurs. Collaborative training programs with ILO and training programmes for UNIDO are also conducted. The state of art facilities of NCRMI, such as the Seminar Hall, lecture hall, hostels, library, and canteen, are utilised for effective learning.



SOCIETY IN FOCUS

CHERTHALA TALUK SMALL-SCALE COIR MATTING PRODUCER'S CO-OP SOCIETY

In 1987, Small Scale Coir Matting Producers in Cherthala Taluk of Alappuzha District formed a Co-operative Society named Sherthalai Taluk Small Scale Coir Matting Producers Co-operative Society Ltd No. A.886. About 300 small-scale producers are members of the society, and about 600 handlooms and seven automatic looms are now working under the society. The society's mission is to avoid the exploitation by middlemen in the Coir Industry and betterment of the living conditions of the small-scale producers, and to support direct marketing. The Society manufactures all types of Coir Mats, Mattings, Rugs, Carpets and Geo Textiles.

The Society collects manufacturing orders from Coirfed, KSCC and exporters based

on orders they purchase the required raw materials in bulk quantity and distribute the orders and raw materials among the members based on their production capacity. After the manufacturing process and quality checking, the products are sold to the buyer concerned. The total sales turnover of the Society during the year 2020-2021 was Rs.40.50Cr. The Society won the "Best Performing Coir Co-operative Society" award in 2018-19.



EXPORTER'S PROFILE

FIBRE WORLD

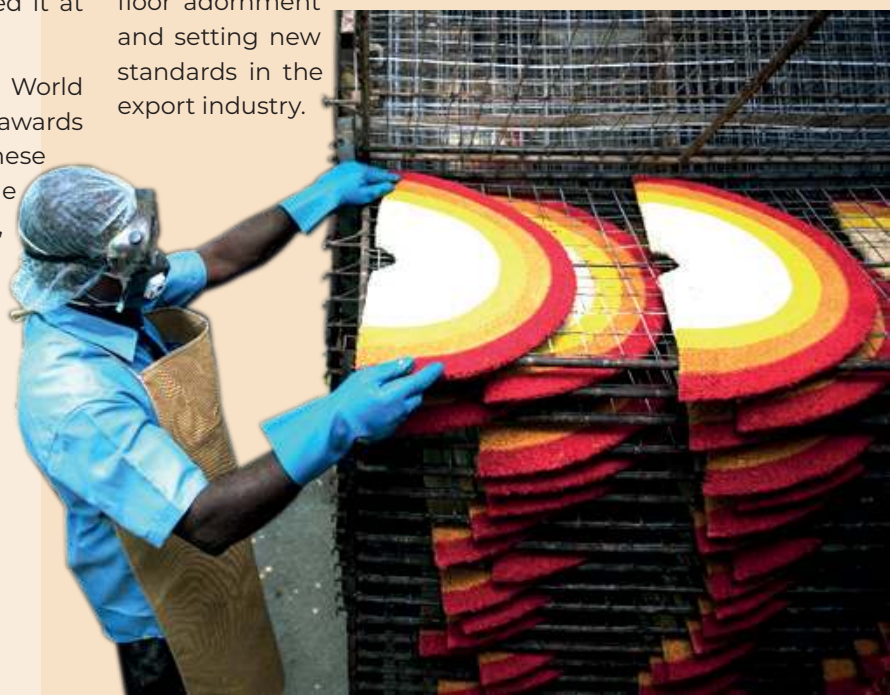
Fibre World is a pioneering export company that has redefined the landscape of design-oriented coir doormats and floor coverings. With a remarkable journey spanning a quarter - century, Fibre World has consistently impressed international markets with its exceptional products and unwavering commitment to quality.

Founded with a vision to transform the humble doormat into an exquisite piece of functional art, Fibre World has successfully blended creativity, innovation, and traditional craftsmanship. The company's dedication to offering unique and aesthetically pleasing designs has positioned it at the forefront of the industry.

Boasting an impressive track record, Fibre World has proudly clinched multiple national awards for its outstanding export performance. These accolades stand as a testament to the company's exceptional business acumen, resilience, and ability to meet and exceed the diverse demands of global clientele.

Fibre World's success story is punctuated by its unwavering focus on customer satisfaction and market trends. By harnessing cutting-edge technology and staying attuned to evolving design preferences, the company has consistently delivered products that resonate with the modern consumer.

As Fibre World embarks on the next phase of its journey, it continues to be a beacon of innovation, quality, and creativity in the realm of coir doormats and floor coverings. With a legacy of 25 years and a mantle adorned with prestigious national awards, Fibre World remains dedicated to elevating the art of floor adornment and setting new standards in the export industry.



SPECIAL FEATURE

ALAPPUZHA- VAIKOM COIR CONSORTIUM

Self-sufficiency in coir production was the most important factor of the second reorganization package, implemented in 2016. The Alappuzha-Vaikom Coir Consortium operates to support the Defibring units with a timely supply of quality coconut husks. 10 DF Mills established under the Vaikom Coir Project in 2019 and 6 DF Mills established under the Alappuzha Project are members of the Consortium. The husk required for the DF mills was being collected from other districts, but currently, the consortium is trading husks mainly in competition with traders from Tamil Nadu and supplying them to DF mills. The price of husk is determined by the market conditions, cost of diesel, weather conditions, transportation charge, etc., which results in large fluctuations. The consortium has a track record of successfully procuring and distributing husk even in uncertain conditions. In the last many months, the situation has been aggravated due to the unavailability of the revolving fund provided by COIRFED to ease the procurement process. A 2.45 - acre land and

building owned by Muhamma Grama Panchayat and owned by the Marari-Naliker a cluster at Kattukada in Alappuzha coir project currently serves as the central hub of the consortium. The Kattukada model mill functions as the consortium's headquarters. 50,000 husks are processed here every month. About 4000 - 5000 kg of fibre produced by the consortium is delivered to coir co-operative societies in Alappuzha and Kottayam districts every month at price slabs decided by COIRFED. The consortium is also working hand in hand with the Integrated Rural Technology Centre (IRTC) to provide inoculated Coir Pith mixture to Panchayats to address waste management. Mr. K K Ganesan, Chairman of Kerala State Coir Welfare Board, is currently working as Chairman of the consortium. The Vaikom Coir Project Officer is currently working as the Executive Officer.



LATEST NEWS

E-RATT TRAINING PROGRAM AT MURUNTHAL CVCS LTD NO.298, KOLLAM PROJECT AREA



INAUGURATION BY
KOLLAM MLA **SRI MUKESH**



AND

PRESIDED OVER BY
SRI V R VINOD IAS, DCD



Department of Coir Development
Government of Kerala, India



National Coir Research
& Management Institute



National Coir Research & Management Institute (NCRMI)

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