TESTING AND SERVICE FESILITIES

YEAR	ACTIVITIES	ACHIEVEMENTS
1960-61	Trials were made on dyeing of coir on the "Dyeing Machine" which revealed better penetration of the dye-stuff on the yarn compared with the dyeing obtained from other package dyeing units. No particular advantages were observed with beam dyeing of coir yarn. The dye uptake as observed from the colour of the dyeings from the package dyeing unit appears to be of a lower order as compared with dyeings from open beck. The possibility of obtaining better results by introducing an efficient cooling system in the package-dyeing machine was indicated. Under the present circumstances, dye beck with circulating arrangements for the dye liquor appears to be the most suitable equipment	1. Studies were carried out to explore the possibility of mechanised dyeing of coir.
1961-62	The work on the moisture relationship of fibre with reference to the relative humidity of the atmosphere to which it is exposed was also initiated. The moisture content of coir fibre varied depending on whether the equilibrium moisture in the fibre was attained from an atmosphere of a lower or higher humidity than the atmosphere to which it was being exposed as observed for cellulosic and lignocellulosic fibres. Steps were initiated to separate the lignin, the major component in the pith responsible for the production of vanillin, from coir pith by elimination of the carbohydrates by acid hydrolysis. Following Standards were formulated for coir and coir products in association with ISI:-  Coir Rope 1S 898 – 1957 Coir fibre IS 1410 – 1959 Hawser Laid Coir rope. IS 1411 – 1959 Shroud Laid Coir rope IS 1412 -1959 Cable Laid Coir rope IS 1693 – 1960 Door mats – rod IS 1858 - 1961 Door mats – Creel, Bit and Fibre	1.Conducted chemical analysis of coir fibre, coir waste and coir pith. 2.Elucidated moisture content, ash content, acetone and alkali solu-bles. 3.Standards were formulated for coir fibre, rope and mats(rod,creel and fibre mats).

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	 Rod Mat  Fibre Mat  Creel Mat Laboratory dyeings were taken on coir yarn with various classes of dyes for a study on the fastness properties of the dyeings to select suitable dyes of improved fastness to produce standard shades for matching. Reduction bleaching was carried out using sodium sulphate and alkaline sodium hydro sulphate. Draft Indian standards were finalised for coir mattings, mourzouks and carpets and superior coir yarn. Procured tensile strength tester, hydroextracter, blender etc.	1.Improved the feel of the fibre by treatment with caustic soda in the cold and at boil. 2.Applied reduction and oxidative bleaching on coir.
1963-64	Laboratory dyeing on coir yarn was carried out with a number of dyes with a material to liquor ratio of 1 : 20 Coir yarn in lots of 50 kg were dyed in copper vats using different dyes of varying strength (0.5 % to 2 %) in water in the cold for 30 minutes with a m:l ratio of 1:15 for soaking in water and a m:l ratio of 1:11 for dyeing in copper vats, heated by fire wood and operated by manual labour. The effect of material to liquor ratio and effect of dye bath assistant on dye up-take was evaluated and the  Traditional Dyeing percentage exhaustion of baths with a m:l ratio of 1:10, 1:20 and 1:30 were studied using 31 dyes. It was observed that dye uptake was best for a bath having a m:l ratio of 1:10, but it was difficult to ensure satisfactory movement of the materials within the tubs when the yarn was being worked in the bath having a m:l ratio of 1:10. For ease of working conveniences and to ensure satisfactory contact between the dye liquor and dyeing, m:l ratio of 1:12 to 1:15 is suitable.	1.Studied bleaching of coir using seven combinations of chemic-als hydrogen peroxide has found to produce best results. 2.Formulated standards for mourzouks /carpets. 3. Determined optimum material to liquor ratio for dyeing of coir yarn.

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	Attempts were made to improve the penetration of the basic dye into the interstices of coir yarn by use of 10 textile auxiliaries, which did not bring about any improvement in the dyeing characteristics to any significant extent. Coir yarn was treated with the following seven combinations of chemicals for dyeing to get light shades of bright tone. 1) Sodium chlorite buffered with acetic acid in the cold overnight. 2) Dilute H_20_2 stabilised by sodium silicate at 60-80^0 c for 2 hours. 3) Freshly prepared solution of bleaching powder in the cold for 4 hours. 4) A mixture of dilute sulphuric acid and sodium hydrosulphite in the cold for 2 hours. 5) Dilute caustic soda at boil for 2 hours. 6) Dilute caustic soda and sodium hydrosulphite in the cold for 2 hours and 7) Treatment by exposure to sulphur dioxide gas overnight It was observed that all dyeings on the bleached material appear brighter in tone compared to the dyeings on the unbleached material; best result was there on the peroxide bleached coir.	4.Dyes belonging to basic, acid, substantive, vat, reactive and azoic class were applied on coir and the fastness to sunlight was studied. 5.Introduced copper vessels for bulk dyeing of coir.
1964-65	Laboratory scale dyeings were carried out with Acid, Basic, Direct and Reactive dyes on bleached and unbleached coir yarn and a preliminary shade card was prepared. Coir fibre and yarn were softened with sodium hydroxide, sodium hydrosulphite and sodium sulphide but the colour was adversely affected when compared with untreated materials. The loss of weight during softening was 20% and it was only 2% during bleaching. Attempts were made to dye the natural and bleached coir yarn with reactive dyes. Reactive dyes do not have much affinity to natural coir yarn but give dyeings of bright tone with coir yarn bleached with H_2O_2 or sodium chlorite. Lynasyns (Natural metal complex dyes) had affinity for both natural and bleached coir yarn. Initiated preparation of shade cards by dyeing of bleached coir using direct dyes at 0.25%, 1.00% and 2.00% depths. Commercial bleaching technique was evolved for beach yarn by treating beach yarn in a solution of sulphuric acid and sodium hydrosulphate with a m: l ratio of 1:15 to 1:20. Formulated a standard viz. IS 2331-1963 on coir matting, mourzouks and carpets. Demonstrated the application of improved methods of dyeing and bleaching of coir with Hydrogen peroxide to the trade on 25th February 1965 at CCRI.	

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	An extension service had been introduced in CCRI to pass on to the Industry, the knowledge gathered by the Institute in studies and to give on the spot advice on dyeing methods. Revised IS standards for Coir fibre IS:898-1964 and formulated standard for superior Anjengo type yarn IS: 2295-1964. Revised the standards for Door mats-Rod IS:1693-1964 (Revised) and Door Mats, Creel, Bit and Fibre – IS: 1858-1964(Revised). Finalised the IS standards for Coir matting for Cricket pitches, coir mats for Gymnasia, Corridor mats and Sinnet mats.  Coir Yarn	
1965-66	Conducted studies in using Aluminium containers for bleaching coir yarn with hydrogen peroxide and two sets of experiments were carried out using an Aluminium vessel and an enamel pot. Bleaches from Aluminium containers were observed to be dull and container showed visible marks of corrosion, though only to a limited extent, which were to a perceptible degree after successive lots were processed in the containers. Peroxide bleaching could be carried out in aluminum containers without much of a detrimental effect if the container was subjected to a pickling process. Conducted study in improving the colour of coir fibre by bleaching with sodium hydrosulphite solution at different concentrations in the cold as also at 60^0C-70^0C. The improvement in the colour of the fibre is practically lost as the fibre samples are taken out, washed and dried even after increasing the concentration of sodium hydrosulphite beyond 4% on the weight of the material. Shade matchings of sample received from the industry were carried out as and when necessary. Shade cards were prepared and sent over for binding. Initiated experiments to assess the light fastness of the standard dyeings by exposure to a standard source of light in the Xenotest.	1.Formulated IS Stand-ards for mats and mattings. 2.Light fastness was assessed in the Xenotest machine. 3.Conducted studies on bleaching using alumin-ium containers 4.Determined limits for sand and salt contents for coir yarn

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	 Xenotest  Corridor Mat Sinnet Mat  Coir Cricket Mat  Applied Acramines for effecting prints of better fastness but the brightness of the prints is of poor order. Important trade varieties of coir yarn were tested for scorage and tensile strength. Moisture content of all varieties of coir yarn during the different seasons and the sand and salt content were studied at CCRI for determining the optimum permissible limits for them.	
1966-67	Bleaching was conducted on "Sumit Yarn" to improve its appearance and also to enable it to absorb and retain faster dyes. The mats made from it had a better appearance and texture. Conducted studies to obtain faster shades on coir for use of the dyed material for the production of carnatic pile carpets from "Sumit Yarn".	1.Shade Cards consis-ting of self-shades were prepared for the trade.

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	Conducted comparative studies in dyeing of coir in cement and stainless steel dye tubs. Preliminary experiment indicated that comparable dyeing could be taken in both the tubs if ensured for efficient heating of the liquors by steam to raise the bath to boil. Shade cards consisting of self-shades from acid, basic and direct dyes on coir were ready for distribution to the trade. Lab level experiments indicated that coir material could be made flame resistant on treatment with a solution (m: l ratio 1:10) containing 70g/ litre of Borax and 30 g/litre of Boric acid at 70^0C for 40 minutes. Samples of coir yarn received from Quality Control Inspectors were tested for sand and salt content.	2. Best dyeings achieved for coir in dyeing with stainless steel dye tub system 3. Flame resistant coir was developed
1967-68	Treatment with a solution of 20% (w/v) of caustic soda in the cold for 24 hours imparts a soft and smooth feel to the coir fibre. Reactive dyes were applied on coir for producing faster shades and fastness to light was examined by exposure of the samples in the Xenotest Light-cum-Weather fastness tester which that indicated that the shades with reactive dyes on coir are considerably faster to light than those obtained with basic dyes. Arrangements made for lining the cement tubs with suitable corrosion and heat resistant materials to improve its adaptability for processing acid dyes. Attempts were made to improve the brightness of prints obtained with Acramine pigment emulsions by incorporating Titanium dioxide, but resulted in clogging of piles at the printed portions. A latex adhesive (TEXSOL) when applied on coir mats/mattings and subsequent hot pressing of the finished edges was found to bond coir fibres/yarns in creel varieties. Efforts were made for taking up investigation on dyeing in collaboration with ICI, Bombay, CIBA Research Centre and the Dept. of Chemical Technology, University of Bombay.	

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1968-69	Summit yarn in lots of 10 kg each were processed in caustic soda solution (20% w/v) overnight followed by washing of the yarn for elimination of the caustic liquor and subsequent treatment of the softened material in a bath containing 3 cc sulphuric acid per litre of water for neutralising the residual alkalinity followed by a further washing in water for removal of the residual acid. The softened material was further treated in 1 volume of solution of hydrogen peroxide at 70-80^{0}C for 1 ½ hours. The bleached material was subsequently washed in water and dried in air. It was observed that by replenishing the spent baths, five batches could be taken out from a bath. The spent bath resulting after processing the fifth batch was observed to be heavily coloured and further replenishment of the bath for processing additional lots of the material was not worthwhile It was observed that there was 20% loss in weight of the material on caustic treatment, 5% loss in weight in subsequent bleaching and 1% loss in weight of the softened and bleached material during the process of dyeing. The softened and bleached material in lots of 10 kg each was dyed in faster shades and observed that softening and bleaching treatments improved the dyeing characteristics of the material so that the dyes penetrate into the material to a much greater extent, thereby ensuring dyeings of better fastness characteristics. Bulk lot of mechanically extracted coir from dry husks was softened with 20% caustic soda solution (v/v) in the cold overnight and subsequently bleached with one volume hydrogen peroxide at 70^{0}C -80^{0}C for 1½ hour. The attempts to soften coir with soda ash solution of 5 %, 10% and 25 %(One volume) in the cold for 24 hours and at a temperature of 80^{0}C for 1 hour was not helpful in softening the material to any appreciable extent. Experimental dyeings were conducted in the cement dye tub lined with corrosion resistant tiles for processing acid dyes on a bulk scale. It was proved that the cement in which the tiles were embedded had a tendency to soften on continued contact with hot liquor.	1. Commenced bulk dyeing for Hindustan Coir at CCRI.

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	Stencilled prints were evolved on mats using solvent soluble dyestuffs and pigment dispersions in drying oils, which yielded faster prints to light. The scorage, runnage (m/kg), twist/foot and break load of Anjengo yarn produced at seven different places and Anjengo chorival was also measured. 	
1969-70	Lab level experiments were conducted to fix the dyes suitable for dyeing rubberized coir materials in faster shades and color ingredients that could be mixed in the latex composition to obtain latex films matching in shades with the dyeings on the coir with faster dyes. Conducted studies on the effect of applying polyvinyl acetate emulsion to the back side of coir door mats yielded a film of flexible nature. Conducted studies on the kinetics of dyeing coir fibre with two selected dyes each of acid, basic and direct class in association with the University Department of Chemical Technology, Bombay. On the spot advice was given to produce coir yarn of uniform twist, definite scorage, splicing technique and stencilled prints.	1.Standard shade cards with a depth of 0.25%, 1% and 2% were evolved on bleached and natural coir yarn using basic, acid and direct dyes for the benefit of the coir industry.
1970-71	Six sets of coir shade cards were prepared using the most suitable dyes to coir. Two types of rubber-based adhesives were applied on the reverse side of pile structure of carnatic mats for providing nonskid backing of flexible nature, which was not satisfactory due to the tackiness of the coating. Polyvinyl acetate polymer dispersions incorporating saw dust as filler gave satisfactory finish. The cost and quantity of dispersion required was worked out. A study of the cross section of coir fibre dyed with typical dyes from acid, basic and direct classes showed that the penetration of dye into the coir fibre was unsatisfactory and dye was present more or less in outer region only.	1.Prepared six sets of shade cards.