Comparison of cleaning efficiency of modern and old Blow room and Card machines

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Table of Contents

Acknowledgement

We always pray to **God Almighty** for His blessing and guidance and our deepest gratitude are to Him for opening new horizons in our pursuit for knowledge. Undertaking project, which was not explored before and that too in textile setup which was relatively new, appeared a bit difficult initially. But with Allah's benevolence that apparently difficult task started becoming easy step by step and finally we have been able to formulate this study project**.**

The task would never have been accomplished that easily without teaching and direction of our learned teachers, professors **Dr. Sarwar Rana**.

Though every body at Siara Textile Mills (Pvt) Ltd & Wisal kamal Textile Mills (Pvt) Ltd. did their best to help us in making this project more efficient. we are especially indebted to **General Managers and the entire technical staff** whose sincere cooperation made it possible for us to finalize our project. Practical aspects of the study became easy to understand through a perfect technical guidance by **the whole technical staff of both mills**. Their kind and considerable approach always kept our spirits high and our problems graph low.

And finally our hearts felt gratitude to our respected teachers, our seniors & staff of our university for the encouragement and help they extended to us during the project.

By:

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Preface

All praises to ALLAH almighty who enable us to complete this project and May ALLAH shows His blessings on MUHAMMAD (S.A.W.) the pride of whole of universe.

We (a group of two students) were given a project “to compare the cleaning efficiencies of old and new Blowroom and Card machines under the supervision of our teacher Dr. Sarwar Rana.

We started our project in the end of September 2008. We got a very warm welcome from the management of the mill.

We have tried our best in carrying out our study. During our study in mill, we have tried our best to grasp any useful information that we could get. We also thank our teachers/project in charges/supervisor Mr. Akhtar Zia for helping us in our study by giving valuable instructions at every step.

In the last we hope that this study report will come up to the satisfaction of the senior teachers of the university and will get appreciation from our mill seniors as well as from the management of mill.

CHAPTER - 1

INTRODUCTION

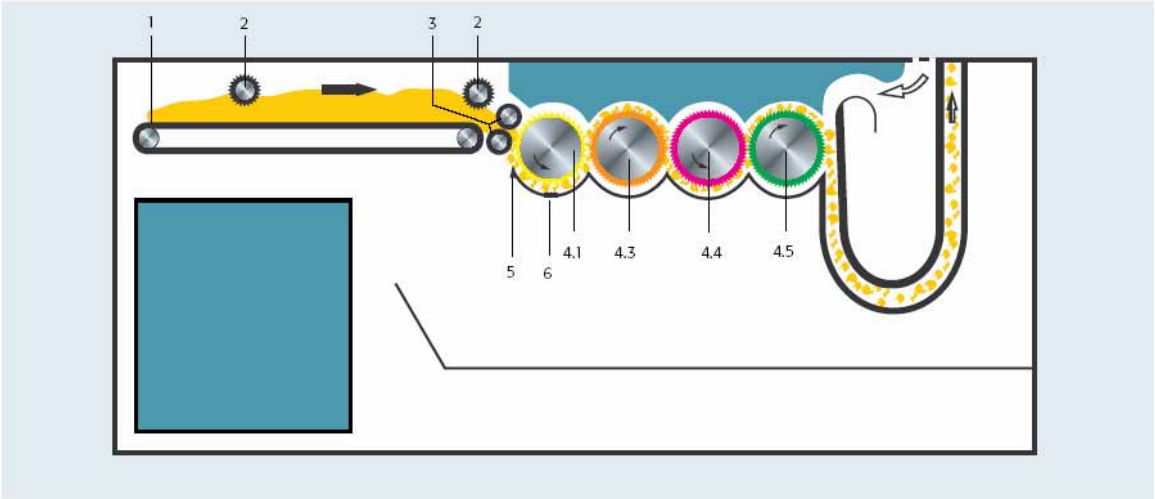
1.1 INTRODUCTION

In this project, we will compare the cleaning efficiencies of various modern and old spinning machines of blowroom and card. It is possible to analyze the cleaning efficiency of machines during the blowroom and the carding at reasonable times and with the little staff in order to compare their function status for a better follow-up.
Raw material contains various kinds of trash, such as leaf, dust, bard and seed coat particles. The content of each of those trash categories in highly depending on the origin of the cotton and its harvesting method.
Trash content from bale to sliver should decrease through the opening. In one hand, the requirements of sliver quality impose that the cotton must be intensively cleaned during blowroom and card process. On the other hand, the amount of those contaminations provides useful information for finding more efficient cleaning processes and predicts the quality of the finished products.
The cleaning efficiency of cotton in blowroom and card depends to a large extent on adequate opening of the tightly packed bale material at an early stage. Scutching is the process in which cotton is cleaned from the remaining trashes after opening by beating the cotton. In the present study, the lap was formed by the Chinese scutchers at different settings. It was observed from the study that the lab weight variation, fiber growth and cleaning efficiency increased by increasing the speed and gauge of the Kirchner beater and pressure of the calendar roller.
Similarly, the cleaning efficiency of cotton in modern Trutzschler and Rieter blowrooms and cards depends on Computer-controlled cleaning efficiency. For example every CLEANOMAT cleaner, whether it has 1, 3 or 4 rolls is controlled and monitored by the integral micro-processor system CLEANCOMMANDER. For example the deflector blades in front of the mote knives, for controlling the amount of waste, are individually adjusted by motors via a keyboard. A rapid adaptation to new raw materials or to an altered degree of cleaning is therefore possible. Stored experience values help with the settings.

The important tests are determination of the cleaning efficiencies, percentage waste extraction by the machines and the output rate of the blow room as a whole. The overall cleaning efficiency depends on the make of the blow room. Generally a cleaning efficiency of upto 70% is achieved with Trutzschler Cleanomat system or Rieter blow room and some what lower cleaning efficiency with the conventional Chinese blow room. Shirley Analyser or a Cotton Analyser is used for the determination of cleaning efficiency.

Waste-cum production test is carried out to determine the waste extracted at each machine by the blow room as a whole and its output rate. For this test the entire blow room is stopped, all machines are completely cleaned. Removing from the heap of cotton mixing vertically a quantity of cotton equal to 500kg is weighed. The blow room is started again and cotton is fed to the first machine of the line. The starting time is noted simultaneously. Like-wise, temperature, humidity readings are also noted. Similarly speeds of beaters, feed rolls etc. are also noted using Tachnometer. The settings between the feed rollers and beaters, beaters and grid bars in the case of conventional blow room and between feed rolls, spiked and toothed rolls, between the latters and the carding segments as well as mote knives and suction hoods in the case of modern blow room should also be noted. When all the quantity of cotton has been processed, the blow room is stopped. The weight of all full laps as well as any partial lap is noted. Similarly, waste extracted at each machine is separately weighed.
Machine-wise percentage as well total waste percentage is calculated. Machine-wise cleaning efficiency is determined by testing samples drawn from the feed material and the stock delivered by each machine. By a similar procedure cleaning efficiency of the entire blow room is calculated. The output rate of the blow room is calculated from the weight of all the laps produced during the duration of the test. It is also necessary to optimise the machine settings and speeds so that maximum elimination of impurities and contaminations is achieved with minimum loss of good

spinable fibres and without damage to cotton fibre staple length. These factors influence the production cost as well as the quality of yarn produced. It may also be pointed out that monorised adjustment of the quantity of waste being extracted by Trutzschler blow room machines is possible during operation by altering the deflector blade settings via serve-motor. Main functional parts of a conventional scutcher and Trutzschler blow room cleanomat system are shown in illustrations No. 1 and fig.2.



The determination of the cleanability is based on the measures of trash by means of the device of control "AFIS" permits to predict the future behavior of cotton in cleaning and gives a preview on the cleaning efficiency of cleaner and even a cleaning line. Since mechanized spinning industry came into being various opening and cleaning machines were developed most of which are now obsolete. With the passage of time and with the advent of new technologies high speed machines were designed having more opening and cleaning efficiency. In the past a typical blowroom line for the cleaning of cotton consists of four to six and in some cases even six beating points. The underlying idea was to open and clean the material slowly and gradually. But during the last decade, the trend has shifted to minimize the number of machines in the blowroom line. Now in modern cleaning line only two to three beating points are available. This became possible only due to the introduction of machines with the higher degree of opening capabilities. Most of the spinning mills in Pakistan are equipped with conventional cleaning set-up in blowroom. Step or Giant cleaner for example is used for excellence in opening and cleaning of cotton through the combination of the action of opposing spikes and the beating action. In this machine, the material falls into the feed hopper and passes to the first beater. From there, it is transported upwards by six beating rollers, each carrying profiled bars, the beaters are arranged on a line inclined upwards at 45 degree. The elimination of impurities takes place during the continual passage of the material over the grid arranged under the rollers. The grids are always adjustable and usually the beater speed is also adjustable. In giant cleaner, progressive increase in speed results in a directly proportional increase in waste extraction. The proportions of lint and trash in the dropping are independent of speed up to about 550rev/min so that a much greater cleaning efficiency is achieved at these higher speeds. At speed greater than 550 rev/min, however the lint loss is much greater as compared to the trash extraction. Some reports are available regarding the effect of cleaning machinery upon fibre characteristics.

1. Behery (1992) narrated that opening and cleaning machines removes short fibres and effect the change in fibre length due to fibre/machine interaction, whereas Scheider(1995) advocated that the Rieter Uniclean performs three main functions equally well viz;

    - Efficient cleaning at the start of the blowroom line,
    - Integration of an efficient dedusting element

- Exceptionally gentle treatements of fibres.

2. Similarly Klein (2000) lamented that Uniclean leads to a higher degree of cleaning, a better cleaning efficiency and less stress on the fibres.

3. Liuetal(2001) commented as the large variatin of single fibre properties within a single variety suggests a very strong influence of growth conditions and development

1.2 PROBLEM STATEMENT

"Comparison of cleaning efficiencies of old & new Blowroom and Card Machines."

1.3 AIMS & OBJECTIVES

Cotton cleaning is an important spinning preparation process. The main objective of this project is to compare the cleaning efficiencies of different old and new blowroom and card spinning machines due to the following reasons:

- Cotton contains very little dust before ginning. Dust is therefore caused by working of the material on the machine.
- A slight reduction in the loss in opening and cleaning by 0.5% will result in a yearly gain of about US $ 15,000(Rs.9, 00,000) in a spinning mill with 20,000 spindles.
- The yarn properties and downstream industries are highly dependent on the cleaning efficiencies of these two departments (Blowroom & Card).
- The quality and cost parameters that are highly affected by these Two departments.

CHAPTER - 2

2.1 BASIC OPERATIONS IN THE BLOW ROOM

2.1.1 Opening

Opening is the first operation required carried out to the stage of flocks in the blow room and the stage of individual fibers in the card. Flock weight can be reduced to about 0.1mg in the blow room.

2.1.2 Cleaning

The blow room cannot eliminate all, of the foreign matter in the raw material. The blow room installation removes approximately 40-70 % of the impurities. The result in depended on the raw material, on the machine and on the environmental condition. Dependence on the raw material in this case, the level of impurities is illustrated by the diagram of Trutzschler.

The cleaning effect cannot and should not be the same for all impurities levels. Since a lot of dirt can be removed easily than a little. The cleaning effect of each blow room machine can certainly be increased by appropriate adjustments. However, improved cleaning must be purchased at the cost of high fiber loss, in addition to the stressing of the fibers, because every elimination of foreign matter is accompanied by a simultaneous elimination of good fibers.

Since the proportion of fibers in waste differs from one machine to another and can strongly be influenced, the fiber loss at each machine should be known. It can be expresses as a percentage of total material eliminated, in cleaning efficiency.

2.1.3 Dust removal

Almost all the manufacturers of blow room machinery now offer dust removing machines or equipment in addition to opening and cleaning machine. However, dust removal is not an easy operation, since the dust partials are enclosed in the flocks and hence are held back during suction.

2.1.4 Blending

Blending of fiber material is an essential preliminary in the production of yarn. Fibers can be blended at various stages of the process. These possibilities should always be carefully exploited, for example by transverse doubling. However the starts of the process is one of the most important stages for blending, since the components are still separate and therefore can be metered exactly and without depend upon random effects. A well-assembled bale layout and even (as far as possible simultaneous) extraction of fibers from all bales is therefore of the utmost importance.

Simultaneous extraction from all bales, which used to be normal in the conventional blending batteries, can now be no longer obtained. Accordingly intensive blending in a suitable blending must be carried out after separate flock extraction from individual bales of the layout. This blending operation must collect the sequentially arriving bunches of fibers from individual bales and mix them thoroughly.

2.1.5 Even feed of the material of card

Finally, the blow room must ensure that raw material evenly delivered to the cards. Previously, this was carried out be means of precisely weighed laps from a scutcher, but now automatic flock feeding installation are increasingly been used.

Raw Cotton Specification

Mic Value	4.5
Length	1.15”
Strength	30 gpt
Short Fiber	8%
Standard Moisture	8.5”

OLD BLOWROOM MACHINERY SETUP

WISAL KAMAL TEXTILE MILLS (PVT) LTD

2.2 Blow Room line

BLOWROOM LINE

Machine	Manufacture	Type	Model
Auto.Plucker	China		1991
Bale Breaker	Trutzschler	MWS 1400	1986
Step Cleaner	Toyoda Hara		1980
B-11	China	FA102C	2004
DX	Trutzschler	RY-9549	1992
Sctucher 1	China	FA 161	1991
Sctucher 2	China	FA 161	1990
Sctucher 3	China	FA 161	1991

2.2.1 BLOWROOM MACHINERY DETAIL

Plucker

Speed = 450 m/min

Bale Breaker

Bale breaker guage: 20mm
Speed: 300m/mint

Step Cleaner

Guage: 2.5mm
Speed: 650 m/mint

B-11

Speed: 450 m/mint
Cleaning intensity: .3/3

Grid bar Angles of A Side

Left	Right
75 9.5	119 7.8

Grid Bar Angles of B Side

Left	Right
75 9.5	119 7.8

DX Beater

Speed	**1650 m/min**
SMEChirner beater	
Speed	**850 m/min**
Guage	**6.0 mm**
Mote kinfe guage	**2.0 mm**
Feed Roller guage	**8/1000**
Calender Roller	
guage	**2.0 mm**
Speed	**15 m/min**

NEW BLOWROOM MACHINERY SETUP

SIARA TEXTILE MILLS (PVT) LTD

2.3 Blowroom line

Manufacture	Type	Model
Jintan textile china	Plucker	A002D -1997 FA002-1991
Rieter	B-11	2002
Rieter	B-70	2002
Rieter	B-60	2002

CARD

Manufacture	Type	Model
Rieter	C-60	

2.3.1 AUTO PLUCKER

It is also called as automatic bale plucker / disc plucker.