

# Automation of Manmade Sliver Producing Operation: A Case Study a Gram Seva Mandal, Gopuri, Wardha

Akash R Neet, Pravin S. Lakade, Suhas H Sahare

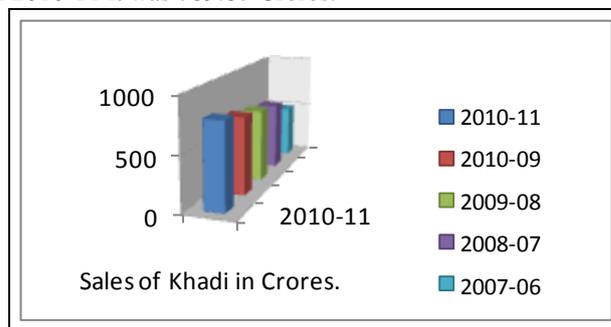
**Abstract**—The economic situation of khadi industry and the extremely sharp worldwide competition with textile industry have forced the khadi industry to use all possibilities of cutting cost. In this context, the question of higher production at each stage of khadi manufacturing gains importance. Now days, khadi has become so popular that internationally renowned fashion designers also prefer to use it. As per the Khadi & Village Industries Associations survey the sales of Khadi is massively increase year by year from 2001 to 2011 sales of khadi is increased upto Rs.- 511.71 Crores . To satisfied such a increasing demand with lower cost, khadi industries needed some mechanized system to increased production rate. In khadi industries the sliver is produce manually. This is time consuming process which is directly effect on cost of khadi. This problem taken into consideration for project work. In this paper we try to developed mechanized system to replace manual method of sliver producing. This project seeks to Analysis and Functional enhancement of Pinjanalaya carding Machine to produce sliver and use to discover a new tool to shorten the sequence for producing the sliver. This may lead to significant savings of time and cost, and thus improve the competitiveness of the Indian Khadi Udyog as well as provide more profit to the farmer.

**Key word**:-Sliver, carding machine, Fiber, khadi industry.

## I. INTRODUCTION

In textile industries the Carding Machine is use for producing sliver which is very costly. In case of khadi industries carding machine is use only for separation of fiber from the cotton & to removal impurity present in the cotton. After Carding process sliver (Pelu) is produce manually. This is time consuming process which is directly effect on cost of khadi. The another carding machine that is “Pinjanalaya Carding machine” having somewhat same function which is used in “Pinjanalaya Center” for opening of fiber & remove impurity from the cotton. Which cost is comparatively less than Textile industries Carding Machine? But this Pinjanalaya carding machine is not able to produce Sliver. This problem taken into consideration for project work. In which we going to develop mechanized system to replace manual method of sliver producing. By functional enhancement of Pinjanalaya carding machine with minimizing the cost. Khadi & Village Industries Commission (KVIC) established under the Khadi and Village Industries Commission Act, 1956 (61 of 1956), is a statutory organization engaged in promoting and developing khadi and village industries for providing employment opportunities in

the rural areas, thereby strengthening the rural economy of the country. Due to effort of KVIC the sales of Khadi is increasing day by day in 2006-07 it was 491.52 Crores, now in 2010-11 it was 789.87 Crores.



Year	Sales in Crores
2010-11	789.87
2010-09	712.26
2009-08	663.19
2008-07	618.12
2007-06	491.52

To satisfied such a increasing demand with lower cost, khadi industries needed some mechanized system to increased production ratio.

## II. LITERATURE REVIEW

Y. Wang (Leader), Georgia Tech (National Textile Center Annual Report: November 2001) presented a project on “Analysis and enhancement of carding and spinning”. In this project they enhance the fundamental understanding of carding and spinning, and to use the discovery as a new tool to shorten the sequence for staple yarn processing. This may lead to significant savings, and thus improve the competitiveness of the US textile industry M. Lee and H. Ockendon (BP Institute for Multiphase Flow, University of Cambridge), Journal of Engineering Mathematics (2006) have provided excellent literature for understanding the transfer of fibers between carding-machine surfaces by considering the movement of a single fiber in an airflow. Understanding the mechanisms for fiber transfer between carding surfaces, will provide much needed insight into

general fibre dynamics during the process, machine design and process control optimization, and the formation of the sliver. They provide model behavior of a single fibre in the transfer regions of a carding machine, and these results could easily be extended to consider many fibres in a dilute suspension. The approach of the work in this paper is in some sense a natural extension of the static analysis, which considers frictional forces acting on a single fibre in tension, held by two hooks on opposing carding surfaces. by this paper they attempt to answer the question is “When does this scenario occur and, in particular, how are fibres that are tethered to a hook on one carding surface presented to the hooks on another carding surface?”

### III. SURVEY OF INDUSTRY

The basic process of sliver producing required raw material of cotton which is came from carding .In case of textile industry carding machine is use which is very costly & for Khadi industry this operation is done manually. So we try to develop a mechanism from Carding Machine (Pinjanalaya) which cost is comparatively so less. Which can be buy by Vidarbha’s farmers. The Survey is conducted to on various Panjanalaya Center (Pinjanalaya Carding machine.) in order to find out Range of speed in which carding is perform to get high Quality cotton & to understand the mechanized system of Pinjanalaya carding machine. We also visit the Main center of Maharashtra Khadi Udyog , Sewagram, & Gram Sewa Mandal ,Gopuri, Wardha .which was developed by the father of nation Mahatma Gandhi. For study & analysis of khadi manufacturing as well as various process of charakha manufacturing. In order to find out various quality requirements of Sliver & its specification.

### IV. CURRENT SLIVER PRODUCING METHOD

In olden days slivering process and is done with a bow like instrument to fluff cotton and to create rolls called slivers. These are handmade and kept in dried banana stems to use to procure the thread.



Fig. 1 - manual method of producing Sliver (Pelu).

While in case Textile industry Sliver is produce with the help of Carding Machine .This is continuous sliver. The cost of this machine is around Rs-12 lacks to Rs-15 lakhs. The “Pinjanalaya Carding machine” use in Pinjanalaya Centre for opening of cotton fiber & removal of impurity. Which having cost around Rs.-2 lacks



Fig 2. - Carding Machine use in Textile Industry and Pinjanalaya Carding Machine

Still now a day same process is adapted to produce sliver with minor changes .Device use for sliver producing in Main center of Maharashtra Khadi Udyog , Sewagram, & Gram Sewa Mandal ,Gopuri, Wardha



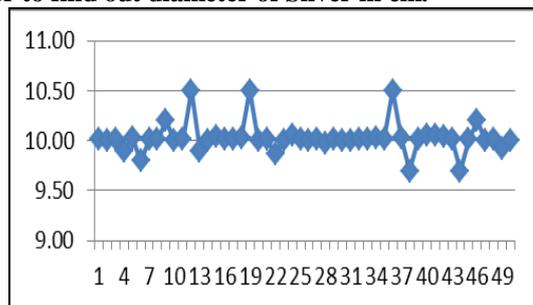
Fig 3. - Recent manual method of producing sliver (Pelu).

With the help of this device 1man or 1women can produce 3-3.5 kg sliver per day. While In Khadi Gram Udyog ,Gopuri ,Wardha demand of sliver 400 to 500 kg per month Which is send to All Over Maharashtra Kerala, Hyderabad ,lakhanav as well as export to Japan, England, Italy .

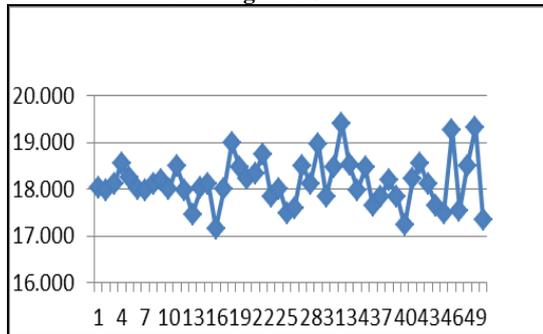
### V. DATA COLLECTION

Dimension of base plate ( length 36 cm, width 17.5 cm, thickened ),Pressing Pad (length = 14.5 cm, width = 14.5 cm, thickness= 1.5 cm, Weight of pad = 500gm.), Rod (Diameter = 0.5 cm, Length =24.5cm.), Sliver (Pelu) (Length =18 cm., Diameter = 1 cm,Weight of sliver = 1gm., Production rate = 3 - 3.5 kg/day/worker, Requirement of sliver = 450-500 kg month.).The actual reading have been taken for understanding the accuracy of work which is carried work at Main center of Maharashtra Khadi Udyog , Sewagram, & Gram Sewa Mandal ,Gopuri, Wardha.

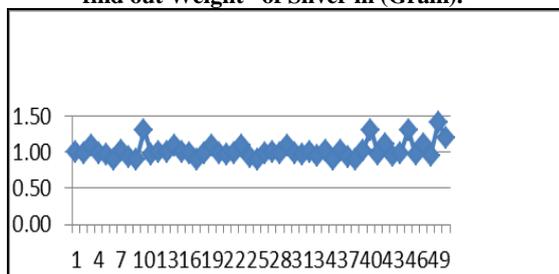
The actual Reading of 50 Sliver (Pelu) takes place in order to find out diameter of Sliver in cm.



The actual Reading of 50 Sliver (Pelu) takes place in order to find out Length of Sliver in cm.



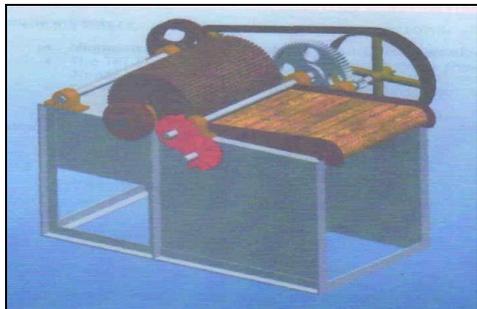
The actual Reading of 50 Sliver (Pelu) takes place in order to find out Weight of Sliver in (Gram).



From the above graph it is found that the manual process of producing sliver is highly inaccurate.

### VI. CONSTRUCTION

To solve above cited problem we propose mechanism in which the main carding roller is use for opening the fiber of cotton. Which having number of teeth on its periphery as shown in fig. and having speed around 1440 rpm. Cotton fibers fed to the card by feed conveyers are separated from the batt in tufts by the lickerin. From the lickerin they are transferred to the main cylinder which move opposite direction with respective to the lickerin. The output of the main cylinder is then connected with the help of duct to the attachment which having two revolving rod in between the two steady wooden plates. Which is rotted with the help of stepper motor. The hook is used to remove the sliver from rod.



### VII. WORKING

The carding conveyers, lickerin and main carding roller rotted with the help of motor. Which transfer cotton to main carding roller, due to high speed difference between lickerin and carding dram the cotton fiber get open and separated from each other. Because of high speed of carding dram the

separated cotton fiber thrown from dram which is transfer to the other attachment with the help of duct. This attachment having one round base plate and revolving assembly at center which is rotted with the help of setter motor. Two rod is connected by using ball and socket joint as shown in figure.



This assembly is attach to the main carding dram with help of duct & due to the high velocity cotton fiber get collect in between two plate .Because of rough surface rotting rod ,the cotton fiber get wound around the rod, which can be remove with the help of hook with some predetermined time.

### VIII. CONCLUSION

With the help of this mechanism we will be able to produce Sliver (Pelu) more efficiently & economic. Which will helpful to khadi industry to increase production rate as well as reduce the cost? The main objective of this project to decentralization of Carding machine and provide a mechanism to specially “Vidarbha” rigion farmer so that they will directly able to sell Sliver to khadi industry and get more profit. This project also leads to shorten the sequence of khadi production.

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#### AUTHOR'S PROFILE



Akash R. Neet, BE Mechanical engineer, I had attend the International conference on Robotics & Mechanical engineering in Jakarta Indonesia Sept 2012, also publish in international journal of research in engineering & technology (IJRET) vol.1 .no.3, 2012 ISSN 2277-4378.



Pravin S Lakade, BE Mechanical Engineer, I had attended a national level techfest wheel spin 2012, I am a member of Indian Society for Technical Education (ISTE) Institute code: MH 079



Suhas H Sahare, Diploma & BE Mechanical Engineer