

# DEVELOPMENT OF MACHINERY

1970-71

During intensive trial runs of the automatic coir spinning machine, it was observed that the draw rollers, the yarn guide and the mouth pieces wear-off frequently due to abrasion in contact with the fast moving coir fibre and yarn. Five types of mouth pieces were examined in the trial test for selecting the most suitable model for efficient operation of the machine.

Introduction of two 'tongues' in the feeding tubes with suitable controls for optimum tension was helpful in maintaining the thickness of the yarn.



FLEX TESTING MACHINE

1. Fabricated a prototype automatic spinning machine with suitable modifications.

2. Designed and fabricated prototype flex testing machine for rubberised coir.

YEAR	ACTIVITIES	ACHIEVEMENTS
	<p>A prototype automatic coir spinning machine with arrangements for winding the yarn separately from the twisting and doubling mechanism was fabricated in collaboration with the Govt. of India Production Centre, Ettumanoor in Kerala for improving the machine performance for production of yarns of different twist.</p> <p>Designed and fabricated a prototype flex testing machine in association of with the Govt.of India Production Centre, Ettumanoor. Kerala.</p>	
<p><b>1971-72</b></p>	<p>A project aimed at evaluation of the performance of the mechanical contrivances in use in the centres of fibre extraction and optimum period of retting husks for extraction of fibre of good quality on processing the retted husks in mechanized system was conducted in the field level at selected units in Kaniyapuram, Perinad, Kumbalangi, Parur, Chowghat and Kozhikode areas. It was observed that a minimum period of 5 months retting was essential for satisfactory processing of the husks on mechanised system. The beater type machines were found to be more suitable for fibre extraction than the combing types, as combing of the husks resulted in breakdown of the fibre length.</p> <p>The combing drum and the belt conveyer of the slivering machine was connected by a chute of suitable design for controlling the rate of fall of fibre on the belt conveyer forming part of the feeding unit and obtained a delivery of 8 meters of sliver per minute having a density of 20 to 25g. per meter which was adequate for meeting the requirements of six spinning machines. The speed of rotation of the sliver can was reduced to reduce the twist of the sliver for facilitating more even distribution of the fibre in the feeding tray of the spinning machine.</p>	<p>1. Modification to SliverCan achieved uniform distribution of fibre in the feeding tray of the spinning machine.</p>



Automatic spinning machine

YEAR	ACTIVITIES	ACHIEVEMENTS
	<p>Modifications were effected in the feeding assembly forming part of the spinning machine for improving the machine performance. A suitable partition and covering were provided for the feeding channel and re-setted the position of combing nails to reduce the breakage of fibre. These modifications improved the yarn quality eliminating the possibility of flattening of the yarn in the course of spinning. Introduction of a spinning system and friction disc for contact with the driving wheel for controlling the bobbin speed did not work.</p>	
<b>1972-73</b>	<p>The research investigation on the ceylon type defibering machine revealed that 350 full dry husks after crushing and soaking in water for 6 to 8 days could be processed per 8 hours operation and the yield of fibre was 107 kg. per 1000 husks in which the bristle fibre content to 20%, Mattress fibre 1<sup>st</sup> grade of 50% and mattress fibre of 2<sup>nd</sup> grade of 30%.</p> <p>Use of suitably hardened tongues on the feeding nozzles of motorised coir spinning machine removed the limitations in controlling the thickness and shape of the yarn. Cracks were also developed in the driving shaft supporting the gears and forming part of the spinning frame during prolonged use of the machine.</p> <p>Fabricated and modified equipments for testing indentation hardness and flexing of rubberised coir.</p>	
<b>1973-74</b>	<p>Soft twist vycome yarn having 17 twist per foot with a runnage of 200 m/kg was produced on motorised coir spinning machine after effecting the necessary modification for synchronization of the feeding, combing and drawing operations and adjusting tension on the feed 'finger tips' of the nozzles. The physical characteristics were compared with commercial grade Vycome yarn and the texture was uniform all along the length unlike the twist of yarn with a runnage of 200 m/kg.</p>	<p>1.Soft twisted yarn comparable to vycome yarn was produced on automatic spinning machine.</p>

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	<p>Conducted spinning trials for processing mattress fibre on motorised coir spinning machine produced coarser yarn of 7/8 score with a runnage of 100 meters per kg.</p> <p>Attempts to dispense with the use of the lead thread yielded an imperfectly twisted material of uneven thickness and twist on the motorised coir spinning machine.</p> <p>The preliminary experiments indicated that an operator could attend 3 spinning machines at a time.</p> <p>Fabricated a loom having fly shuttle for weaving lightweight fabrics of simple construction for use as window/door curtains woven out of single strand coir yarn.</p>	<p>2. Fabricated a handloom having fly shuttle for weaving lightweight fabric.</p>
<b>1974-75</b>	<p>Multiple spinning heads were introduced on the motorised coir spinning machine and put into intensive performance run. The introduction of a specially designed porcelain nose tip in place of the ordinary nose tip prone to wearing found to improve the machine performance.</p> <p>Yarn was spun from slivers made from blends of bristle and mattress fibre in the proportion of 60:40 on the motorised coir spinning machine and produced coarse yarns with a runnage of 120-150 m/kg having a score of 11/12 from the blend. An output of 54 kg was realised on 3 spinning heads in 8-hour work.</p> <p>Designed and fabricated a device for steady application of the emulsion for lubricating the warp sheet of power loom of Hindustan Coir.</p> <p>Standardised the components of slivering and motorised coir spinning machine.</p> <p>An improved handloom with fly shuttle picking arrangements was developed for weaving light weight fabrics of simple construction from single strand coir yarn spun out of softened, bleached and dyed coir fibre. Studies on the productivity indicated that an expert weaver produced 12.5 meters of the matting in 1 meter width on this loom in the course of 8 hour work.</p> <p>The repositioning of the sley and modified shuttle and eyelet of the shuttle resulted in an increased production of 20 sq. meter of matting in 8 hours work.</p>	<ol style="list-style-type: none"> <li>1. Designed and fabricated a device for lubricating warp sheet of power loom.</li> <li>2. Multiple spinning heads were introduced for the motorised coir spinning machine.</li> <li>3. Standardised components of slivering and motorized coir spinning machine.</li> </ol>

YEAR	ACTIVITIES	ACHIEVEMENTS
<b>1975-76</b>	<p>A number of modifications were effected on motorised coir spinning machine in feeding, improvements for reduced wear of nozzle controls, realignment of worm wheel assembly, balancing of the spinning frame, easier positioning of lead thread, reduced wear and tear of driving mechanism, modification for elimination of flattening of yarn, improvements in spindle tube for reduced strand breakage led to the improved performance of the machine in production of yarn.</p> <p>Roller type nozzle controls were used to accommodate thicker strands of yarn while spinning of soft twisted and coarse yarns.</p> <p>Jute spinning system with improved settings was used for spinning single strand coir yarn from softened coir fibre in association with the Jute Industries Research Association.</p> <p>Rectification/ Fabrication of loom components was attended. New tappets were fabricated for the defective looms.</p>	
<b>1976-77</b>	<p>Carried out trials on spinning of coir ropes of 8 score with a runnage of 100 m/kg having a doubling twist of 14 to 16 per ft on the motorised coir spinning machine by suitably modifying the controls and roller type nozzles and set of change gear wheels and also adjusting the spindle speed. Both retted and brown fibres were processed to make ropes and the output was 35 to 40 kg. per spinning head per 8 hour work.</p>	<p>1. Produced coir ropes from retted and brown coir fibre on motorised coir spinning machine.</p>

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	<p>Vycome type soft twist yarn was also spun on the motorised coir spinning machine by effecting suitable alterations in the settings, revising the ratio of speed of the spinning frame to that of spindle to 1:3.25, a 14 toothed change gear wheel in place of 9 toothed wheel for draw rollers and increasing the combing drum speed vycome coir yarn having a runnage of 230 m/kg, score of 11 to 12 with a doubling twist of 16 per ft. was realised on the machine.</p> <p>Trials were also conducted by replacing the 2/20<sup>s</sup> cotton thread with 20<sup>s</sup> single yarn of Z and S twist for effecting reduction in cost of production of yarn. Fabricated 8 spinning heads, one slivering machine and one willowing machine and put into performance run by an operator attending to 4 spinning heads at a time and achieved an output of 45 kg. yarn with a runnage of 230 m/kg for 8 hours. The breakage of strand was reduced by replacement of flat spring control with specially designed roller control on the machine but the yarn produced was found to be more hairy.</p> <p>Section wise assembly drawings and machine drawings of the components of willowing, slivering and spinning machines were drawn.</p> <p>Designed and fabricated a new device consisting of two roller with one emery roller and positioned in between the creel stand and the loom for eliminating the buckling in mattings resulting from unequal tension in the warp strands. The modification produced mattings of much better texture without any buckling and uniform selvages.</p>	<p>2. Drawn section and assembly wise machine sketches of components of Willowing, Slivering and Spinning machines.</p> <p>3 . Designed and fabric-ated a device in elimina-ting buckling in matting during manufac-ture.</p>



Willowing Machine

YEAR	ACTIVITIES	ACHIEVEMENTS
1977-78	<p>Designed and fabricated new tappets for power loom which increased the design capacity of the loom for weaving dot patterns in coir mattings.</p> <p>Springs made out of spring steel wire of different gauges were designed and fabricated for maintaining appropriate tension on the roller controls for spinning satisfactory quality of coir yarn from white fibre on motorised coir spinning machine.</p> <p>It was observed that springs made out of steel wire of 20, 21 and 22 gauges is suitable for producing hard twist yarn and springs made out of 23 and 24 gauge for soft twist yarn on operation of the machine with a speed ratio of spinning frame to the nozzles at 1:3.</p> <p>The spinning units for the field centers at Narasapur and Arsikere were fabricated and tested with refinements. Exploratory studies were undertaken on spinning of coir by feeding the fibres from slivers to the spindles on the ratt.</p>	<ol style="list-style-type: none"> <li>1. Fabricated and tested refined spinning machines.</li> <li>2. Springs made out from varied gauges of spring steel wire yielded soft and hard twisted coir yarn on motorised coir spinning machine</li> </ol>
1978-79	<p>On revision of combing device and use of 13 X 27 gear teeth combination for the draw roller, an output of 60 kg yarn of 7/8 score with a runnage of 113 m/kg. was attained on one spinning head per 8 hour work for thicker variety yarn on the motorised coir spinning machine. Modifications were effected by the use of nozzle controls made out of hardened high carbon steel. Realised an output of 13.5 kg. of coir yarn with a runnage of 230-240 m/kg while processing the FFF quality.</p> <p>Studies conducted by replacing cotton lead thread with jute twine were not successful due to the untwisting of the jute twine on operation of the motorised coir spinning machine.</p> <p>Introduction of revised pulley system with wire ropes for positioning of the heddle frames in place of coir rope facilitated easy movement of the heddle frames with reduced physical strain on part of the weaver. Use of the wire rope dispenses with the need for frequent retieing of the heddle frames by coir ropes to adjust for the elongation in coir ropes on continued use of the system in the weaving process.</p> <p>A counter weight was positioned at suitable distance on the top of the sley beyond the fulcrum for reducing the strain in the beating on the handloom for weaving mats/mattings.</p>	<ol style="list-style-type: none"> <li>1. Designed and fabricat-ed a machine for making bottle cleaning brush.</li> <li>2. Introduction of revised pulley system with wire rope led to easy movement of the heddle frame and reduced physical strain to the weaver.</li> </ol>

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	<p>Evolved a revised design for the shuttle to facilitate easy movement of the shuttle through the shed with easy release of the weft from the cops positioned in the shuttle, which increased the productivity by about 10%.</p> <p>Designed and fabricated a machine for the manufacture of bottle cleaning brushes.</p> <p>Hard twist aloe yarn of uniform twist was spun on motorised coir spinning machine.</p> <p>Attempts were made to use picking sticks from local wood in place of processed wood did not succeed.</p>	
1979-80	<p>A revised arrangement of nozzle tips with improved design which controlled the thickness of the single strand yarn yielded an output of 8 kg of 2 ply yarn with a runnage of 155 m/kg per 8 hour on the treadle spinning machine.</p> <p>Designed and introduced an improved beaming arrangement with direct feed of warp from spools positioned on the creel to coir handloom increased weaving output by 15%.</p> <p>Improved shedding was achieved on use of freely rotating wheels in pulley system and wire ropes for the link up of the heald frames and treadles.</p> <p>Designed and introduced a compounded lever treadle mechanism on coir handlooms, which increased the output of the loom with lesser physical effort.</p> <p>Designed a new type of sley for the coir handloom.</p> <p>Designed a semi-mechanised coir handloom and fabricated components like take up roller, main bearings, crankshaft etc.</p> <p>Coir extraction spinning and brush making machine were installed at the Central Institute of Coir Technology, Bangalore.</p> <p>Extended technical assistance and supervised fabrication and installation of improved 4-metre loom at Foam Mattings (India) Ltd, Alleppey</p>	<p>1.Introduced a compounded lever, treadle mechanism which increased output of handloom and reduced physical strain to the weaver.</p> <p>2. Fabricated components of semi-mechanised loom.</p> <p>3.Introduced and improved weaving of Carnatic mats on loom with two treadles resulting in higher productivity with reduced physical strain in weaving process.</p>

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		<p>4.Introduced an improved beaming mechanism working on emery fillets for the preparation of warp beam. Improved the above mechanism by fitting motor thereby increasing the productivity and quality of the beaming.</p>
<p><b>1980-81</b></p>	<p>The designs of the various drives for synchronizing the beat-up, let- off, take up and shedding of the improved coir handloom with coordinated loom motions for weaving coir matting was finalized</p> <p>The settings on the spindle assembly of the treadle-spinning machine were revised with introduction of new type of mouth pieces and providing a feed tray of two sections to spin 5 kg Anjengo rope yarn having a runnage of 330 m/kg in 8 hrs by hand feeding of fibre by two persons.</p> <p>Completed fabrication of loom components like heald frames, pulleys, spiked take up rollers, back rest, clutches, weavers pedal, brake system and sprocket drives for the improved coir handloom.</p> <p>Assistance was extended to Hindustan coir in developing indigenous fabrication of spindle tubes for cops winding machine and developed warp lubricating system for 2 metre power loom using wax moulded in wooden plank floating on the warpsheet</p>	<p>1.Improved weaving techniques for creel mats.</p> <p>2. Fabrication of a few components of improved coir handloom were completed.</p>