

# PRODUCT DEVELOPMENT AND DIVERSIFICATION

| YEAR                  | ACTIVITIES   | ACHIEVEMENTS   |
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| <p><b>1971-72</b></p> | <p>Light weight carpets of low pile heights of 3/8 inches were manufactured from single strand coir yarn using jute yarn as base fabric.</p> <p>Coated PVC based adhesives at the cut edges of coir door mats and hot pressed to yield a refined edging for the mat.</p>   | <p>1.Light weight carpets were developed.</p> <p>2.PVC based adhesives for finishing the cut edges of mats were developed.</p>   |
| <p><b>1972-73</b></p> | <p>Developed pile carpets woven with polypropylene filament yarn as the base fabric for development of light weight fabrics having coir pile structure in place of traditional carnatic carpets of high weight.</p> <p>Coir webbings were woven from single strand coir yarn for finishing the cut edges of coir mattings and have advantages of better wearing life with increased resistance against degradation under moist condition on comparison with hessian webbings.</p> <p>Woven fabric from single strand coir yarn spun out of softened coir fibre for use as window and door curtains.</p> <p>Utility of coir netting as a means of erosion control was established by field studies undertaken in collaboration with Central Road Research Institute by covering a total area of 23000 sq.ft at certain hillside slopes in Simla and Railway embankments in Pathankott in 1972. The monsoon rains of 1972 and the winter rains of 1972-73 and the weather effects of the period had little influence on coir netting at both the experimental sites and the coir netting was intact. Grass was uniformly covered itself on the slopes in Jammu whereas in Simla the grass cover is not so luxuriant. Coir nettings with ½” mesh seemed to offer too small openings to permit quick emergence of vegetation, though such small openings provide a greater weight on the soil, thereby reducing the impact of heavy rains. There was no damage or cuts on the nettings, covering the treated slopes.</p> | <p>1..Applied coir mattings for lining canals to prevent seepage of water.</p> <p>2.Field studies were carried out on coir netting for soil erosion control.</p> <p>3.Preformed joint filler boards were developed.</p> <p>4.Woven coir webbing from single strand coir yarn</p> |

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|                | <p>Laboratory experiments in association with Central Road Research Institute (CRRI) in preparation of pre fabricated bituminous surfacing using coir mesh matting as the base fabric indicated that coir mesh had to be pre-dried to whittle down the moisture content to facilitate proper impregnation of the bitumen into the coir mesh. About 6 to 7 kg. of bitumen was required to coat 1 sq. metre of coir netting. Bitumen of 20/30 grade pen or partially blown grades was found to be suitable for impregnating the material. Thickness of coir netting put limitations in rolling of treated material to convenient size without forming cracks on the binding medium.</p> <p>Preformed joint filler boards were made in collaboration with Central Road Research Institute (CRRI) by dipping rubberised pads in bituminous composition of 10/20 pen. The board so prepared was pressed under a pressure of 100 lb per sq. inch to expel the excess binder and dried in chamber. The binder content was 3 kg per sq. meter of 2.5 cm thick pad.</p> <p>Investigations on the efficacy of coir nettings to prevent scour was conducted on a laboratory scale under the collaborative project with the Department of Civil Engineering of the Punjab University using 1 cm mesh nettings made of 11/12 score anjengo yarn and 13/14 score vycome yarn. The study revealed that coir is adequately tough and hard to withstand cutting on contact with sharp edges of the stones. Coir nets have extreme flexibility to allow the settlement of the coir-stone-bed to assume the profile of the protected bed with the advantage of causing the stones to act in unison, there by precluding the possibility of the stones being washed away even at high velocity flows.</p> |  |
| <b>1973-74</b> | <p>Non-skid backing and finishing of the cut edges of matting mats was developed using compounded reclaimed rubber by pressing in a hot press at a temperature of 120 to 140<sup>0</sup>c for 4 to 12 minutes. ¾ inch width strips of rubber sheet were used for finishing the cut edges of matting mats.</p> <p>Central Road Research Institute selected a hill slide slope in Simla and a rail embankment at Pathankot. The sites selected were the following:-</p> <p><b>Site 1 Hill side slopes</b><br/> Hindustan – Tibet National Highway – downhill near Idgah Grounds in Simla.<br/> Western Slide (Wooden pile) 167.2 sq.mtr.<br/> Opposite Western slide: 111.5 sq.mtr.</p>   | <p>1.Evolved nonskid matting mats.</p> <p>2.Composite boards were developed out of coir fibre and cement.</p> <p>3. Conducted field demonstration on application of coir netting at Pathankot.</p> |

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|                       | <p><b>Site 2 : Railway embankment slopes</b><br/> Near Bridge No 154- Pathankot to Jammu Railway Link 70 km from Pathankot – Both side slopes give a total area of 1200 sq.mtr.<br/> The slope angle, soil temperature, moisture content, soil type, pH of soil, total rainfall and the percentage survival of vegetation were also recorded during the investigation.<br/> It was reported that coir nettings are a very effective means of checking erosion and establishing vegetation on denuded slopes.<br/> Studies were conducted for using coir as a reinforcing material in the preparation of roofing/paneling boards in collaboration with the Central Building Research Institute and developed composite boards from coir fibre, rice straw and cement, from coir fibre, coconut pith and cement and corrugated sheets from coir fibre and cement. The panels were found to be suitable for partitions and walling in building constructions. The physical properties such as bulk density, texture, moisture absorption, bending strength, thermal insulation, thermal performance index, fire resistance, drying shrinkage, sound transmission loss and absorption coefficient were measured.</p> |  |
| <p><b>1974-75</b></p> | <p>A project for construction of an experimental road using coal tar carpets was evolved in consultation with the National Highway Division.<br/> The prospects of using tubular coir mattings as filter points in tube wells was investigated in collaboration with the Agricultural Department of Tamil Nadu Government.<br/> The technical aspects of using coir matting as a medium for sea erosion control were examined in consultation with the Kerala Engineering Research Institute. The prospects of using coir reinforced precast slabs in civil works for drains were explored.<br/> Kayarool druggets of 4 shaft weave in different design patterns were woven.<br/> Composition for non-skid backing and edge finishing of matting mats with improved flexibility was evolved.<br/> 110 druggets and 80 rolls of Kayarool webbings were made against the requirement of the trade</p>  | <p>1.Bristle and mattress fibres were converted in to yarn.<br/> 2.Kayarool druggets were made from softened coir.</p> |

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| <p><b>1975-76</b></p> | <p>Admixture of jute to the extent of 20% improved the uniformity of single strand yarn due to more efficient movements to the coir fibre in association with the jute strands.</p> <p>Developed woven sample carpets in 20 different patterns in 4 shaft carpet weave resulted in projecting different patterns of the design on the two sides of the fabric by the relative disposition of yarns of different shades. Sample mourzouk carpets were made out of softened hard twist yarn.</p> <p>Developed woven carpet with carnatic yarn (natural as the warp and softened carnatic yarn as the weft).</p> <p>Evolved smooth loop mats/ carpets in novel designs out of softened carnatic yarn used for the formation of loop. Hand tufted coir in PVC base was evolved.</p> <p>Asphaltic coir mesh mattings was used in the road construction in the premises of CCRI. After making the surface of the road dust free, hot bitumen was sprayed on the cleaned surface before laying the chipping carpet, which was subsequently rolled for consolidation. Reinforcement of the road with coir mesh was attempted in following phases to arrive at the most satisfactory method of application of reinforcement.</p> <p>In the 1<sup>st</sup> phase ½ inch mesh matting soaked in bitumen at near about boil by dip treatment in the tank by open width passage of the matting from the roll, suitably positioned on the top of the tank, was laid on the chipping carpet. The seal coat with 6 mm metal was spread to 1-inch thickness over the coir tar carpet and the surface rolled for consolidation.</p> <p>In the second phase, ½ inch mesh matting was spread on the chipping carpet already sprayed with hot bitumen. On application of a coat of hot bitumen on the top of the mesh matting, the seal coat was spread and the surface rolled. Consolidation was better in this case.</p> <p>In the 3<sup>rd</sup> phase, ½ inch mesh matting spread on the chipping carpet sprayed with hot bitumen was stretched by passage of the roller before application of the hot bitumen for bonding with the seal coat. The seal coat was applied and the surface consolidated.</p> <p>In the 4<sup>th</sup> phase, 1 inch mesh matting was spread on the chipping carpet sprayed with hot bitumen, stretched by passage of the roller and finished with the seal coat and consolidated.</p> <p>In areas of curvature, the mesh was laid crosswise, with the warp running across the road.</p> <p>The performance of the coir-reinforced road was compared to the control with a broad stretch not containing coir mesh.</p> | <p>1. Jute spinning system was modified to produce single strand of coir.</p> <p>2. Asphaltic coir mesh mattings were used for construction of roads in the campus.</p> |

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| <b>1976-77</b> | <p>Single strand yarn spun from blends of softened coir fibre and jute was bleached and dyed in black shade for weaving wall carpets in novel designs.</p> <p>Uncut pile carpets from single strand coir spun from blends of 80% softened coir and 20% Jute fibre on jute spinning system was woven with an uncut loop fabric of ½ inch pile height. 3 ply jute yarn was used as the tight chain, single ply jute as slack chain and single strand softened coir for the loops.</p> <p>Yarn was also spun from blends of 50% each softened coir fibre and ordinary jute fibre.</p> <p>A new woven pattern was developed for ribbed matting/mats on a two shaft treadling system with stationary tight warp and a slack chain weave. In weaving, two sheds are formed; insertion of weft in the top and bottom sheds, woven patterns with differential colour effects could be produced in the material. Fancy coir products in novel designs, ten carpets in different design patterns and wall carpets in fancy designs from blends of softened coir and jute were displayed at the ISOCARD exhibition at Kasargode.</p> | <p>1. Innovative products were developed out of softened coir.</p>              |
| <b>1977-78</b> | <p>Evolved a black shade on coir based on KCA Direct black along with 2% soda ash and 10% common salt at 90-95<sup>0</sup>C. Wall hangings and table mats in mourzouk weave were evolved using single strand coir yarn spun out of softened coir fibre and carnatic yarn.</p> <p>Attempts were made to reduce the harshness of coir by blending coir with sisal and bhendi fibre in the proportion of 3:1 and 1:1 that had substantially improved the feel of the product.</p> <p>18” x 18” sample panels were made by spreading coir shearing dust uniformly on the polyvinyl acetate coated cardboard, plywood and cotton fabric was dressed with a spring of the adhesive and hot pressed for effective bonding of the coir fibre bits with the base material.</p>   | <p>1. Coir was blended with sisal and bhendi fibres to provide supple feel.</p> |

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| <b>1978-79</b> | <p>Experiments were done for spinning 2 ply yarns from blends of softened coir yarn and goat hair in the proportion of 1:1 and observed that it is not successful.</p> <p>Evolved reversible pile carpet with pile structure on both sides of fabrics.</p> <p>Carpets were made from single ply and two ply yarn spun from composite blends of softened coir and goat hair mixed in the ratio 1:1</p> <p>Coir quilts were woven out of yarn spun from blends of softened coir and goat hair using rubberized coir and mattress fibre as the stuffing material.</p> <p>Ribbed matting and loop carpets were woven from yarn spun from composite blends of softened coir and goat hair mixed in the ratio of 1:1</p>   | <p>1. Coir quilts were developed from blends of coir and goat hair.</p>  |
| <b>1979-80</b> | <p>Designed and woven striped matting. Eleven designs suitable for fibre mats were translated into loom sketches on pointed paper and sample fibre mats incorporating the new designs got woven.</p> <p>Seventy five Fibre mats in No. 2 size were woven and displayed as exhibits.</p> <p>Analysed two photographic designs of mats and translated to loom sketch for guidance in weaving against request from the industry</p>   |  |
| <b>1980-81</b> | <p>12 patterns were evolved for 4 shaft carpet/ mattings and a new type of loop carpet with rib formation on the face side was evolved and used for wall-to-wall carpeting.</p> <p>22 pieces of wall hangings of size 75 cm X 50cm in different design and colour schemes were produced. Seven samples of carpets of size 75cm x 50 cm in different colour schemes were evolved from Beach yarn dyed by the tie and dye method.</p> <p>Investigations in utilisation of coir pith as manure in agricultural farms were conducted in collaboration with the Tamil Nadu Agricultural University for different crops in the field level. The result revealed that coir pith can be successfully utilised in agricultural farms for higher yield with lesser application of fertilizer, improving the yield in alkaline soils as well and coir pith application increase the hydraulic conductivity of the soil.</p> | <p>1. Designed and evolved 4 shaft carpets and tubular mattings.</p> <p>2. A new type of loop carpet was developed with ribbed formation.</p> <p>3. Coir pith manure identified for partially replacing the fertilizer</p> |