Issue 9 vol 3 ISSN: 2321-8134

IJFEAT

INTERNATIONAL JOURNAL FOR ENGINEERING APPLICATIONS AND TECHNOLOGY

DEVELOPMENT OF MECHANISED SYSTEM FOR PRODUCTION OF SLIVER IN KHADI INDUSTRY

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Abstract

Small and Medium Enterprises (SMEs) have always played a key role in the economies of all major industrial societies in both Gross Domestic Product (GDP) and employment levels. Lack of productivity costs money which affects the bottom line. In today's world an organization cannot afford to leave such potential untapped. No matter what type of organization, the search for and the need to improve productivity is the ultimate goal. Money is wasted each and every day in organizations due to lack of ability to recognize areas of potential improvement. In the past, most of the new manufacturing concept and technologies have been implemented in large scale manufacturing industries. However Khadi industries have not received due attention for the implementation of such new manufacturing concept and technologies with the objective to improve productivity. In this paper, an attempt has been made to improve productivity by developing mechanized system to produce quality sliver in Khadi industries. The project has been taken place in Khadi udyog Gopuri, Distt. Wardha (Maharashtra). The objective of the project is to develop Mechanized system for producing the sliver. Sliver is a Cylindrical roll of cotton which is use to produce the thread by using charakha. Sliver is having many name in India like "Pelu", "Pooni", "Tag" etc.

Key words:Sliver, carding machine, Fiber, khadi manufacturing.

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1.INTRODUCTION

Now days, khadi has became so popular that internationally renowned fashion designers also prefer to useit. Clothes for special occasions are being designed by designers all over the world using khadi as fabric. Khadi cotton is not harmful to the skin as synthetic fibers. As per the Khadi & Village Industries Associations survey the sales of Khadi in 2000-2001 was 213.95 lacks & it massively increase year by year .In 2010-2011 sales of khadi is 725.66 lacks. To satisfied such a increasing demand with lower cost, khadi industries needs some mechanized system to increase productivity.

As we know that, the Khadi is the only cloth, which has backing of the ideology and philosophy regarding betterment of the poor and village people in India. After passing through the various identities like "A Tool for Freedom", "Political leaders' dress code" "Freedom Fighters' wear" etc.; now Khadi Fabric has got the latest appearance with Khadi

Shirt, Khadi Dress, and Fashion dress material. Now, Modern Youth prefer khadi clothes like other textile products. In khadi industries the sliver is produced manually. This process is time consuming which is directly effect on cost of khadi. This problem has been taken into consideration, for project work. Here, we made a successful attempt to develop mechanized system to replace manual method of sliver producing. This project gives emphasis on analysis and Functional enhancement of Pinjanalaya carding Machine use to produce sliver and to discover a new tool which shorten the sequence of producing the sliver. This may lead to significant savings of time and cost, and thus improve the competitiveness of the Indian Khadi Udyog. Due to effort of Khadi & Village Industries Commission (KVIC) the sales of Khadi is increasing day by day, in 2006-07 it was 491.52 crores and in 2010-11 it was 789.87 crores. To satisfied such an increasing demand with lower cost, khadi industries needs some mechanized system to increase sliver production rate.

What is sliver?

Fig-1: Sliver (Pelu)

Sliver is a Cylindrical roll of cotton which is use to produce the thread by using charakha. Sliver is having

many name in India like “Pelu”, “Pooni”, “Tag” etc. Fig. 1 shows the Sliver.

2. SLIVER PRODUCING METHOD

In olden days slivering process was 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 produce the thread. Till date same process is adapted to produce sliver with minor changes .Fig.2 shows the hand tool used for sliver producing in Main center of Maharashtra Khadi Udyog , Sewagram, & Gram Sewa Mandal, Gopuri, Wardha.

Fig-2: Recent Manual method of producing Sliver

With the help of this device, one man /women can produce about 2-2.5 kg sliver per day.The sliver produced at Khadi Gram Udyog, Gopuri, Wardha, is send all Over Maharashtra, Kerala, Hyderabad, Lucknow and it is also exported to Japan, England, Italy. In Textile industry Sliver is produce by using Carding Machine. This is continuous sliver. The cost of this machine is around Rs. 12 lakhs to Rs. 15 lakhs. The “Pinjanalaya Carding machine” use in Pinjanalaya Centre for opening of cotton fiber & removal of impurity is costs around Rs.-2 lakhs. Fig. 3 shows the Carding machine used in both textile industry and in Pinjanalaya.

Fig. 3. Carding Machine

3. DATA COLLECTION

Dimension of base plate (length 36 cm, width 17.5 cm, thicken), 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 = 2 - 2.5 kg/day/worker.). The actual reading have been taken for understanding the accuracy of work which is carried out at Main center of Maharashtra Khadi Udyog , Sewagram, & Gram Sewa Mandal ,Gopuri, Wardha.

4. CONSTRUCTION

To solve above cited problem we have developed a mechanized system as shown in fig.4. In which the main carding roller is use for opening the fiber of cotton. Which is 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 moves opposite direction with respective to the lickerin.

Fig-4: Mechanism for Carding

The output of the main cylinder is then connected with the help of duct to the attachment as shown in fig.5., Which is having two revolving rod in between the two steady wooden plates. This is rotate with the help of stepper motor. The hook is used to remove the sliver from rod.

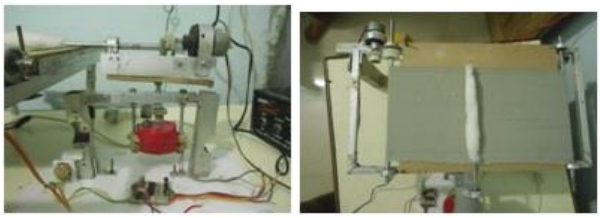

Fig-5: Attachment for producing sliver

5. Working

After carding process the cotton use to produce sliver, picture shows the mechanism in which cotton is feed manually. Two spindles are attached by using cotton belt in which one spindle is rotated with the help of motor and cotton get wound around the rod is also rotated in reverse direction. After predetermined time both spindle and rod get stop and rod which having cotton sliver around it move with 90^0 so that sliver get remove easily.

6. PRODUCTIVITY

In case of manual method the production rate of producing sliver is 2 kg to 2.5 kg per day. This Mechanized system enabled the worker to produce 4 to 4.5 kg per day with more comfort & uniform quality. In case of manual method the sitting arrangement of worker is not ergonomically design it also effect on

productivity of worker while by using this mechanized system worker work efficiently with higher productivity.

7. CONCLUSION

With the help of this mechanized system, Sliver (Pelu) can be produced more efficiently & economically. In case of manual method one man can able to produce 12 sliver per minutes. This Mechanized system enables the worker to produce 30 sliver per minutes with uniform quality. This system is useful in khadi industry to increase production rate and to reduce the cost. The main objective of project is decentralization of Carding machine and to provide a mechanism specially farmer of "Vidarbha" region so that they will directly able to produce and sell Sliver to khadi industry and get more profit. This project also leads to shorten the sequence of khadi manufacturing.

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