Faculty of Engineering
Department of Textile Engineering

Project (Thesis) on
Quality Issues in Knit Fabric

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A thesis submitted in partial fulfilment of the requirements for the degree of

Bachelor of science in Textile Engineering

DECLARATION

We hereby announce that we completed this project under the guidance of Dr. Md. Professor Mahbubul Haque, Daffodil International University's Department of TE. We also announce that no part of this initiative, or any part of it, has been applied for a degree elsewhere.

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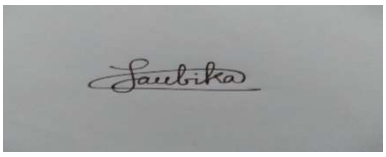

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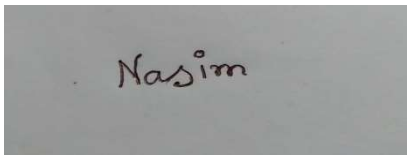

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Finally, we must honor and accept our parents' unwavering love and patients.

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ABSTRACT

To finish our project job, we first collected some defected fabric pictures from Liz Fashion Industry Limited, Magpie Knit Composite. In knitting floor, dyeing area, finishing floor, and inspection section. Then we divide the collected pictures of the flaws into different categories so that we can more effectively examine the fabric defects and determine an appropriate result that will be sufficient to assess the grade of various fabrics and, over time, will assist us in carrying out additional activities based on the defined type of work.

Following the assessment of the fabric samples' grade, we set out to discover the true causes of these flaws in the industrial sector.

These were made possible as a result of our project (Thesis) work. Then we try to examine them thoroughly in order to determine the source's trail and figure out how to resolve the issues.

We have made every effort to eliminate woven fabric defects caused by various manufacturing processes such as spinning, warping, dyeing, measuring, knitting, finishing, and so on.

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CHAPTER 01:

INTRODUCTION

1.1 General Introduction:

In a later year, there has been an awfully quick development within the knitting section of the textile industry. A request for knit cloth has expanded numerous folds over a long time within the residential and export markets.Knit fabrics give extraordinary Comfort qualities and have long been preferred as textures in many types of clothing, as knitted fabrics are made on different machines with different knitting stitches and conditions to create different patterns and types of fabric, is expected to have different qualities. The report says that efforts are being made to make a knitted fabric more comfortable by changing the fibers, yarn parameters (twist, bulk, count, and finish), knitting parameters (courses per inch, wale per inch, loop length, and fabric weight) and post knitting finishes (enzyme and chemical). Simple knitting properties, particularly dimensional and physical properties, are mainly influenced by constituent fibers, yarn properties, loom variables, processing, and finishing treatments.

Fabric quality means different properties of finished fabric which depends on yarn properties and fabric construction. The properties of knitted fabrics are impacted by different parameters, like raw fabric, yarn structure, fabric structure, preparing to organize, and finishing. The method received influences the fabric properties and its by and large exhibitions. The properties which are important for knitted fabric and kept up within the industries from grey stage to finished stage are GSM, dimensional stability (shrinkage and spirality), bursting quality, pilling resistance, and speed properties. Tactile (hand) and appearance properties are moreover exceptionally imperative in all classes of textures.There have been several considers on the impact of diverse fiber types, preparing parameters on different properties of knitted fabrics, and impact of wet processing stages and prepare arrangements on the physical, dimensional, and coloring properties of the cotton knitted fabrics. In any case restricted number of studies on the impact of fabric structures on the physical, dimensional, and coloring properties of the cotton knit colored fabrics.

In Bangladesh, there are a few common knit fabric structures that are delivered within the industrial facilities. Such as Single jersey, double jersey, single jersey derivatives, and double jersey derivatives like Single Lacoste, polo pique, Double pique, F/Terry, Interlock, 2×1 Rib, 3×3 Rib, Variegated Rib, etc. Among them, seven knit structures that are broadly created in Bangladesh are chosen. They are Single Jersey, 1×1Rib, 2×1 Rib, Interlock, French Terry Single Lacoste, and Pique. The quality parameters of all the textures are tried and compared the comes about. Nowadays fabric quality is the most vital issue for the trade of garments. So, it is necessary to have information around the quality of the textures and attempt to progress their quality as requirements. As I am working in a knit dyeing plant it is additionally exceptionally imperative for me to know around in case there are any changes in quality parameters due to altering in texture structure alter. So, I think it'll be truly exceptionally supportive for me and other textile related1.2 Objective of the Study:

1.2 General Objective:

The quality status of knit fabric includes an extraordinary effect for The successive production units of the company such as fabric production are started from this area. Hence, this study is supported in several of which the taking after is the critical one

1.2.1 Specific Objectives:

- To identify and measure the critical fabric defect types and their root causes in the section.
- To estimate the cost of rejection rate (cost of a loss) for the section under investigation.
- To provide the possible solution for the identified critical defects.

1.3 Significance of the Study:

The quality status of knit greige fabric has a great impact on the succeeding production units of the company as production of fabric is started from this section. Therefore, this study is helpful in different of which the following are the significant one:

- In pointing focus areas where one can address the problem to reduce the rejection rate.
- To show the scientific approach to tackle the problems in the knitting section that the rejection rate is reduced.
- Other researchers can use the result of this research as a base for further study.

1.4 Scope and Limitation of the Study:

This research is carried out in the knitting plant of Liz Fashion Industry Limited and Magpie Knit Composite Factory, focus on finding defect causes of weft gray knitted fabric, and in this study, we limit the time and resources not to implement the project in this section.

1.5 Organization of the Thesis:

The Thesis is organized within the taking after thesis format. Chapters are created to show the components of the investigation, and the arrangement of the chapters compares to the stream of the work as takes after. The research begins with the primary chapter to be the specific introduction and this Includes foundation data of the subject matter and the company, issue statement, investigate question, objectives, scope, and importance of the study, besides the research system. Then again, the second chapter consolidates Writing Survey Counting the audit of previous research works on quality-related issues. This is often taken after by Technique Included in it the way to gather information, analyze them, translate them, and represent the information and their particular results in general. Then again, data Presentation and Investigation and results are displayed in Chapter 4 and incorporate the strategies utilized to reach the general results have appeared in detail. Finally, the results of our thesis are included in chapter 5.

At long last, the results of the finding are concluded in chapter five specifically Conclusions and Recommendation summarizing the finding of the case, the recommended guideline to be connected and future investigate regions to be centered on common.

CHAPTER 02:

LITERATURE REVIEW

The illustrative inquire started with an essential establishment of understanding knitting information, the highlights of different knitting structures, responsive coloring, and quality parameters of the knitted fabrics. All of the underneath data and information are assembled from the reference books, diaries, articles, web websites, and magazines to solidify all the parts of thoughts into this part.

2.1 The Evolution of Textiles:

Although the earliest pieces of clothing and equipment of man were probably animal skin wraps temporarily sewn with bone needles and creature ribbons, after a short time he tried to process fibrous materials into woven fabrics, strengthened by his experiences with intertwined branches, clearings, and grasses within the Creation of primitive shelters.

Typical textile processes are:

- Spinning
- Knitting
- Weaving
- Dyeing
- Printing
- Garment

Spinning is the act or process of converting short or short fibers, such as cotton or viscose, into continuous yarn or yarn.

Knitting is the process of making fabric by converting continuous strands of yarn into a series of intertwined loops, each row of these loops hanging from the immediately preceding one.

Weaving is an important method of making fabric or cloth in which two different sets of yarn, known as warp and weft or weft, are intertwined to form one fabric.

Dyeing is the process of dyeing textile products such as fibers, yarns, and fabrics

Textile printing is the process of applying color to fabric in defined patterns or designs

Textile finishing can be defined as any process (chemical and/or mechanical) used after textile dyeing, which gives the textile material additional functionality / superior aesthetics. Textile finishing is mainly applied to woven fabrics (woven fabrics, knitted fabrics, fleeces); However, textile finishes can also be applied to fibers and yarns.

The garment manufacturing process is how garments are made for shops and other outlets. Yarns are the raw materials controlled during knitting. A yarn is characterized as = a get-together, of significant length and moderately little cross-section, of filaments or fibers, with or without turn '. Knitting is the foremost common strategy of inter-looping and is the moment as it were to weaving gas a strategy of fabricating material items. It is evaluated that over 7 million tons of weaved goods are delivered every year all through the world. Although the interesting capability of weaving to make formed and form-fitting articles has been utilized for centuries, cutting edge innovation has empowered sewn developments in molded and unshaped texture shape to expand into a wide extend of apparel, domestic and industrial end-uses.

2.2 Fabric:

Fabric is a flexible planar substance made up of any combination of liquids, fibers, yarns, or textiles. Non-woven textiles and felts can be made directly from webs of fibers by gluing, fusing, or interlocking, but their physical qualities tend to limit their potential end uses [5]. The most adaptable way of making textile fabrics for a wide range of end-uses in the mechanical manipulation of yarn into fabric.

Interweaving (interlacing or interlacement), interloping, and twisting are the three main ways of mechanically manipulating yarn into textile fabrics. Through the use of hand-manipulated procedures, all three methods have evolved.

A. **Interweaving:**

   It is the meeting or interlacement of two sets of straight threads, the warp (ends) and the weft (picks or fills), that cross and interweaves at right angles to one other. The earliest and most frequent way of generating continuous lengths of straight-edged fabric is weaving.

B. Twisting:

It encompasses a variety of techniques, including braiding and knotting, in which threads are made to interweave at right angles or other angles. These approaches are prone to producing unique structures with extremely specialized applications.

C. Interloping:

It entails twisting yarn (s) into loops, each of which is normally released only after a consecutive loop has been made and intertwined with it, resulting in a secure loop structure. The yarn flowing from one loop to the next also holds the loops together. Knitting is the most common method of interloping and the second most common method of producing textile goods, after weaving. Knitted goods are projected to be manufactured more than seven million tons per year around the world. Knitting's unique ability to create structured and form-fitting products has been used for millennia, but contemporary technology has made knitted constructions possible. I sculpted and sculpted.

2.2.1 Fabric Structure:

It can be classified as-

1. Woven fabric
2. Knitted fabric
3. Nonwoven fabric
4. Braided fabric

2.3 KnittingTechnology:

2.3.1 Definition of Knitting:

Knitting is a manufacturing method in which needles are used to construct a sequence of interlocking loops from one or more yarns or a set of yarns, according to Adolph (2007:266). "It consists of creating yarn(s) into loops, each of which is generally only released until a subsequent loop has been produced and intermeshed with it so that a stable ground loop structure is achieved," according to Spencer.

During the knitting process, loops are produced by interlacing yarn in a series of continuous loops. Weft knitting and warp knitting are the two forms of knitting. Machine knitting was utilized in the manufacturing process, as well as hand knitting using a straight eye needle.

2.3.2 Historical Background of Knitting:

Knitted textiles are substantially different from woven materials. A piece of woven fabric is made up of a succession of longitudinal and across threads that are interlaced. Knitting is the process of creating loops through those that have already been made. The knitted fabric structure is created by this interloping and the continual creation of additional loops into each other. Machine knitting replaces the pins, hands, and fingers needed in hand knitting with a variety of needles, needle holders, and yarn feeders.

Knitting is a fabric-making technique that involves converting continuous strands of yarn into a series of interlocking loops, each row hanging from the one before it. The fundamental element

of a knit cloth structure is that the loop is intermeshed with the loops adjacent to that on each side and top of and below it. unwoven materials are divided into 2 main groups, filling and warp knitted fabrics.

The weft knitted structure is incredibly completely different from the warp-knitted one. The distinction is obvious from each warp and weft knitted structure is shown in simplest forms below. it's seen from this figure that during a weft knitted structure a horizontal row of loops may be created exploitation one thread and also the thread runs in a horizontal direction.

The knitting business belongs to the branches of the textile industry with a long tradition and also the unwoven product is better-known for centuries. within the period, they were created by hand and the first-hand operated textile machine wasn't made up till the sixteenth century. This invention is sometimes attributed to an exact English spiritual leader (1589) William Lee. Since that point, knitting machines have been developed and redesigned so currently daily they gift the foremost sophisticated and most machine-controlled machinery in the textile industry.

A skilled hand knitter produced 120 to 150 stitches per minute. In comparison, a modern high-speed circular knitting machine makes about 20 million stitches per minute.

1589: William Lee, the inventor of the mechanical stitch formation technique.

1758: Jedediah Strutt, inventor of double weaving technology (right). This invention relates to an accessory for the hand-woven tire that has become world-famous under the name "Derby Rib Machine".

1798: Monsieur Decroix quickly arranges the needles in a crown that turns, moving the needles one after the other through the loom steps. The round fabric frame is born.

1805: Joseph Marie Jacquard presents his control device for shadow construction on looms in Lyon. It is not clear when Jacquard became interested in the problems of the weaving industry after its success in the weaving field. you will find the jacquard machine in different variations on knitting machines with the same purposes: individual movement of knitting and shoulder needles leads or guide needles for modeling.

1847: Mathew Townsend receives a patent for his invention of the valve pin. A new era in weaving technology begins. With the help of these needles, stitch formation was made easier

because the press was no longer needed, the result: simplification of the mechanism, increased production speed, and cost reduction.

1910: The Robert Walter Scott company from Philadelphia is granted a patent for "Interlock Fabrics".

1918: The first small double cylinder double hook needle rounding machine is built by Wild in England.

1935: After the production of round platinum wheel machines, Mayer and Cyber gang produced circular knitting machines in 1906 Knitting machine

Knitwear of all kinds is currently enjoying unprecedented consumer demand. In many end uses where woven fabrics were previously undisputed, knitwear has taken a dominant position, while in end uses where knitwear has traditionally been in the foreground, production has been pushed forward by leaps and bounds.

2.4 Materials:

2.4.1 Fibers:

Fibers and yarns are the foremost essential raw materials for knitting, which can be initial thoughtful factors during the planning method of the article of clothing normally.

The fiber of knitting is outlined by Textile Institute as units of matter characterized by flexibility, fineness, and a high magnitude relation of length to thickness (Carty, 1996:3). Generally, fibers may be divided into natural fiber or synthetic (Man-made) fiber respectively.

A. Natural Fibers:

Haan, G (1999) declared that, in keeping with the account regarding 3000BC, the fiber has been domesticated and being manipulated for the textile market over 5000years ago. Nowadays, it's thus usually utilized in the clothing business due to its sensible proprieties, like fineness, high flexibility, and resilience. The character fibers are often separated into vegetables and animal types. Vegetable fibers are taken from plants. These styles of fibers are supported by cellulose,

which is treated material in nature as a structural material within the world. the foremost acquainted teams of vegetable fibers used commonly in the textile industry are the seed fiber (cotton), and stem fiber (flax, linen, ramee, and bamboo), that their properties of flexibility, fineness, resilience, and shape.

All the textile fibers are classified in keeping with their staple length into 2 categories, corresponding to staple fiber and filament.

(1) Staple Fibers:

It has a restricted length that varies per type, resembling cotton, wool, jute etcetera There are 2 kinds of staple fiber, one is brief staple fiber another one is long-staple fiber. Cotton is especially short-staple fiber and alternative most fibers are long-staple except silk. Silk is barely natural fiber that's filament.

(2) Filament:

It has a continuous length which means the length of filament is up to the length of yarn. All synthetic fibers are filament. synthetic fibers are created as filament, though they are used as staple fibers if necessary.

2.5 Yarn Types:

Yarns play a vital role that is manipulated throughout knitting. inventive look on knitting is contributed by special styles of yarn.

Herbert Spencer, outlined it as "an assembly of considerable length and comparatively tiny cross-section of fibers or filaments with or while not twist". Staple small stuff may be created of relatively short fibers whereas filament yarn is a gathering of nearly endless parallel continuous yarns by twisting and spinning them together. varied yarn embraces single yarn, wire yarn, and stitching thread. (Harris, 1954). varied yarns include ply yarn, cord yarn, and conjointly fancy yarn.

2.5.1 Types of Cotton yarn:

There are two types of cotton yarn according to their manufacturing process as follows:

1) Carded yarn
2) Combed yarn

2.6 Knitting Terms Related to Fabric Structure:

Knitting structure is a very important component for an honest performance on vesture design. Besides, knitting structure is additionally enjoying Associate in Nursing's influential role towards the aesthetic look of an unwoven fabric. Therefore, correct knitting sewers and structures ought to be selected.

2.6.1 Knitted Loop:

A kink of yarn that's intermeshed at its base. once intermeshed 2 kinks of yarn is named loop.

2.6.2 Knitted Stich:

The stitch can be a fairly intertwined thread on its lower and upper parts. The knitted stitch is the basic unit of interlocking and often consists of 3 or additional interlocking stitches, with the middle stitch being passed through the top of the lower stitch, which has been interwoven successively through the head through the stitch above.

2.6.3 Knitted Loop Structure:

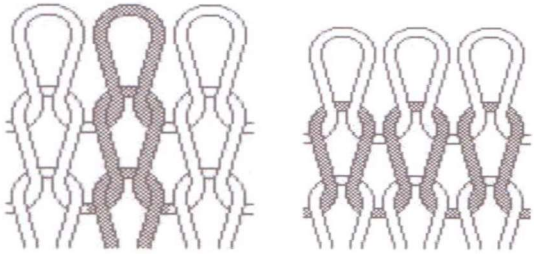
The properties of a fleece structure are largely determined by the reciprocity of each seam with its neighbors in every respect and above and below. Fleece loops are arranged in rows and columns, roughly speaking, love the selection and concatenation of woven structures called "courses" or "wales".

2.6.4 Wales and Courses:

A crossbow can be a predominantly vertical row of needle stitches that are produced by knitting an equivalent needle in successive knitting cycles, thus weaving each new stitch through the previous stitch. the same needle in successive weaving cycles thus creates a column or warp seam covering movement. In all alternatives, the wales are attached by solder loops or under flaps.

A course is a predominantly horizontal series of stitches created by adjacent needles during the same knitting cycle.

In spiked fabrics, a row consists of yarns in a regulation called row length. A pattern row can be a horizontal row of clear stitches made up of a bed of adjacent needles. In the case of a single shot fleece, this can be the image of a row; In the case of complex additional materials, however, a pattern row also consists of 2 or more row lengths.



Wales and Courses

Figure 1

2.6.5 Stitch Density:

The term stitch density is often used in weaving rather than as a linear activity of courses or Wales; is the total number of needle loops during a square space measurement, one square centimeter or square inch is estimated. it is obtained by multiplying, for example, the number of rows and crossbows per inch in diameter. The seam density is usually a very correct measure, as the tension acting in one direction within the fabric could result in an occasional measured value for courses of stitches, for example, and a high measured value for whales, which, if increased at the same time, negates the effect. sometimes, for the sake of simplicity, it is assumed that the line and sample rates can be replaced by the bullet rates per linear unit of measure.

Stitch density = Wales per inch (WPI) × Courses per inch (CPI)

2.6.6 Loop or Stitch Length:

The length of the fleece yarn in a seam in yarn knitting. The seam length on paper is a thread length that contains a needle loop and the length of the thread (half a solder loop) between this needle loop and the adjacent needle loops in each of its facets. the more elastic and lighter the fabric, the worse the hood's opacity and its explosive power.

Stitch length = one needle + two half a sinker loop

2.6.7 Face Loop or Stitch:

Also known as a smooth stitch. A stitch so woven into the fabric and its legs are placed on the highest arc of the stitch formed on the same line in the previous row. This facet of the stitch shows the new loop that returns to the viewer as it passes and covers the climax of the last loop. Face stitch stitches tend to show the side limbs or legs of the needle loops or above the loops as a series of intermittent ones.

2.6.8 Technical Face or Right Side:

The underside of the material on the needles shows only the front seams within the type of facet legs or the legs of the loops or covers as a series of intermittent Vs.

2.6.9 Reverse or Back Loop or Stitch:

It is also known as a reverse stitch. A stitch that is intertwined with the fabric in such a way that the highest arch and also the lower arch is placed on top of the legs of the stitch formed in the previous and next pass on the same line. This is often the other side of the stitch to the front of the loop side and shows the new loop that will deviate from the viewer as it passes under the top of the last loop. Warp weaving on the surface is more visible. The reverse loop facet is that the loop closest to the needle head as a result of the needle pulls the new loops down through the old loops.

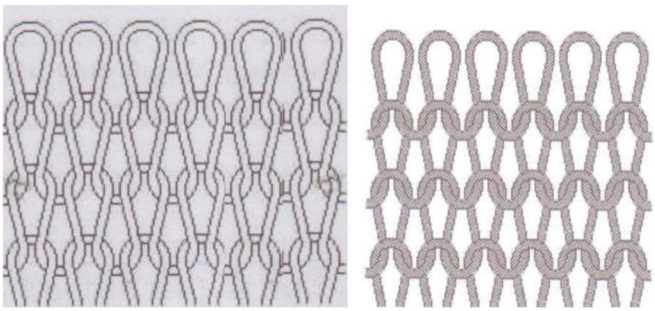
2.6.10 Technical Back or Left Side:

The side of the fabric on the needles should only have reverse stitches within the lottery-type or under the turns and heads of the loops.

2.7 Different Types of Stitch

2.7.1 Knit Stitch:

It is the essential sew employed in thread knitting. this sort of stitch represents 2 different faces per its relative position of the manufacturing needle associate degreed fabric. The cloth has been created commonly a lot of elongation crosswise and fewer elongation lengthwise.

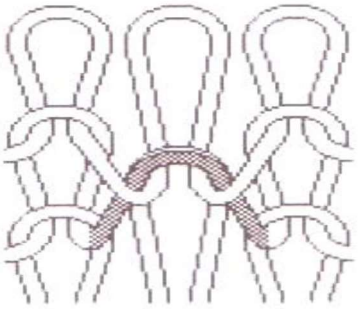


Technical face & Technical back of the knit stitch

Figure 2

2.7.2 Tuck Stitch:

A tuck stitch means that an elongated loop once a needle rises to require a brand-new yarn by the needles while not doing away with the previous loop. associate degree elongated loop is {formed} that one needle gets two or more stitches without clearing from the needles. Tuck stitch is featured in tuck loop is placed behind the stretched face loop. [7]. On the technical backside, the tuck loop is hidden. As a result, the cloth will have resulted thicker and heavier. It may be accustomed to turning out color patterns to create openwork or sheer effects. kind of like miss sew, tuck stitch seems as stretched loop by increasing the material breadth however reduced the fabric length; raise surface effects can be made.



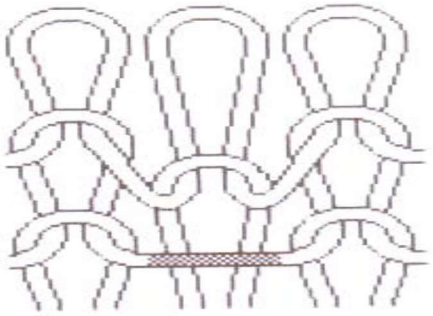
Tuck Stitch

Figure 3

2.7.3 Miss Stitch:

Miss stitch is made at the needle by the contiguous needle once the new stitch is made throughout the assembly sequence. meaning a needle is inactive once knitting. Therefore, it is

detected as a "float" or "welt" stitch. per "Knitting symphony: Overture. Hong Kong" [8], miss loop presents an identical characteristic and look with tuck loop, however, the miss loops can't be seen from the technical face facet of the fabric, and can't be shaped alone into the material while not unwoven loops. This distinctive property allows reducing the width, length, and physical property of the knitted fabric.



Miss Stitch

Figure 4

2.8 Quality Control:

Quality begins with the procurement of the fiber brought to you from the USA with strict quality parameters. Practice User HVI, AFIS, UTs, and Tenso quickly, all materials are fully checked and the look of the method is delicious. Least-bit-level materials contain all kinds of hands-on information on color tests and analysis, SDL Atlas, and Wictor workplace test tools. The sewing quality and productivity are maintained by a well-trained supervisor and our in-house engineering department monitors and analyze suitable code applications. The textile trade wants a very intelligent, efficient, and reliable infrastructure and public services. Movements, entrances, security, future expansion. All production units are designed to regulate for maximum efficiency, therefore maintenance and public services receive special attention from management at all levels.

2.9 Dimensions of Quality:

Dimension 1: Performance:

Performance is often a source of competition between customers and suppliers, especially since the performance does not appear to be adequately delimited between the specifications. The performance of a product often affects the bottom line or the name of the end-user. Therefore, various contracts or specifications contain damages related to improper performance.

Dimension 2: Features:

While this dimension may seem obvious, performance specifications rarely describe the options required throughout a product. Therefore, vendors planning products or services based on performance specifications need to understand their intended use and maintain close relationships with end-users. The reliability of

Dimension 3: Reliability:

could also be closely related to performance. For example, a product specification could describe parameters for acceptable uptime or failure rates. Reliability can be an important factor in the overall or company image and is seen by most end-users as a fundamental quality dimension.

Dimension 4: Conformance:

If it was developed to a performance specification, does it work as stated? If it was developed based on a style specification, did you set all options?

Dimension 5: Durability:

The durability is closely related to the guarantee. The requirements for product robustness are usually contained in the specifications of the associated titles of the procurement contracts. For example, the fighter jet purchased for use on aircraft carriers contains criteria that are intended to improve its durability in harsh operational environments.

Dimension 6: Serviceability:

Since end-users pay more attention to the Total Price of Ownership than to simple acquisition costs, service friendliness (as well as reliability) is becoming an increasingly important quality dimension and criteria for product selection.

Dimension 7: Perception:

Perception is reality. the good or service could be of a reasonable size or even higher quality, but still, be the victim of negative customer or public perception. As an example of an associate degree, a good quality product could be called a service. Poor quality, aided by installation or field technicians. the goods are not properly placed or maintained and as a result, fail, the defect is generally related to the quality of the product.

Dimension 8: Appearance:

The material is out of whack as both sides of the fabric have a unique look. Between all sides, the loops are identical in all fields and wales. Both sides of the fabric are created from a loop shape, either front or back (back). the top and bottom of each loop are on the back of the material and therefore the center (legs) of the loop appear to be on the surface of the fabric. Hence the face of the fabric is smooth and shows the facets of the loops as a series of interlocking "Vs". The back is rough and appears as interlocking semicircular columns.

Dimension 9: Extensibility:

the material is elastic, although not always elastic. In general, the fabric stretches more in width than in length. the material protrudes in an over-course direction and towards the crossbow; however, the degree of extensibility is completely different when the primer is pushed down than when the facet is pulled aside. careful expansion due to the degree of restriction required in each loop due to its nesting. The loop drawn vertically spans its length, while the loop drawn horizontally spans its entire length. The degree of recovery from stretching is not a developmental characteristic; however, it depends on the nature of the material and the

construction of the yarn. Without a doubt, it offers a potential 40% recovery in width when stretched.

Dimension 10: Aesthetics:

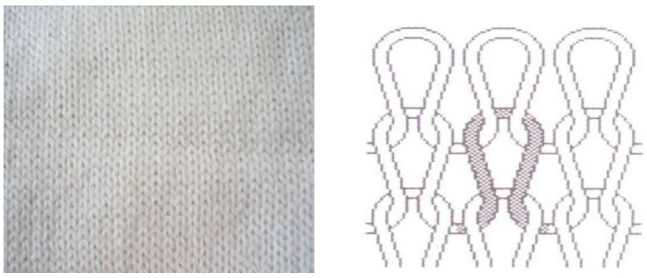
The appearance of a product is of vital importance to the end-user. The aesthetic properties of a product contribute to the identity of a company or a brand. Faults or defects in a product excessively affect its aesthetic properties, even if the quality is not cut or changed, which are usually a reason for rejection.

Dimension 11: Edge Curling:

The material will pucker at the bite as the fabric relaxes after cutting. It is a curve that turns backward on {circumferential edge surfaces} and forwards up and down. The distinction in construction between the 2 sides creates tension within the structure so that the material tends to bend. (Face) exerts a longitudinal tension that puckers the top and bottom of the fabric towards the front. The needle and plumb loops, which are in a horizontal plane, pull the sides of the fabric and pucker them towards the back of the fabric. Crimping or different heat/water processes often minimize or eliminate the crimping caused by the creativity of the loop formation.

Dimension 12: Unroving:

The smooth knitted structure simply untangles itself from the last loosened loop. This selvage is the leading edge when the material is upright like in the knitting machine. In contrast to the different fabric families, the smooth knit construction is symmetrical and could even peel off the woven edge first. Therefore, the smooth fabric can be tested from both ends. Note that this ability is limited to the most important basic structures of the smooth family, as there are no special classes of loops built-in.



Plain Knit fabric

Figure 5

2.10 Different Types of Knit Fabric Produce

2.10.1 Single Lacoste:

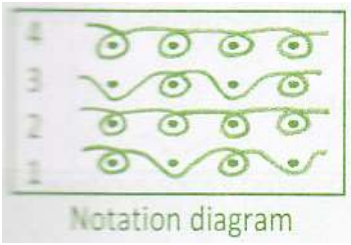
Single Lacoste is a knit-tuck unmarried jersey shape. So, one set of needles is used to supply this shape. It is likewise a famous shape to supply reduce and stitch knitwear. The prominence of the layout seems at the returned aspect of the material. The repeat of the shape completes on 4 courses. Knitting series for a repeat as follows:

• First direction: Knit on all unusual range needles and tuck on all even range needles.

• Second direction: Knit on all needles.

• Third direction: Tuck on all unusual range needles and knit on all even range needles, which is contrary to the primary direction.

• Fourth direction: Similar to 2d direction knit on all needles.



Notation diagram of Single Lacoste Fabric

Figure 6

Face side of Single Lacoste & Backside of Single Lacoste

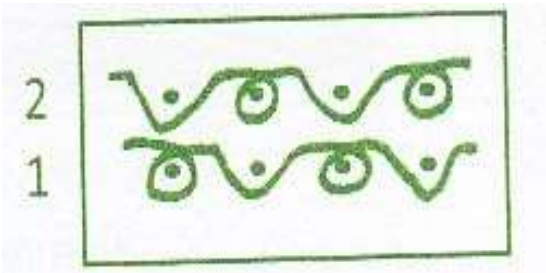
Figure 7

2.10.2 Pique Fabric:

Single cross tuck is a knit tuck single jersey structure. So, one set of needles is used to supply this shape. The repeat of the shape completes on courses. Knitting series for a repeat as follows:

• First direction: Knit on all unusual range needles and tuck on all even range needles.

• Second direction: It is contrary to the primary direction tuck on all unusual range needles and knit on all even range needles



Notation Diagram of Pique Fabric

Figure 8

2.10.3 Terry Fabric:

It can be tuck-knit or pass-over knit or knit-tuck-pass over a single jersey structure, so one set of needles is used to supply this structure. The prominence of the layout seems at the returned aspect of the material. The predominant functions of this shape are that the diagonal line (twill

line) seems at the material floor like as woven twill material. The repeat of the shape completes on numerous courses. The following figures display the face aspect and bottom of the shape:

Face Side and Back Side of Terry Fabric

Figure 9

2.10.4. Double Weft Knit:

Double weft knitting is produced with the usage of units of needles, with the second set or mattress of needles placed on the proper perspective to every other set of needles in machines. V-mattress machines are one of the accurate examples of offering needle beds. The double-knit material may be made with one or greater sets of yarns and the association of the needles withinside the gait of the system in knitting.

Double knit material can beautify the thickness of the material and create distinctive textural impact with any mixture of the 4 stitches-knit, tuck, pass over, and purl because it has very excessive dimensional balance evaluating with unmarried weft knit. Even just like the woven denim, a double weft knit may be made.

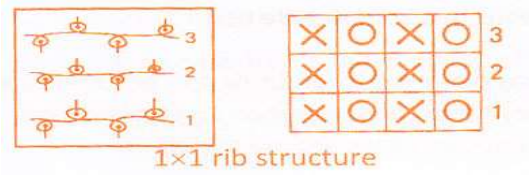
2.10.5 The Rib structure or Rib Fabric:

Rib additionally referred to as "Double-knit" is the second one own circle of relatives of knit structures. Rib calls for units of needles working in among every different so that wales of face stitches and wales of returned stitches are knitted on every aspect of the material rib fabric are knitted on machines with units of needles those needles are organized in the sort of manner as to permit them to intermesh while raised and this needle association is referred to as rib gaiting flat machines with units of needles organized on this manner are normally referred to as “V” beds due to the fact from the aspect they appear to be an inverted “V” The needle beds are referred to

as the front and the returned beds Circular machines with units of needles have a dial and cylinder the cylinder needles are organized vertically spherical the system. The best rib shape is the 1x1rib. To knit this shape all of the needles in each needle bed are lively the association of the needles every located in among from the other mattress and a sequential motion make sure that the loops are produced alternately one toward the front and one toward the returned while each 1/3 needle is inactive and is located among lively needles on the other mattress the 2x2 rib material is fashioned the overall traits the rib shape own circle of relatives are as follows:

A. Appearance:

The same look in each facet of the ribbed cloth each facet of the cloth will display face loops for the reason that cloth is produced at the needles of each needle beds taken off the needles the cloth contracts right now in a widthwise path the rear or lower back loops that can generally see among the front wales while the cloth is prolonged can be hidden the cloth looks like it's far made simplest of face loops on each facet, for this reason, such names as proper/proper double face or double knit every wale withinside the cloth is uniform i.e. fabricated from an unmarried form of loop both face or opposite on every facet of the cloth there is face and opposite wales, the association is the change in 1x1rib and specific in numerous different rib systems. The cloth typically being symmetrical on each facet isn't always subjected to unbalanced stresses. It is likewise called unmarried jersey that's finished with the aid of using on an unmarried set of needle mattresses withinside the gadget, i.e. all needles knitting often in every path inside one needle mattress. (Raz 1991:38) It is the only shape in weft knitting with clean, lighter, and much less texture than different knit. In addition, it without problems reasons curling withinside the lengthwise edges of the lower back at the same time as stretch due to the low extensibility.



Notation Diagram of 1×1 Rib Fabric Structure

Figure 10

Figure Face side of 1×1 Rib Backside of 1×1 Rib

Figure 11

B. Weight and Thickness:

Rib systems are bulkier and heavier than simple knit systems fabricated from a comparable yarn thickness on machines of a comparable gauge. The width of a 1x1 rib cloth is about 1/2 of the width of a simple sew cloth while knitted with the equal duration of yarn withinside the loop and the equal range of loops in a path. On the opposite hand, the thickness, weight, and extensibility of the rib Structure are about two times that of the corresponding simple cloth. After l casting off from the gadget, a 1x1 rib cloth shrinks in width so that the front loops cowl the lower back ones. This phenomenon is observed with the aid of using a thickness Increase to about two times that of a simple knit cloth.

2.10.5 End-users of Rib Structures:

A wide variety of uses, waistbands, cuffs, and collars are normal applications collectively with entire clothes of a becoming nature. Rib fabrics are used in which quantities of clothes are anticipated to hold to the form of the human shape and but be able to stretch while required. Cotton rib-knitted cloth, the backside of the sweater, skirt belt, numerous forms of fancy borders, beneath Neath wears, sweaters, etc.

2.10.6 Purl Knits:

Purl knit is produced with needle beds and double hooked needles, containing each face and reserve loops. The semi-circle look may be proven at the technical lower back Purl has the maximum variant on growing thrilling 2D texture effects, with the aid of using devising

shape front and back loops decided on at every path to knit. The cloth has excessive extensibility in duration and is additionally wealthy withinside the x texture one very facet.

Purl Stitch & Purl Knit Fabric

Figure 12

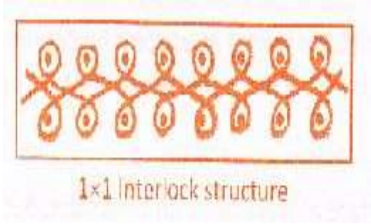
2.10.7 Interlock Knits:

Interlock is some other 1x1 rib variation shape that's produced on particularly designed machines. These machines own units of needles (brief and lengthy needles) in each cylinder and dial and as minimum feeders. For ordinary interlock, the needles in each cylinder and dial are organized to be alternately lengthy and brief, and on the peculiar feeders the lengthy needles are decided on to knit and on the even feeders, the quick needles are decided on to knit. At every feeder, a 1x1 rib systems knitted at adjoining feeders interlace every different and shape a double 1x1 rib cloth. So, interlock cloth is produced with the aid of using 1x1 rib shape interlace to every different.

Interlock has the technical side of the smooth fabric on each facet, but its clean bottom cannot be stretched to expose the opposite stitch loop straps as the straps on each side are exactly the opposite of all different and are blocked together.

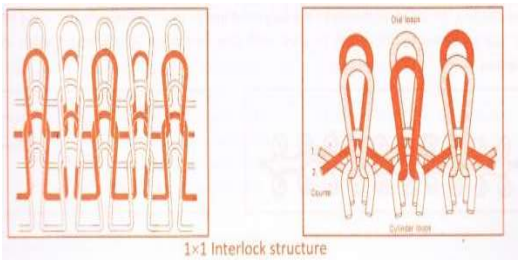
Basic Interlock l5 is a balanced, clean, and solid shape that lies flat without puckering. as 1> yet; 1 elastic, now it no longer detaches from the anchorage point that was first woven but is much thicker, heavier, and narrower than a spring. of equal strength and requires a finer, better, and more expensive wire. In addition, it has sufficient healing properties.

When special-colored yarns are used, horizontal stripes appear when the same shade of color is woven on successive feeders and vertical stripes that particular feeders knit in one color or even knit the feeders in the opposite color. the mesh size of the device in needles according to the inch notation of the interlocking systems: 1x1 interlocking form



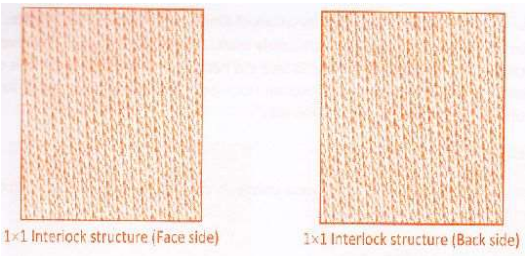
Notation diagram for Interlock Fabric

Figure 13



Front Loop diagram of Interlock fabric

Figure 14



Interlock Fabric Structure (Face side and backside)

Figure 15

2.11 Machines of Knits:

Talking approximately the easy knitting machines, hand-propelled and control fashions is probably discussed. The fashions are unmarried mattress and V-mattress knitting machines. Circular knitting machines, digital flat knitting machines and deform knitting machines are labeled as power-pushed machines which might be completely routinely controlled.

2.11.1 Weft Knitting Machines:

It is referred to as a completely-style machine. Knitting generation can also additionally affect the traits of the material while the floor treatment. The material has a decrease degree of elasticity and is frequently run-resistant in weft knits.

There are 3 forms of round machines, unmarried mattress knitting machines for the easy systems the sort of unmarried jersey or restrained color jersey. Double-mattress knitting machines, equipping with a multi-color choice machine for growing non-stop material, and interlocking knitting machines are one of the important classes of round double-mattress machines.

2.12 Quality of Fabric:

Quality is very important in all types of fabrics and textiles, there are some important points

2.12.1 Quality of Knitted Fabrics Depends on:

- Strength and extensibility
- Course density
- Wales density
- Lop length
- Elasticity
- Deformation
- Grams per square meter (G.S.M)

- Yarn count.
- Design.

2.12.2 Quality Control System:

There are two types of quality control systems. They are-

- Online quality control system.
- Offline quality control system.

2.12.2.1 On-Line Quality Control System:

This type of handling is achieved without hindering the production technology. During the production technology inspection, a facility acts mechanically and detects the error, and takes additional corrective measures...

Raw material control, because a great product depends on excellent raw material, so we should be supplied with the raw material of excellent quality at a reasonable price. The fabric must be perfect, with correct absorbency, whiteness as in step with the requirement of the following technique. The gray inspection log provides information about the raw material status.

2.12.2.2 Off-Line Quality Control System:

Performed withinside the laboratory and different manufacturing regions with the aid of using preventing the manufacturing technique which includes cloth inspection and laboratory and different take a look at. Correction steps are taken in line with the take a look at the result.

- Off-Line Tests.
- Physical Test.
- Chemical Test.

1. Off-Line Tests:

All the Off-Line tests for finished fabrics can be grouped as follows:

2. Physical Tests:

There are many types of physical tests. They are-

1. GSM measurement
2. Shrinkage
3. Spirality
4. Tensile strength
5. Abrasion resistance
6. Pilling resistance
7. Crease resistance
8. Bursting strength

3. Chemical Tests:

There are many types of chemical tests. They are-

1. Color Fastness to wash
2. Color Fastness to light
3. Color Fastness to perspiration
4. Fiber analysis

CHAPTER 03

Literature Survey

3.1 Methodology

3.1.1 Overarching Quality and Control:

Textile's manufacture is one of the oldest industries on the planet. The earliest known textiles are scraps of linen fabric discovered inside Egyptians tunnels circa five thousand B.C. Until the first 1500s, textiles manufacturing was a closed business in the Western world, when the primary factories were created. As early as the Zhou Dynasty, Asia, particularly China, began to centralize and standardize textile production. Fabrics made of silk and cotton had highly strict criteria and rules. One dynasty law said, "Cottons and silks whose grade and dimensions do not meet the specifications are still not permitted to be put on the market.

Tusshar ("showing of fabric"), an initial quality assurance rule for the western textile trade, dating back to the 14th century in Germany. Expert inspectors and an equivalent combination number of members of the council were present throughout the manufacturing process, beginning with the inspection of warps on the loom. No cloth might be supplied except it had been manufactured within these tight guidelines.

Knitting is an important aspect of the textile production process, either for its significant impact on overall conversion rates and for its impact on final quality of products, specifically the number of flaws per piece. The most significant and costly operation is circular knitting.

Quality is a term that refers to a certain level of excellence, the nature of that's decided by the causes behind the product's popularity. The most crucial aspect of a product that meets or exceeds the customer's expectations is its quality. Quality is defined as a set of features or properties that enable a product to be used.

The American Association for Internal Control defines quality as a scientific effort to attain perfection (cost reduction, productivity, teamwork, scheduled performance, the bottom-line customer satisfaction, sales). The phrase "suitability for use" effectively expresses it. It can also be stated as conformity to specifications from the maker's perspective.

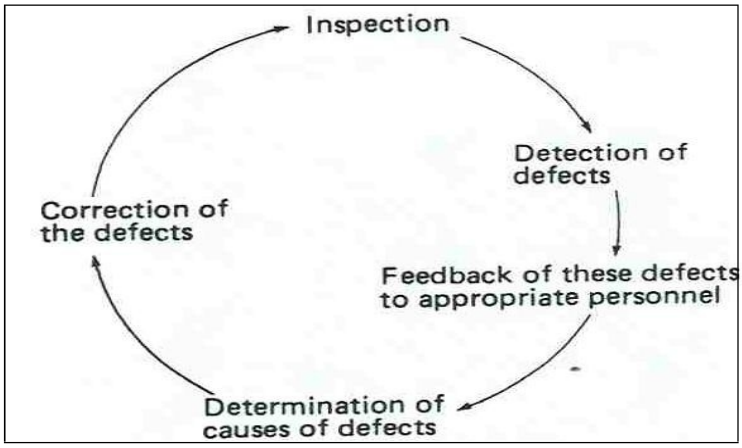
Quality control is one of the terms used to describe the processes involved in quality planning and scheduling. Quality control is often referred to as statistical quality control or comprehensive quality control, and they all serve the same objective. Quality assurance, by any name, is a multi-step regulation method that follows a systematic process.

- Establishes standards relevant to the company's quality objectives
- Presents the results of the analysis and, if necessary, suggests and implements corrective actions
- Analyzes the significance of departures from these criteria using statistical methods.
- Presents the results of the analysis and, if necessary, suggests and implements corrective actions. At the end of the day, top management is responsible for the fabric quality produced in a facility.

Quality in the textile industry, as in most other manufacturing industries, was attained through final inspection of finished goods for many centuries. This last evaluation was commonly used to give numerous quality levels to products, which were then sold at different prices. Raw materials and production procedures were gradually inspected and controlled by manufacturers.

3.1.2 Inspection:

The study or evaluation of raw materials (like as buttons, sewing threads, fabric, zipper, trims etc.) and partially. garment components, and fully finished garments in regards to some specifications, standards & requirements, along with evaluating the garments to see those who meets those standards, specifications, or requirements produced garments is known as inspection in the apparel industry. The idea behind inspection is to find problems early, the communication of that report to the relevant persons, and the assessment of the cause, which leads to the problem being corrected.The primary goal of inspection is to find flaws and non-conformances as soon as possible in the production line, saving money and time long run by either writing off faulty or correcting the damage cloths. The entire inspection loops, as indicated in Fig, should be performed for inspection to be effective.



Inspection Loop

Figure 16

3.1.2.1 Fabric Inspection:

Fabric inspection systems are as follows:

1. Four Point (4-point) system
2. Ten Point (10- point) system
3. Graniteville "78" system

4-Point System:

For fabric quality checking, the four-point system is commonly used in the apparel sector. To utilize this system, you must understand the following information.

- Method or preparation for fabric examination
- Criteria for awarding penalty points based on the number of defects and the length of the defects.
- Method for calculating total penalty points for total flaws discovered in a fabric roll or thin
- A data-recording check sheet or type

Table 1 Criteria for Awarding 4-Point System Penalty Points

The penalty evaluation points for various lengths of fabric defect and hole dimensions are listed in the table below.

Defect's size	Penalty points
Up to 3"	1
From more than 3" to 6"	2
From more than 6" to 9"	3
More than 9"	4

Holes and opening size	Penalty points
Up to 1"	2
More than 1"	4

Total Points Per Yard Calculation:

Fabric quality is measured in unit points per 100 square yards in a four-point system.

(Total points in roll * 36 * 100)/ (Fabric length in yards* Fabric width in inches) = points / 100 sq. yd.

Fabric rolls with 40 points per 100 square yard are usually acceptable.

For example, a 120-yard-long, 46-inch-wide fabric roll has the following flaws.

5 defects up to 3 inch length	5 x 1	5 points
2 defects from 3 to 6 inch length	2 x 2	4 points
3 defects from 6 to 9 inch length	3 x 3	9 points
2 defect over 9 inch length	2 x 4	8 points
1 hole over 1 inch	1 x 4	4 points
Total defect points		30 Points
Therefore, Points/ 100 sq. yards	= (30 x 3600) /(120 x 46) = 19.56 points	

Since the acceptance criteria are 40 points/100yd square, then this roll is acceptable.

3.1.3 Quality Control Tools:

Statistical literacy is required in production contexts that use modern quality control methodologies. The quality control instruments employed there are known as the seven quality control tools. These are some of them: Statistical literacy is required in production contexts that use modern quality control methodologies. The seven quality control tools are the quality control equipment used there. Examples include a check sheet, Pareto chart, Flow chart, Cause and Effect Diagram, Histogram, Scatter Diagram, and Control Chart.

A check sheet's purpose is to provide information in a graphical, productive way A basic list of items can be used to do this. In some cases, however, the check sheet's utility might be considerably increased by including a representation of the system under investigation.

3.1.3.1 Counts Pareto:

You'll need to do a counts Pareto diagram with this kind of Pareto chart to figure out which group occurs a most often. To make a Pareto chart, you'll have to understand the group or how often each one occurred.

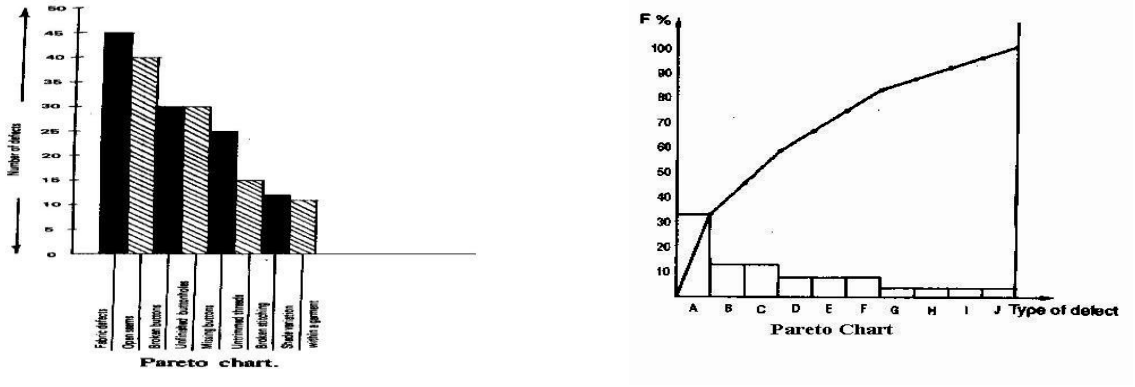
When you can answer "yes" to both of these questions, use a Pareto diagram.

1. Is it possible to categorize data?

2. How significant is the sequence in which each category appears?

Despite its simplicity, Pareto analysis is one of the most effective problem-solving strategies for improvements.

Pareto graphs are particularly valuable since they may be used to discover the components which have the biggest cumulative effect on the system, allowing you to filter out the less important factors from your study. This, in theory, helps the user to concentrate on a few key aspects of a procedure (Figure 3.1.4.1)



Pareto graph

Figure 17

3.2 Fabric Faults, Causes, and Remedies:

3.2.1 Defects in the Knitted Fabrics:

1. Drop stitch:

Drop stitch

Figure 18

Causes: High Yarn, Tension Yarn Overload or Underfeed, High Texture, The erroneous crevice between the dial and barrel rings.

Remedies: Ensure uniform yarn weight on all of the feeders, with a pressure meter. The rate of yarn nourish ought to be through and through directed. The surface chamber ought to be much identical to a completely amplified inflatable, not tight or pointlessly slack. The yarn being utilized, ought to have no flaws, like; Good-for-nothings, Rests and huge bunches, etc.

2. Snarls:

Snarls

Figure 19

Causes: High, bend within the yarn.Yarns are fragile bowed. Tall, turn within the yarn, is the reason for growling.

Remedies: Ensure utilizing the Yarns, of the proposed T.P.M. in a way of speaking.The yarn features a sensible bend, in case it doesn't will when all is said in done pivot or turn, like a snarl.

3. Contamination:

Contamination

Figure 20

Causes: The closeness of dead strands and other inaccessible materials, for occurrence, shaded strands, husk and planned strands, etc. Dead strands do not get shading within the middle of dyeing. Presence of the exterior materials, within the staple fiber mixing.

Remedies: Use rich fiber blending for the yarns. Rigid control measures within the Blow Room

4. Spirally:

Spirally

Figure 21

Causes: Use wealthy fiber blending for the yarns, Rigid control measures within the Blow Room, Segregate the Turning and Weaving Machines, with Plastic Window ornaments or Mosquito Nets, to keep the strands flying from the neighboring machines, from getting presented within the yarn/surface

Remedies: Use the Hosiery yarns of the suggested TPM level for Knitting**.** Fabric control or the take down strain. Ensure the uniform rate of the bolster of the shaded surface, on both the edges, whereas strengthening the surface to the Calendar, Compactor, or Stented machines.

5. Needle Line:

Needle Line

Figure 22

Cause: Bent Hooks, Needle Snares, and Needle stems **.**Tight Needles within the areas **.**Wrong Needle confirmation

Remedies: Replace all the missing needles having, bowed bolts, catches, or stems. Remove the filaments assembled within, the Needle traps (grooves). Replace any curved Needles, running tight within the devices. Check the Needle filling gathering within the Cylinder/Dial grooves (traps).

6. Sinker Line:

Sinker Line

Figure 23

Causes: Sinkers being tight within, the Sinker Ring grooves.

Remedies: Replace, all the depleted or bowed sinkers, causing Sinker lines within the texture. Remove the fibers, ceasing up the Sinker traps (Grooves).

7. Oil line:

Oil line

Figure 24

Causes: Fibers and cushions are collected within the needle traps, which stay sprinkled with oil. Excessive oiling of the needle beds.

Remedies: Fibers, amassed within the needle traps, cause the oil to douse the Fabric.Some lubing up oils isn't washable and can't be removed within the middle of Scouring. Clean the scores of the Barrel and Dial of the machine out and out, with oil.

8. Pilling:

Pilling

Figure 25

Causes: Abrasion due to the contact with unforgiving surfaces. Excessive surface delicacy.

Remedies: Control shrinkage. Need sharp surfaces. Maintain a key remove from kept reprocessing of the surfaces.

9. Shade Variation:

Shade Variation.

Figure 26

Causes: Different fiber combining. Causes like time, temperature, speed of surface roller, etc.

Remedies: Ensure the dim texture**.** Ensure the same prepared parameter like width, length.

10. Pin Hole Damage:

Pin Hole

Figure 27

Causes: Oxidization of weaving oil. Presence of sharp metallic part. Presence of overpowering metal particles in peroxide shower

Remedies: Check the machine parts. Provide an attractive filter in water.

11. Crease Mark:

Crease Mark

Figure 28

Remedies: An Anti-creasing operator can ensure a wrinkle stamp.

12. Dye Spot:

Dye Spot

Figure 29

Causes: Color shower hardness. Not unsettling influence of dyestuff.

Remedies: Use palatable whole sequestrate. Legitimate unsettling.

13. Dead Cotton Dye:

Dead Cotton Dye

Figure 30

Causes: Absorption amid the process. Poor quality cotton used.

Remedies: Use great quality cotton. Reduce retention time.

14. Lycra Burn:

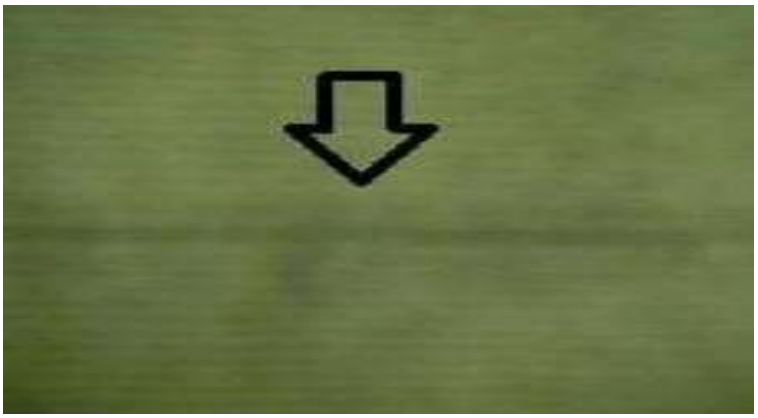
Lycra Burn

Figure 31

Causes: Overflow warmth on the surface during hit sitting. Incorrect speed.

Remedies: Provide redress temperature in setter m/c. To keep redress speed of setter m/c.

15. Lycra Out:



Lycra out

Figure 32

Causes: Fail to capture the Lycra yarn by a needle. Lycra yarn breakage. Faulty auto halt motion

Remedies: Ensure the nourish of Lycra yarn to each needle. Auto halt movement ought to work properly.

16. Dust:

Dust

Figure 33

Causes: Due to messy completing floor. Unclean the trolley of completing the floor. Due to unclean m/c surface. Drop the walk-in whereas texture.

Remedies: To clean the completing floor. Clean the trolley of completing the floor. To clean the m/c surface

17. Slub:

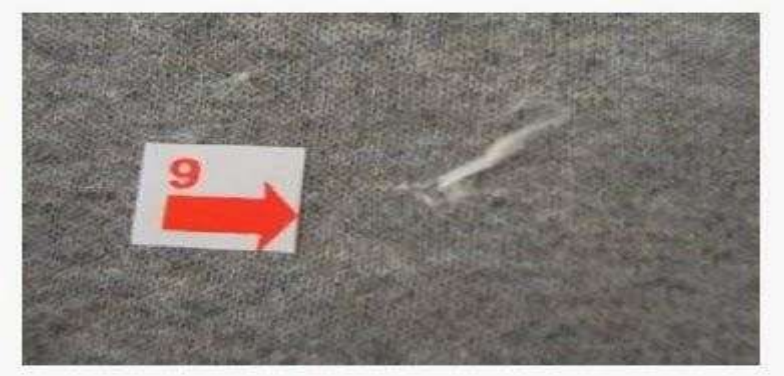
Slub

Figure 34

Causes: Usually caused by a thick or overpowering spot in yarn.

Remedies: Use great quality yarn.

18. Lycra Drop:



Lycra Drop

Figure 35

Causes: A low strain of Lycra yarn.

Remedies: Ensure the bolster of Lycra yarn to each needle. The pressure of Lycra yarn has to be uniform.

19. Needle Break:

Needle Break

Figure 36

Causes: High yarn tension. The bad setting of the yarn feeders.

Remedies: Ensure uniform & the correct yarn pressure on all the feeders. Keep the suggested hole between the yarn feeders and the needles. Periodically alter the total set of needles.

CHAPTER 4:

RESULT & DISCUSSION

In this chapter includes the dynamic examination and the talk of the comes approximately of the four fundamental absconds indicated. Typically radiated from prioritizing four of them out of the eleven overwhelming imperfection.The step taken after is depicted here in underneath:

4.1 Month to month Dismissal Rate and Their Recurrence:

The company recorded information are summarized and the dismissal rate at the side their person repeat is figure out and arranged here bellow:

Table 2 Month to Month Dismissal Rate with Their Deformity Frequency

MONTH	Dismissal Rate (%)	Deformity Types with Their Recurrence %										
		Needle Line	Lycra Jump	Hole	Sinker Mark	Yarn Variatio	Drop Stitch	Oil Stain	Contamination	Latch Mark	Slub	Lots Variation
February	4.58	15	30	13	18	5	5	7	7	0	0	0
March	4.05	17	27	11	21	8	3	6	6	1	0	0
April	7.7	35	1	15	26	6	6	4	5	0	0	0
May	22	39	35	6	8	8	3	0	2	1	1	0
June	3	37	18	13	16	3	4	2	2	0	0	2
July	5	19	18	17	22	2	14	1	4	1	1	1
Total	47.24	162	129	75	111	32	36	20	26	3	2	4
AVE-RAGE	**7.87**	**27.00**	**21.50**	**12.50**	**18.50**	**5.33**	**6.00**	**3.33**	**4.33**	**0.50**	**0.33**	**0.67**

The 6 months quality expulsion rate of the zone, based on the information from the office, were characterized objective and come nearly interior the taking after comes about and this result is depicted in table 4.1.2 underneath.

Table 3 Summarized Month to month Quality Dismissal rate and Era Report

S.No.	Months	Rejection Rate in %	Rejected Fabric in KG	Production in KG
1	February	5.58	4788.7	104,537
2	March	5.06	4536	111710
3	April	7.6	4747.6	71919
4	May	15	18575	77394
5	June	3	1502.5	75075
6	July	5	5204.4	86725
	Total	41.24	39354.2	527360
	Average	**6.87**	**6559.03**	**87893.3**

Agreeing to table 4.1.2, the rate of dismissal is uncovered in rate and in KG and this clearly appears there is a misfortune and this misfortune is fiscally communicated here underneath.

Dismissal rate in value:

Concurring to the fund report, the normal offering for to begin with review is 61 birr per kg though the second-grade texture has been sold for 41.3 birr per kg which is reduced by 21.7 (61- 41.3=19.7) birr per each kg of texture hence its esteem has decreased by 34%.

Based on the costing framework employed:

- Input fabric (yarn)=60 birr per kg
- Labor & FOH=4 birr per kg

After the compilation of 6 months quality and generation reports, the normal month to month dismissal rate is 6.87 % and generation is 87,893.3 kg.

- Average month to month production=87,893.3 kg.
- Average month to month dismissal rate=6.87%
- Rejected fabrics=87,893.3 kg. * 6.87%=6559.03 kg
- Cost brought about due to rejected fabric = loss in cost *Quantity of rejected fabrics=19.7 * 6559.03 = 129212.89 birr.

In this manner, the company is causing 129212.89 birr per month since of moment review texture. Note that a normal item sort (plain single shirt 150 GSM) and the input sort (yarn Ne=28/1) is utilized in this case.

Again, the surrenders within the locale have been figured out and summarized on unbelievable organize as takes after that table 4.2.1. That result is orchestrated in their unequivocal arrange in climbing way, from more chosen to the smallest sincere moderately.

4.2 List of Fabric Deformity Types

Table 4 Summarized Forsakes with Their Repeat

Source: [Company's Monthly QC report]

S/N	Name of The Faults	Recurrence (Event)	Total %
1	Yarn Variation	161	26
2	Oil Stain	130	22.60
3	Needle line	112	19.40
4	Fabric Hole	74	11.50
5	Spandex Jump	35	5.10
6	Latch mark	33	5.34
7	Sinker Mark	27	4.32
8	Contamination	19	4.33
9	Slub	5	0.66
10	Lot variation	2	0.51
11	Drop Stitch	3	0.32
Total		**600**	**100**

4.3 Causes for the Basic Absconds:

The basic four abandons are distinguished and appeared here underneath as per their earnest arrange & arranged on Table 4.4 underneath. This earnest arranges of the absconds isn't just checked by the information of the company but moreover coordinate perception and enrolling the particular information has been made and cross checked for understanding. And this uncovered that they are of the same unequivocal organize as showed up here underneath.

Table 5 Rank of Faults with Their Recurrence

S/No.	Name of The Faults	The Watched Recurrence of Faults	Recurrence (%)
1	Fabric Hole	267	28
2	Needleline	192	25
3	YarnVariety	70	23
4	SpandexJump	51	9
Total		**580**	**85**

The previously specified basic absconds are the point of the examination here after and they yarn variety are portrayed as takes after with individual causes. Each deformity is additionally sorted out based on the preeminent chosen ones are considered.

1.Needle Line Fault:

It can be a fault when a needle breaks down or needle catch turns at that point a vertical string out check comes along the fabrics.

Table 6 List of Faults for Needle Line

S.No.	Name of The Faults	Recurrence	Recurrence (%)
1	Doubleyarn	50	23
2	Machinedust	44	19
3	Badlyknot	42	19
4	Highyarntension	30	13
5	Brokenneedlelatch	13	7
6	Snarledyarn	10	4
7	Poormaintenance	9	5
8	Thickyarn	6	2
9	Loose yarntension	8	4
10	worn-outneedles	4	1
11	Twod/tneedlegauge	5	3
12	worn-outsinkers	3	1
	Total	**226**	**100**

Table 7 The Critical Faults of Needle Line

S.No.	Name of The Faults	Recurrence	Recurrence (%)
1	DoubleYarn	50	23
2	MachineDust	44	19
3	HighYarnPressure	42	20
4	Severely Knot	34	13
	Total	**170**	**75**

At the fundamental time of meet, 12 conceivable causes (table 4.5) were recognized with the help of assemble exchange and a check sheet organize was in expansion scattered for 20 working days to sort out the essential compelling causes of the misshaping. In few days, 230 needle line absconds were watched within the middle of that period and computed 170(75%) of the twisting was caused by the 4 fundamental causes as recorded in table 4.3.4.

2. Hole Defect:

It could be a fault when a yarn breaks or jumps in the midst of circle course of action at that point it gives an impression of tear or cut on the fabric.

Table 8 List of the Causes for Hole

S.No.	Name of the Faults	Recurrence (%)	Recurrence
1	MachineDust	17.7	34.1
2	BadKnotting	18.3	29.5
3	ClutchBearing	13	25.1
4	DoubleYarn	10.2	26.5
5	HighYarnPressure	11	15.4
6	LooseYarnPressure	7.5	20
7	WrongSettingforYarn Feeder	5	7.7
8	RoughCeramicforYarn Guide	6	8.9
9	Take-DownTension (High&Loose)	2.2	4.5
10	ContaminatedYarn	2	4.2
11	ThickYarn	1.9	3.6
12	BentNeedleLatch	1.4	2.8
13	Worn-OutNeedles	1.3	2.6
14	WrongSettingofKnob Scale	1.3	2.4
15	Thin Yarn	1.2	2.1
16	PoorMaintenance	1.0	2.0
17	Mixingof Two	0.8	1.7
18	Worn-outSinkers	0.8	1.5
19	CrackedCONIPipe	0.9	1.3

20	Twod/tNeedleGauges	0.5	1.1
21	Impropercreepingofyarn	0.5	1.1
	Total	**108**	**198**

Table 9 The Basic Causes of Hole

S.No.	Name of The Faults	Recurrence (%)	Recurrence
1	BadKnotting	18.7	33.0
2	DoubleYarn	16.3	30.6
3	MachineDust	14.1	26.0
4	HighYarnTension	11.6	22.7
5	DamageofCONI+clutchbearing	12.6	20.2
6	Loose YarnPressure	10.7	20.1
	Total	**83**	**153**

A count sheet was conducted for the 20 days, and in that time 193 crevice surrenders were observed and out of which the 183 surrenders were come around from the over 6 causes and they cover 83% hence the company got to address these causes so as to play down the event of this twisting by around 80%.

3. Lycra Jump Causes:

It may be a cause when a spandex yarn breaks or splits at that point a Extend marks unmistakable on fabric surface evenly.

Table 10 List of Causes for Lycra Jump

S.No	Name of The Faults	Recurrence (%)	Recurrence
1	WrongPositioningof Wheel	22	10.5
2	BrokenNeedleHook	16.6	7.7
3	MixingofSpandex&CottonYarns	13	7.1
4	HighorLooseSpandexYarn	12	5.7
5	DirtyGuidingRoller	8.8	4.7
6	PoorQualityofSpandexYarn	8.1	3.6
7	Tension PoorQualityofCottonYarn	3.4	2.3
8	Operator'sHeadisCollidedwithSpandex	5.3	2.3
9	ExpiredSpandex	1.8	1.3
10	Cotton YarnisMisled	3.9	1.5
11	Mixingof 40&20 Deniers	1.6	1.2
12	DoubleSpandex	3.5	1.2
13	MalfunctioningofSensor	1	2.1
	Total	**102**	**51**

Table 11 Causes of Lycra Jump

S.No	Name of The Faults	Recurrence(%)	Recurrence
1	WrongPositioningof LycraWheel	20	10.6
2	BrokenNeedleHook	18.6	7.7
3	PoorQualityofCottonYarn	15	7.1
4	DirtyGuidingRoller	10	5.9
5	PoorQualityofSpandexYarn	8.5	5.9
6	MixingofSpandex&cottonyarns	8.6	3.6
	Total	**80.7**	**40.8**

With the assistance of check sheet and amass discussion, the 6 crucial causes of spandex bounce are recognized out of the 13 causes which are recorded in table 4.3.8

The generation line must address the over basic causes of the deformation, and after that it can minimize the repeat of happening this flaw by approximately 80%

4.Yarn Variety Imperfection:

It is caused by either blending yarns on support into machine or having yarn with more flaw and the surface will show up to have horizontal streaks.

Table 12 List of Causes for Yarn Variation

S.No.	Name of The Faults	Recurrence (%)	Recurrence
1	Mixed Counts	36	24.1
2	DoubleYarn	34	23.4
3	Two Yarns areHeld byOneNeedle	13	9.8
4	Clutch of CONI + is Disengaged	8.6	7.7
5	Thick&ThinPlacesinOneYarn Cone	7.4	5.1
	Total	**99**	**70**

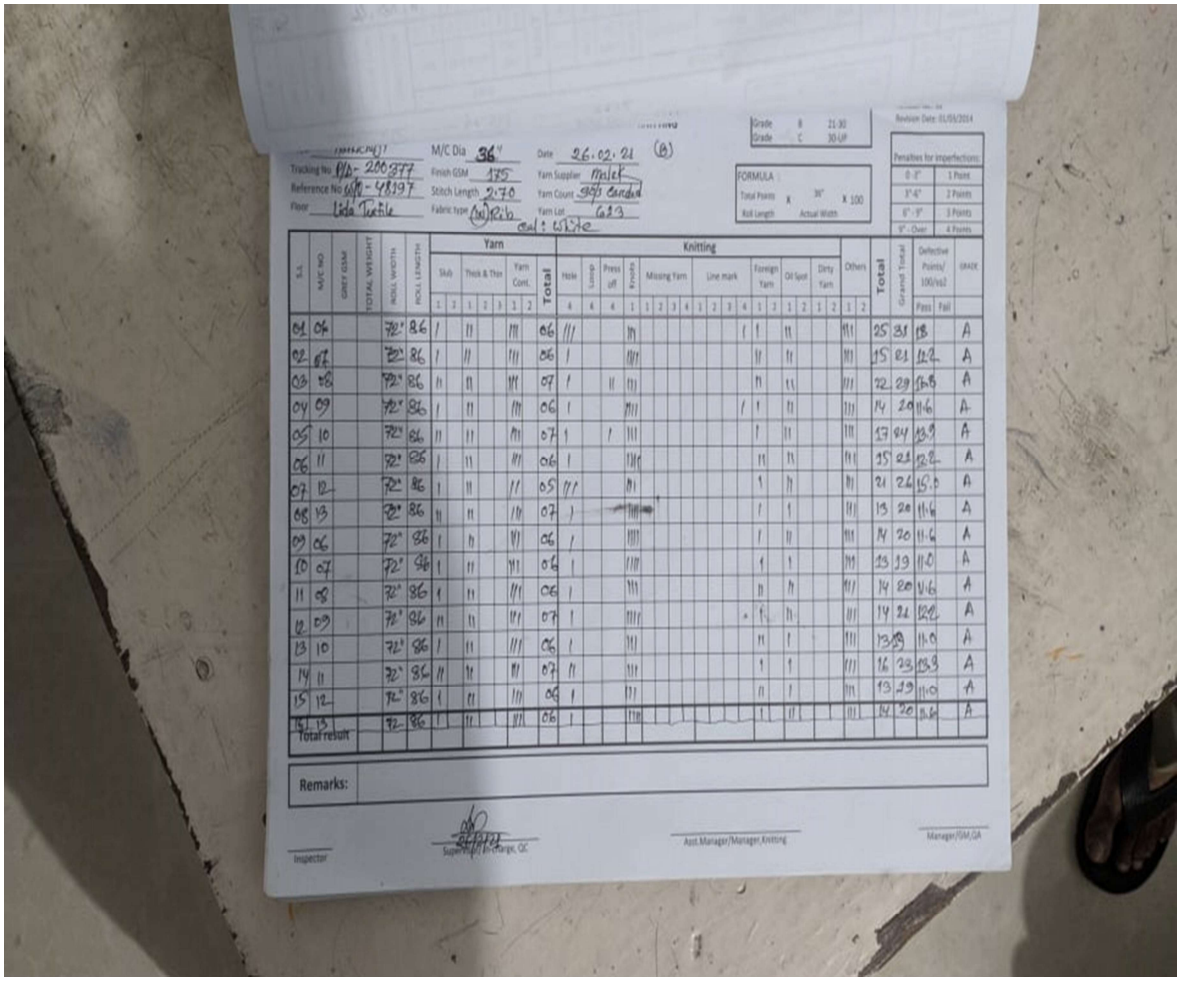
Table 13 Causes of Yarn Variety

S. No.	Name of The Faults	Recurrence (%)	Recurrence
1	Mixed Counts	35	26.1
2	DoubleYarn	35	23.6
3	Thick&thinplaces inone yarncone	14	12.7
	Total	**87**	**62**

At first, conceivable causes of yarn assortment are recognized at that point after the 3 fundamental causes are sort- out by the help of count sheet and bunch talk.As table 4.3.13 shows up the fundamental causes have the weight of 87% (62 forsakes) to happen. It is exceptionally clever to handle these causes so as to decrease the imperfection by almost 81%.

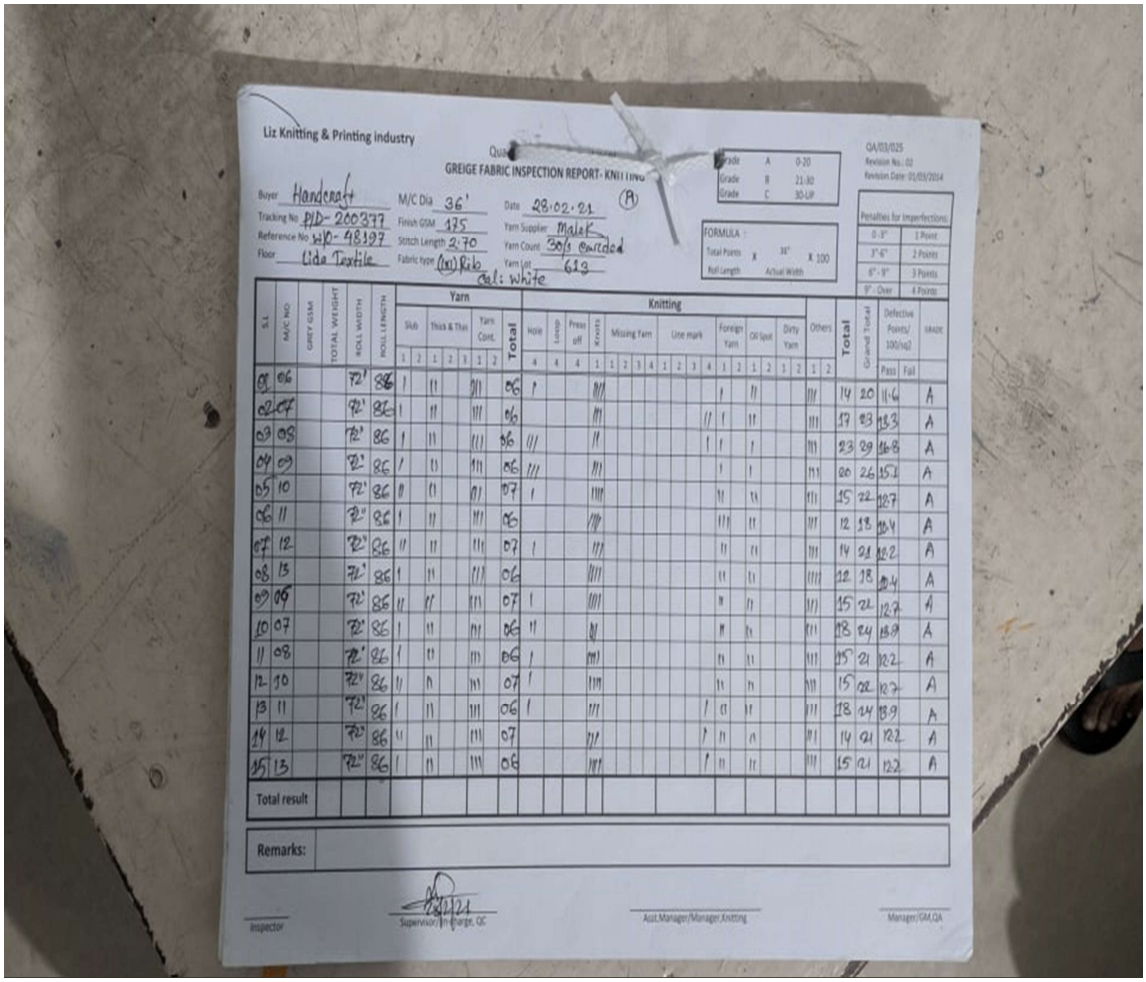
The twofold yarn incorporates a repeat of 36% which is the overpowering one as compared to the other causes while the thick & lean put of yarn has the recurrence of 14% which is slightest relative to each other. Consequently, dealing with the already specified 36% radiated from twofold yarn inside and out makes strides the occasion of the person abandons said, yarn assortment.

Inspection report of Liz knitting & printing industry:



Inspection report: 1

Figure 37



Inspection report: 02

Figure 38

CHAPTER 5:

CONCLUSION & RECOMMENDATION

5.1 Conclusion:

Based on the result talked about, the ponder found the underneath specified basic focuses on which the arrangement is required.

- According to the examination of the information, the texture dismissal rate was found 7.87% within the section.
- Majority of the dismissal rate comes from surrenders consolidating Needle line, Gap, Yarn variety and Lycra jump.
- The cleaning system they have as of now isn't compelling to decrease the clean within the section.
- The imperfection presence has influenced the company's monetary execution by about 80%.
- The nearness of absconds within the area is unavoidable and due this presence of texture abandons, it has been sold at lower costs, or indeed in a few cases as clothes which makes a colossal misfortune to the company.
- This consider will offer assistance for the area to distinguish the source of identified surrenders causes; in this manner, the dependable substance can take prescribed medicinal activity to overcome the basic defects.

5.2 Recommendations:

This proposition has been carried out on greige sewn texture to make strides its level of quality status.

Currently analyzed information shows that dismissal rate is exceptionally tall when it is assessed with the company's quality target. To make strides its quality of item the ponder centered in diminishing dismissal rate. The production line should address the basic causes of absconds to progress its quality based on the taking after recommendations:

- The plant must center on the basic recognized texture absconds and their particular causes to progress its quality.
- It is prescribed that Standard Operating Procedure (SOP) is used because it is the finest anticipation device to play down deformity rate whereas working generation and it too keeps machine healthy.
- It is critical to have vacuum sucker gear over each sewing machine to have a compelling cleaning system.
- The plant has to screen machine operation, machine cleaning, yarn related blame and yarn capacity to progress quality.