Skill India
कौशल भारत-कुशल भारत

सत्यमेव जयते
GOVERNMENT OF INDIA
MINISTRY OF SKILL DEVELOPMENT
& ENTREPRENEURSHIP

N·S·D·C
RE IMAGINE FUTURE

APPAREL MADE-UPS HOME FURNISHING
SECTOR SKILL COUNCIL

Participant Handbook

Sector
Apparel

Sub-Sector
Apparel, Made-Ups & Home Furnishing

Occupation
Quality Control

Reference ID: **AMH/Q1401, Version 4.0**
NSQF level: 5

QC Executive – Stitched Items

Published by

Apparel, Made-Ups & Home Furnishing Sector Skill Council

Address: Flat No. A-312 to A-323, 3rd Floor, Somdatt Chamber-1,
Bhikaji Cama Place, Africa Avenue, New Delhi-110066

Email: info@sscamh.com

Website: www.sscamh.com

Phone: (+91) 011 - 40160600

This book is sponsored by Apparel, Made-Ups & Home Furnishing Sector Skill Council

Printed in India by AMHSSC

Disclaimer

The information contained herein has been obtained from various reliable sources. Apparel, Made-Ups & Home Furnishing Sector Skill Council disclaims all warranties to the accuracy, completeness or adequacy of such information. Apparel, Made-Ups & Home Furnishing Sector Skill Council shall have no liability for errors, omissions, or inadequacies, in the information contained herein, or for interpretations thereof. Every effort has been made to trace the owners of the copyright material included in the book. The publishers would be grateful for any omissions brought to their notice for acknowledgements in future editions of the book. No entity in Apparel, Made-Ups & Home Furnishing Sector Skill Council shall be responsible for any loss whatsoever, sustained by any person who relies on this material. All pictures shown are for illustration purpose only. The coded boxes in the book called Quick Response Code (QR code) will help to access the e-resources linked to the content. These QR codes are generated from links and YouTube video resources available on Internet for knowledge enhancement on the topic and are not created by AMHSSC. Embedding of the link or QR code in the content should not be assumed endorsement of any kind. Apparel, Made-Ups & Home Furnishing Sector Skill Council is not responsible for the views expressed or content or reliability of linked videos. AMHSSC cannot guarantee that these links/QR codes will work all the time as we do not have control over availability of the linked pages.

> Skill development of the new generation is a national need and is the foundation of Aatmnirbhar Bharat

Shri Narendra Modi
Prime Minister of India

Certificate

COMPLIANCE TO QUALIFICATION PACK – NATIONAL OCCUPATIONAL STANDARDS

is hereby issued by the

APPAREL, MADE-UPS & HOME FURNISHING SECTOR SKILL COUNCIL

for

SKILLING CONTENT: PARTICIPANT HANDBOOK

Complying to National Occupational Standards of

Job Role/ Qualification Pack: **'QC Executive – Stitched Items'**

QP No. **'AMH/Q1401, NSQF Level 5'**

Date of Issuance: **February 18th, 2025**

Valid up to: **February 18th, 2028**

** Valid up to the next review date of the Qualification Pack*

Authorised Signatory
(Apparel, Made-Ups & Home Furnishing Sector Skill Council)

Acknowledgements

Apparel, Made-Ups & Home Furnishing Sector Skill Council would like to express its gratitude to all the individuals and institutions who contributed in different ways towards the preparation of this "Participant Handbook". Without their contribution it could not have been completed. Special thanks are extended to those who collaborated in the preparation of its different modules. Sincere appreciation is also extended to all who provided peer review for these modules.

The preparation of this handbook would not have been possible without the Fashion Industry's support. Industry feedback has been extremely encouraging from inception to conclusion and it is with their input that we have tried to bridge the skill gaps existing today in the industry.

This participant handbook is dedicated to the aspiring youth who desire to achieve special skills which will be a lifelong asset for their future endeavours.

About this book

Welcome to the "QC Executive – Stitched Items" training programme. This PHB is designed to provide participants with comprehensive knowledge about the principles and practices of maintaining security, ensuring vigilance, and safeguarding premises. It also focuses on planning, executing, and managing routine security tasks, conducting inspections, and verifying the integrity of individuals and documents as part of field operations.

This Participant Handbook is designed based on the Qualification Pack (QP) under the National Skill Qualification framework (NSQF) and it comprises of the following National Occupational Standards (NOS)/ topics and additional topics.

1. AMH/N1401: Identify and assess the quality of raw material
2. AMH/N1402: Identify and assess the quality in sewing room
3. AMH/N1403: Identify and assess the quality after finishing of garment
4. AMH/N1404.Coordination with different Departments
5. AMH/N0620: Promote and sustain safety, health, and security in workplace, while fostering Gender and Persons with Disabilities (PWD) Sensitization
6. AMH/N0621: Adhere to industry, regulatory, and organizational standards and embrace environmentally sustainable practices
7. DGT/VSQ/N0102: Employability Skills (60 Hours)

Symbols Used


Key Learning Outcomes


Unit Objectives


Exercise


Tips


Notes


Summary

Table of Contents

Skill India
कौशल भारत-कुशल भारत

सत्यमेव जयते
GOVERNMENT OF INDIA
MINISTRY OF SKILL DEVELOPMENT
& ENTREPRENEURSHIP

N·S·D·C
RE IMAGINE FUTURE

APPAREL MADE-UPS HOME FURNISHING
SECTOR SKILL COUNCIL

1. QC Executive Stitched Items

Unit 1.1 - Apparel Industry Overview and QC Executive Role

Bridge Module

Key Learning Outcomes

By the end of this module, the participants will be able to:

1. Describe the size and scope of the apparel industry.
2. Describe various employment opportunities for a 'QC Executive – Sewing Line' in the apparel industry.
3. Explain the roles and responsibilities of a 'QC Executive – Sewing Line'.
4. Describe the apparel production process and the role that the 'QC Executive – Sewing Line' plays in the process.

UNIT 1.1: Apparel Industry Overview and QC Executive Role

Unit Objectives

By the end of this unit, the participants will be able to:

1. Outline the key sectors and market forces shaping the apparel landscape.
2. Describe the step-by-step production process of apparel.
3. Explain the primary duties and core functions of a QC Executive in the sewing line.
4. Illustrate various job roles and career progression paths in the sewing line quality control.

1.1.1 Overview of the Apparel Industry and Key Market Forces

The apparel manufacturing sector in India is one of the biggest industries in the country. It includes making clothes like shirts, pants, dresses, uniforms, and traditional wear. It also includes items we use at home, such as bed sheets, towels, curtains, cushion covers, and tablecloths. Many factories and small units across India manufacture these garments for both domestic consumption and export to other countries.

This sector provides employment to millions of people, particularly women and workers in rural areas. It includes many types of work such as stitching, cutting, embroidery, ironing, checking, and packing. India is renowned for its skilled workers and exquisite designs, which is why clothing made in India is in high demand worldwide.

The apparel industry in India is growing every year. With an increasing number of people purchasing clothes in India and other countries, there is a growing need for more workers and enhanced skills. New machines, better training, and government support are helping this sector grow fast. It is a strong part of India's economy and offers good job opportunities for skilled workers.

Market Size and Growth:

- **Current Value:** The Indian apparel market size was valued at USD 115.70 billion in 2024. The broader Indian textile and apparel market was valued at USD 222.08 billion in 2024.
- **Projected Growth:** The Indian apparel market is projected to grow to USD 171.60 billion by 2034, exhibiting a compound annual growth rate (CAGR) of 4% from 2025 to 2034.

Source: textileinsights.in

Fig. 1.1.1: Apparel manufacturing unit

India is known around the world for its beautiful embroidery, traditional designs, and skilled work. Because of this, there is a high demand for Indian-made clothes and home products in many countries.

The work in this sector is done by hand and by machines. It requires workers who are careful, skilled, and hard-working. Jobs like those of embroidery machine operators are crucial in maintaining the quality and design of products.

This sector helps many families earn a living and plays an important role in the country's growth.

Key Strengths and Growth Drivers of India's Apparel Industry

India's garment and textile industry is strong and growing fast. Here are the main reasons why:

1. **Plenty of Raw Material**

   India grows a lot of cotton, the highest in the world and is also the top producer of jute and jute products. India is also the second-largest producer of silk. India also produces and exports various types of blended and synthetic yarns.

Fig. 1.1.2: Cotton tree and pre-processed jute plant

2. **Large Domestic Market**

   India has a big population that buys clothes. People in India now have more money to spend and like to wear new styles. This means there is always high demand for new garments in the local market.

3. **Government Support**

   The government is giving help through special schemes like PLI and PM MITRA Parks. These programs help build better factories, support workers, and attract more companies to invest in India.

4. **Strong Export Business**

   India exports clothes and textiles to many countries, including the USA and those in Europe, making it the sixth-largest exporter of textiles and garments in the world.

5. **Use of New Technology**

   Modern machines and computers are now used in many factories. This makes the work faster, better, and more accurate.

Fig. 1.1.3: Advanced garment manufacturing technology

6. **Focus on Sustainability**

   Many companies are now using eco-friendly methods. They are making clothes from organic cotton and trying to reduce waste. This is good for the environment and future generations.

Apparel, Made-Ups and Home Furnishing Sector Skill Council (AMHSSC)

The Apparel, Made-Ups, and Home Furnishing Sector Skill Council (AMHSSC) is an organisation that helps people acquire the necessary skills to work in the clothing and home furnishing industry.

AMHSSC (Apparel, Made-Ups and Home Furnishing Sector Skill Council) plays an important role in helping people learn and grow in the garment and home furnishing industry. It creates special training courses for different jobs such as embroidery machine operators, tailors, pressmen, fashion designers, etc. These courses teach workers how to do their jobs in a safe, fast, and correct way.

AMHSSC also works with factories and companies to understand what kind of workers are needed. This helps ensure that the training aligns with what the industry is looking for. Trained workers can get jobs in factories, export houses, or even start their own small businesses. By learning the right skills, workers can make better-quality products, feel more confident, and earn more money. In this way, AMHSSC connects skilled workers with good job opportunities and supports their future growth.

A National Initiative with NSDC

APPAREL MADE-UPS HOME FURNISHING SECTOR SKILL COUNCIL

Fig. 1.1.4: AMHSSC logo

1.1.2 Apparel Production Process

The garment production process involves several key steps to transform fabric into finished clothing. Trained workers do each step, and one of those key roles is the Embroidery Machine Operator. Here is how a garment is usually made:

- **Step 1. Designing:** First, the fashion designer or company decides what kind of garment they want to make. They create a design on paper or a computer. This includes the style, size, colour, fabric type, and sometimes embroidery patterns.
- **Step 2. Fabric Selection and Sourcing:** The right fabric is chosen based on the design. For example, cotton, silk, polyester, or denim. Then the fabric is purchased or brought to the factory.
- **Step 3. Fabric Inspection:** Before using the fabric, workers check it for any damage, stains, or colour differences. Good quality fabric is approved for use.
- **Step 4. Fabric Spreading:** Large rolls of fabric are spread evenly on long cutting tables. This helps in cutting the fabric properly.
- **Step 5. Cutting:** Patterns are marked on the fabric using chalk or a marker. Then, the fabric is cut into parts like sleeves, collars, front, and back.
- **Step 6. Embroidery (if required):** If the design includes embroidery, the cut fabric pieces are sent to the Embroidery Section.
- **Step 7. Stitching:** After embroidery, all the cut pieces are stitched together using sewing machines. This step forms the complete garment.
- **Step 8. Checking (Quality Control):** Every garment is carefully checked to make sure there are no defects like open stitches, stains, or missing buttons. If needed, small corrections are made.
- **Step 9. Finishing:** The garment is pressed, threads are trimmed, labels are attached, and it is folded properly.
- **Step 10. Packing:** The finished garment is packed in poly bags or boxes, ready for sale or delivery.
- **Step 11. Dispatch:** Finally, the packed garments are sent to shops, warehouses, or directly to customers in India or other countries.

1.1.3 Role, Duties, and Core Functions of a QC Executive – Stitched Items

Who is a Quality Control Executive?

A QC (Quality Control) Executive in the sewing line is a hands-on professional responsible for monitoring and maintaining quality during the stitching phase of apparel production. The stitching process involves multiple operators working on different parts of the garment, which increases the chances of variation and defects.

Core Duties and Responsibilities

In the apparel industry, particularly within garment manufacturing units, the Sewing Line Quality Control (QC) Executive holds a critical position. Their role is not confined to identifying defects — they serve as the gatekeepers of quality, ensuring that every step in the sewing process aligns with buyer expectations, technical specifications, and internal standards.

The QC Executive plays a proactive role in maintaining consistency, precision, and compliance across every garment on the line. Below is a detailed look at their core responsibilities, routine tasks, and the essential skill sets they must possess.

1. **In-Line Inspections:** Real-Time Quality Assurance

   One of the primary duties of a Sewing Line QC Executive is to conduct in-line inspections, which involve checking the garment at various stages of stitching rather than waiting until it is fully assembled.

   Key Actions Involved:

   - Conducting station-wise inspections across sewing operations such as shoulder joining, collar attachment, sleeve setting, etc.
   - Using inspection formats or checklists to monitor the following list:

Fig. Inspection Format

   Purpose:

   - To catch and correct defects early, minimizing rework and preventing defective pieces from progressing through the line.
   - Ensuring that each operator adheres to the approved construction methods and that the production flow maintains uniformity.

   Impact:

   - Saves time and cost by reducing final rejections.
   - Helps maintain line efficiency and production targets without compromising quality.

2. **Defect Prevention and Root Cause Analysis**

   A skilled QC Executive goes beyond simply identifying flaws that they seek to understand and eliminate the source of recurring problems.

   Key Responsibilities:

   - Observing patterns of recurring defects such as broken stitches, skipped stitches, or uneven hems.
   - Using techniques like the 5 Whys, fishbone diagrams, or real-time analysis to uncover root causes — whether it's operator skill, machine malfunction, or raw material inconsistency.
   - Working closely with sewing operators and line supervisors to:
     - Demonstrate the correct technique.
     - Provide immediate, constructive feedback.
     - Reinforce good practices through on-the-spot guidance.

   Escalation Protocol:

   If certain issues persist or exceed acceptable limits, the QC Executive is responsible for escalating the matter to the Quality Manager or Production Head for resolution.

3. **Standard Operating Procedure (SOP) Implementation**

   A consistent, standardized approach to sewing is essential for production efficiency and quality uniformity. The QC Executive plays a key role in enforcing this.

Actions Include:

- Ensuring every operator follows the SOP for each style, including needle type, SPI settings, stitch types, and attachment methods.
- Verifying that construction techniques comply with:
  - Buyer requirements
  - Style-specific guidelines
  - Product safety norms, especially for children's garments
- Updating and maintaining construction reference sheets at the workstation for easy accessibility.

Benefits:

- Reduces variation in workmanship.
- Increases first-pass quality yield.
- Ensures that garments are consistently made to spec, regardless of operator.

4. **Measurement and Specification Checks**

Measurements and fit are among the most critical buyer checkpoints. A garment may look perfect, but if it does not meet the size specifications, it risks total rejection.

QC Executive's Role:

Randomly selecting pieces from the line and verifying:

Fig. 1.1.5: Checklist of pieces

- Using calibrated measuring tools such as measurement tapes, garment measuring forms, and digital calipers when needed.
- Cross-referencing with:
  - Tech packs
  - Spec sheets
  - Approved samples (including fit and PP samples)

Goal:

- To ensure that every piece matches the intended sizing, enhancing customer satisfaction and reducing returns.

5. **Coordination and Communication**

Quality management is not a siloed activity. It requires strong coordination across departments to ensure alignment in production goals and quality expectations.

QC Executive Collaborates with:

- Line supervisors to communicate real-time quality feedback.
- Industrial engineers (IEs) to align on production methods and work aids.

- Finishing and packing teams to flag any sewing-related issues that affect post-sewing processes.
- Merchandisers or QA team to stay updated on buyer-specific instructions or quality alerts.

Communication Tasks Include:

- Explaining buyer-specific checkpoints, such as bar tack positioning or label placement.
- Sharing critical control points (CCPs) that must be carefully monitored.
- Participating in pre-production meetings (PPMs) to align on expectations before bulk sewing begins.

6. **Documentation and Reporting**

Accurate documentation is essential for traceability, performance analysis, and compliance audits. The QC Executive is responsible for maintaining timely and detailed records of all inspection activities.

Reports Maintained:

- **Inline quality logs:** Documenting operator-wise and operation-wise defects.
- **Defect summary reports:** Categorizing defects by type, severity, and frequency.
- **End-line audit reports:** Summarizing the output of fully stitched garments.
- **Daily reports:** Highlighting inspection coverage, line quality scores, and major concerns.

Tools Used:

- Visual management aids such as:
  - Checklists
  - Control charts
  - Pareto analysis
  - Traffic light systems to indicate line performance (green = acceptable, red = action needed)

These reports not only guide internal improvement but also provide data during buyer audits and third-party inspections.

Key Skills Required to Excel as a QC Executive

Being a successful Sewing Line QC Executive demands a unique combination of technical expertise, observation skills, and people management. Below are the essential competencies:

1. **Attention to Detail**
   - The ability to spot even minor inconsistencies in stitching, seams, or finishing is crucial.
2. **Technical Knowledge**
   - Sound understanding of different sewing machines (single needle, overlock, flatlock, etc.).
   - Familiarity with garment construction techniques and stitching methods.
3. **Knowledge of AQL Standards**
   - Awareness of Acceptance Quality Limit (AQL) methods for garment inspection.
   - Understanding sampling techniques and acceptable defect thresholds.

4. **Communication and Interpersonal Skills**
   - Ability to clearly convey feedback to operators and supervisors without demotivating them.
   - Collaborative mind-set to work across departments and production shifts.
- **Problem-Solving Ability**
   - Proactive approach to identify bottlenecks, reduce rework, and improve right-first-time (RFT) ratios.
   - Critical thinking to suggest layout or workflow improvements based on defect trends.

The QC Executive ensures that quality is not an afterthought, but a continuous process ingrained into production.

1.1.4 Job Roles and Career Progression in Sewing Line Quality Control

The sewing line quality department has a structured hierarchy with well-defined roles and responsibilities. Each role builds upon the previous one in terms of technical depth, managerial capacity, and accountability.

Common Job Roles in Sewing Line Quality Control

1. **Inline Quality Checker:** The Inline Quality Checker is typically the first line of defence against defects on the production floor. They are stationed at specific sewing operations and perform basic checks on garments as they are being produced.

   Key Responsibilities:

   - Perform visual inspections of garments during production.
   - Check for defects such as broken stitches, skipped operations, seam puckering, or incorrect attachments.
   - Ensure operators follow style specifications and approved samples.
   - Report defects to the QC Executive or Line Supervisor for corrective actions.
   - Mark defective garments for rework.

   Skills and Qualifications:

   - Generally, an entry-level position suitable for freshers or semi-skilled individuals.
   - Requires basic understanding of garment construction and quality parameters.
   - Training is typically provided on-the-job.

   Importance:

   - Provides immediate quality monitoring during production.
   - Helps reduce accumulation of defects and supports the QC Executive in maintaining line quality.
2. **QC Executive (Sewing Line):** The QC Executive is a mid-level quality professional who oversees a section of the sewing line. They supervise multiple quality checkers, verify complex construction elements, and ensure that garments meet quality standards.

Fig. 1.1.6: Key Responsibilities of QC Executive

Skills and Qualifications:

- Diploma or training in apparel manufacturing, preferably with 2–3 years of experience.
- Proficient in technical specifications, quality standards, and inspection methods.

Importance:

- Acts as a bridge between operations and quality standards.
- Ensures buyer-specific quality parameters are followed across the production line.

3. **Quality Supervisor:** The Quality Supervisor is responsible for a broader section of the production floor. They oversee multiple QC Executives and Inline Checkers and ensure that the entire line performs to quality benchmarks.

Key Responsibilities	Supervise a team of QC Executives and Checkers across several lines.
	Monitor Key Performance Indicators (KPIs) such as Right-First-Time (RFT) rate, Defects per Hundred Units (DHU), and Rework percentage.
	Conduct spot audits and inline inspections.
	Lead corrective action meetings with production and quality staff.
	Escalate major or recurring quality issues to the QA Manager.
	Organize training sessions for quality teams to address common issues.

Fig. 1.1.7: Key Responsibilities of Quality Supervisor

Skills and Qualifications:

- 4–6 years of experience in QC with proven leadership and problem-solving ability.
- Strong knowledge of SOPs, AQL standards, and buyer quality requirements.

Importance:

- Ensures uniformity in quality practices across teams.
- Leads data-driven improvements and fosters a culture of accountability.

4. **Quality Assurance (QA) Manager:** The QA Manager is a senior-level quality professional who oversees the entire quality assurance framework of a production unit, covering all departments including sewing, finishing, and packing.

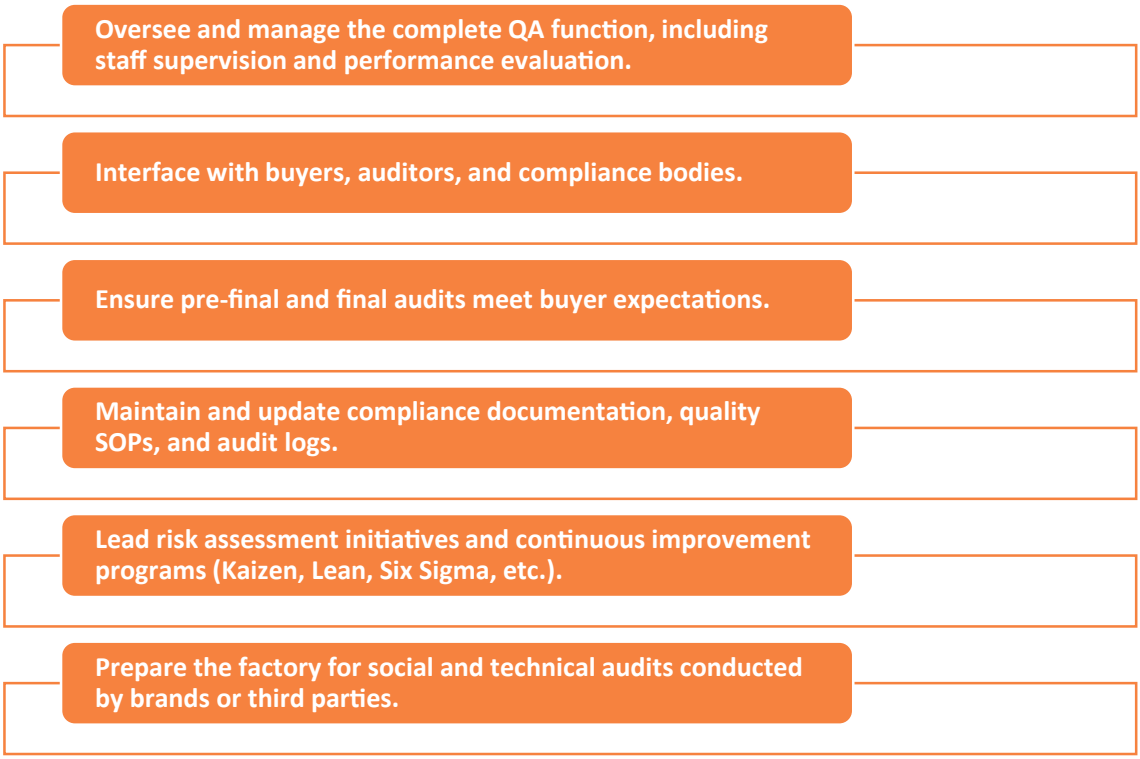


Fig. 1.1.8: Key Responsibilities

Skills and Qualifications:

- Graduate in apparel production or industrial engineering with 8+ years of experience.
- Deep understanding of global standards, ethical compliance, and sustainability norms.
- Effective in leadership, communication, and cross-departmental coordination.

Importance:

- Ensures the factory's reputation for quality and compliance credibility.
- Leads strategic quality planning and drives improvement in factory-wide performance.

5. **Factory Quality Head:** The Factory Quality Head holds the top-most position in the quality structure of a production facility. They define the quality vision and strategy and are responsible for overall quality performance.

Fig. 1.1.9: Key Responsibilities

Skills and Qualifications:

- 10–15 years of industry experience, often with cross-functional exposure.
- Mastery over production systems, buyer requirements, and global textile standards.

Importance:

- Responsible for the factory's brand reputation and business continuity.
- A key contributor to customer satisfaction, retention, and long-term buyer relationships.

6. **Buyer-Side Quality Auditor:** The Buyer-Side Quality Auditor is either an in-house representative of international brands or a third-party agent hired to conduct impartial inspections on behalf of global clients.

Fig. 1.1.10: Key Responsibilities

Skills and Qualifications:

- Apparel production or quality background with 5+ years in inspections.
- Certification in AQL/Audit procedures often required.
- Must be unbiased and detailed in evaluation and reporting.

Importance:

- Acts as the final gatekeeper for product acceptance.
- Helps ensure that only quality-assured products reach the end customer.

Career Progression Path

A career in sewing line quality control can be highly rewarding. With experience and continuous learning, professionals can move up the ladder to leadership roles.

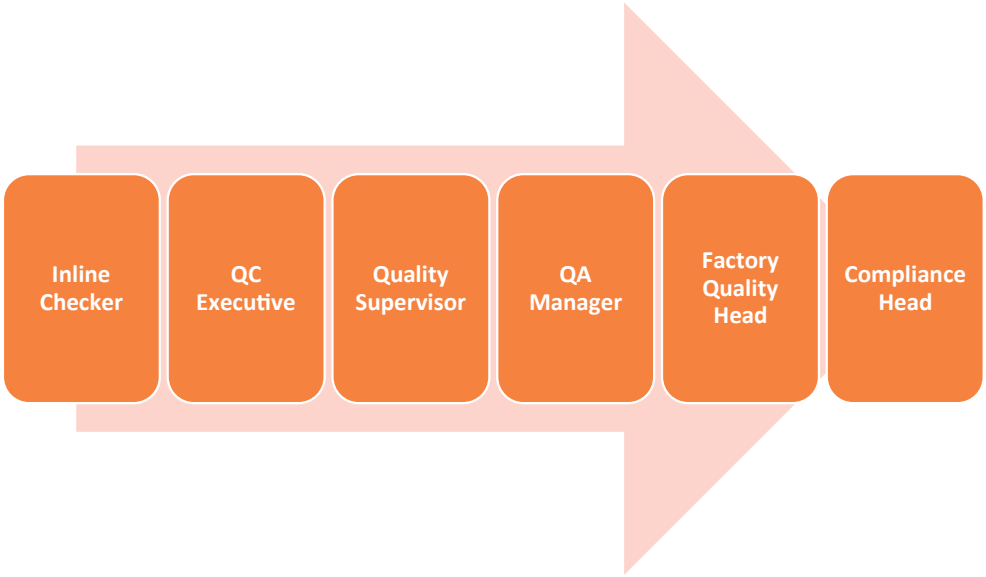


Fig. 1.1.11: Typical Growth Path:

Along the way, professionals may pursue certifications in lean manufacturing, Six Sigma, ISO 9001, or sustainability standards to enhance their credentials and employability.

The apparel industry is vast, vibrant, and constantly evolving. It offers immense career opportunities, especially in the area of quality control, where skilled professionals play a pivotal role in ensuring that the garments meet global standards. This unit provided a detailed insight into the structure of the apparel industry, the technical flow of garment manufacturing, and the responsibilities and opportunities for QC Executives in the sewing line.

As apparel brands demand higher quality, faster turnaround, and sustainable practices, the role of QC Executives becomes even more critical. With the right knowledge, skillset, and attitude, quality professionals can not only ensure defect-free production but also become key drivers of process excellence and customer satisfaction.

Summary

- Inline Quality Checkers perform basic garment checks and report issues to higher authorities.
- QC Executives oversee sewing line quality, guide checkers, conduct inspections, and maintain quality logs.
- Quality Supervisors manage multiple QC Executives, monitor KPIs, and lead team audits.
- QA Managers handle factory-wide quality assurance, compliance, buyer coordination, and corrective strategies.
- Factory Quality Heads define quality strategies, coordinate with all departments, and lead process improvements.
- Buyer-side Quality Auditors work for international brands or agencies to perform pre-shipment audits and ensure compliance.
- Career progression typically moves from inline checker → QC Executive → Quality Supervisor → QA Manager → Factory Quality Head.

Exercise

Multiple-choice Question:

1. Who is responsible for performing visual checks on operator output in the sewing line?
   a. QA Manager
   b. QC Executive
   c. Inline Quality Checker
   d. Factory Head

2. What is one key responsibility of a QC Executive?
   a. Conducting export documentation
   b. Supervising fabric dyeing
   c. Monitoring sewing line quality

3. Which position typically handles buyer interactions and compliance documentation?
   a. Inline Checker
   b. Quality Supervisor
   c. QA Manager
   d. Cutting Room Manager

4. Who defines the overall quality strategy in a garment manufacturing unit?
   a. QC Executive
   b. QA Manager
   c. Factory Quality Head
   d. Line Supervisor

5. Which role is responsible for final shipment inspection and buyer-side compliance?
   a. Sewing Operator
   b. QA Manager
   c. Buyer-Side Quality Auditor
   d. Finishing Supervisor

Descriptive Questions:

1. What is the role of a QC Executive in the sewing line?
2. Describe the responsibilities of a Quality Supervisor.
3. How does a Factory Quality Head contribute to overall production quality?
4. What key tasks does a Buyer-Side Quality Auditor perform before shipment?
5. Outline the typical career progression path in sewing line quality control.

Notes

Scan the QR codes or click on the link to watch the related videos

https://youtu.be/ddisteV3tOo?si=uFDW4QKnItoOKknY

Textile Sector in India

https://youtu.be/QaS4sI0n5Qg?si=_BndodY0hCorANp6

Garments Full Production Process

https://youtu.be/zX9KoZ7tz6Y?si=oKKdSHPsGu9jMfP4

QUALITY ASSURANCE IN APPAREL MANUFACTURING

Skill India
कौशल भारत-कुशल भारत

सत्यमेव जयते
GOVERNMENT OF INDIA
MINISTRY OF SKILL DEVELOPMENT
& ENTREPRENEURSHIP

N·S·D·C
RE IMAGINE FUTURE

APPAREL MADE-UPS HOME FURNISHING
SECTOR SKILL COUNCIL

2. Identify the Quality of Raw Material

Unit 2.1 - Garment Production Essentials

Unit 2.2 - Materials, Work Environment, and Quality Control

AMH/N1401

Key Learning Outcomes

By the end of this module, the participants will be able to:

1. Explain the quality standard required for raw material and the product construction.
2. Explain the methods of handling the defects.
3. Identify the types of tools and equipment used for garment construction such as sewing machines, attachments for sewing machines, cutting equipment.
4. Identify the various types of patterns.
5. Explain the process involved in the production of products like garments.
6. Inspect the work area for any type of hazardous material.
7. Check that the work area is clean.
8. Identify the various types of garments and the components.
9. Identify main types of raw materials like fabric, trims, accessories required for product construction of garment.
10. Identify the types of defects in the raw material.
11. Analyse the types of samples like prototype sample.

UNIT 2.1: Garment Production Essentials

Unit Objectives

By the end of this unit, the participants will be able to:

1. Explore the quality standards essential for raw material and garment construction.
2. Discuss the various methods used to handle and correct defects in garment production.
3. Examine the tools and equipment used for garment construction, including sewing machines, attachments, and cutting equipment.
4. Identify and describe the different types of garment patterns and their applications in the production process.
5. Illustrate the process involved in the production of garments, from raw material to finished product.

2.1.1 Understanding Quality Standards in Raw Materials and Garment Construction

Quality in garment production begins with selecting the right raw materials and following strict standards through every stage of production.

The primary reason for scrutinizing raw material quality is to ensure that the end product meets customer expectations, brand standards, and legal requirements. Poor-quality inputs result in higher rejection rates, rework, customer complaints, loss of credibility, and in severe cases, financial losses due to returned shipments or cancelled orders.

Additionally, the longevity, comfort, and performance of a garment are determined by the properties of the materials used. For example, low GSM (grams per square meter) fabric may not provide the structure required for formalwear, while coarse fibres may irritate the skin and reduce wearability. A zipper that breaks or threads that bleed colour during washing can render the entire garment useless. Therefore, rigorous raw material checks help in avoiding quality issues later in the production chain.

Fig. 2.1.1: Raw Material Quality

Raw Material Quality Standards and Garment Construction Standards

In the garment manufacturing industry, the foundation of a high-quality finished product lies in the quality of its raw materials and the precision of its construction processes. Raw material quality standards and garment construction standards play an integral role in ensuring that the final product meets the expectations of buyers and end consumers. This document expands upon the key parameters

involved in evaluating raw materials—especially fabrics, trims, and accessories—and establishes the benchmarks for garment construction.

Fabric Quality

Fabric is the most critical raw material in garment manufacturing. The quality of fabric impacts every aspect of the final product, including durability, aesthetics, comfort, and fit. Several indicators are used to assess fabric quality:

Quality Indicators	Measurement
GSM (Grams per Square Meter)	GSM refers to the weight of fabric per square meter and is a direct measure of fabric density. A higher GSM usually indicates a thicker, more durable fabric. The correct GSM must match the buyer's specifications to ensure proper drape and functionality.
Tensile Strength	This measures the fabric's resistance to breaking under tension. Fabrics with higher tensile strength can withstand stress and wear better during manufacturing and usage.
Shrinkage Percentage	Fabrics naturally shrink during washing and drying. Pre-shrunk fabrics are often preferred. Shrinkage tests help determine the dimensional stability of the fabric, which must be within acceptable limits.
Pilling Resistance	Pilling refers to the formation of small balls of fibre on the surface of fabric due to friction. Fabrics that pill easily may look worn out after a few uses, thereby affecting customer satisfaction.
Colourfastness	Colourfastness tests assess how well a fabric retains dye when exposed to washing, rubbing, or light. High colourfastness indicates resistance to fading and bleeding, which is critical for multi-coloured garments.
Breathability and Moisture Management	Fabrics intended for activewear or summer clothing must offer high breathability and the ability to wick moisture away from the body.
Fabric Inspection	Fabric inspection is conducted through the 4-point or 10-point system, where each defect is rated, and the total points per yard are calculated. This process identifies flaws like slubs, streaks, misweaves, holes, or dye defects, helping to eliminate inferior fabric lots.

Trims and Accessories

In addition to the main fabric, trims and accessories contribute to the garment's functionality, durability, and aesthetic appeal. These include zippers, threads, buttons, hooks, snaps, labels, laces, and interlinings.

1. **Zippers and Buttons:** These must be tested for strength, durability, and colourfastness. Zippers should have smooth functioning and should match the garment’s design. Buttons should be firmly attached and pass pull tests.

Fig. 2.1.2: Zippers and Buttons

2. **Sewing Threads:** Thread type must match the garment's material and purpose. Factors like tensile strength, elasticity, and shade matching are crucial. Thread quality also influences the garment's appearance and structural integrity.

Fig. 2.1.3: Sewing Threads

3. **Interlinings and Fusing Materials:** These provide stiffness and support to parts like collars, cuffs, and waistbands. Their adhesion and durability must be tested under different washing and pressing conditions.

Fig. 2.1.4: Fusing Material

4. **Labels and Tags:** These must comply with legal regulations (such as fibre content, washing instructions, and country of origin). In addition to being readable and securely attached, labels should not irritate the skin.

Fig. 2.1.5: Labels and Tags

5. **Trims Testing:** Trims are tested for colourfastness, dimensional stability, and resistance to heat and moisture. Buyer SOPs often include guidelines for trims inspection, especially for garments intended for export.

Colour Matching and Lab Dips

Colour consistency is essential to maintain brand image and buyer satisfaction. Any visible variation in colour can result in product rejection.

1. **Shade Cards:** Buyers often provide shade cards that define the exact tone and depth of colour required. Fabrics and trims must be dyed to match these cards.

Fig. 2.1.6: Shade Cards

2. **Lab Dips:** These are trial dye samples submitted to buyers for approval. Once approved, the dyeing process is standardized to ensure consistency across all fabric batches.
3. **Light Box Testing:** Fabrics are checked under different lighting conditions (e.g., daylight, tungsten, UV) to ensure the colour remains consistent under varied environments.
4. **Colour Matching Equipment:** Spectrophotometers are used for digital colour matching and to measure the Delta E value—the difference between the target and achieved shade. A low Delta E value is preferred.

Surface Defects

Defects on the fabric surface can severely compromise garment aesthetics and customer satisfaction.

1. **Visual Inspection:** Inspection is carried out by trained inspectors using overhead lighting. Common surface defects include stains, holes, oil marks, misprints, and yarn knots.
2. **Repair or Replacement:** Fabric rolls with minor defects can be repaired if permissible by buyer guidelines. Severely defective rolls are rejected or returned to the supplier.
3. **Mapping Defects:** Critical defects are marked with stickers or chalk to avoid their inclusion during cutting. Fabric inspection reports are generated and signed off before fabric is sent for cutting.

Garment Construction Standards

Construction standards are essential to ensure garments are manufactured uniformly and perform well in wear and care conditions. These standards guide sewing, finishing, and quality checks.

1. **Seam Integrity:** Seams must be strong and stretchable (where needed) to prevent seam slippage. Seam slippage tests are conducted especially for synthetic or slippery fabrics.
2. **Stitch Density and SPI:** The number of stitches per inch (SPI) determines seam strength and appearance. High SPI can increase seam durability but may reduce elasticity. Stitch density is specified in the tech pack.
3. **Alignment and Symmetry:** Pockets, prints, pleats, and seams must align correctly and mirror each other. Misalignments are unacceptable in high-quality garments.
4. **Tolerance Management:** Buyers allow a certain measurement deviation called tolerance. For example, a chest width of 40 inches may have a tolerance of ±0.5 inch. Garments outside this range are considered defective.
5. **Construction Techniques:** Each operation, such as attaching sleeves or collars, must follow the approved method as per the standard operating procedure (SOP). Unauthorized shortcut methods are strictly discouraged.
6. **Finishing Quality:** Garments must be free of loose threads, untrimmed seams, or pressing marks. Final pressing must ensure a crisp, clean look.
7. **Tech Packs and Buyer Specifications:** Buyers provide detailed tech packs which include garment dimensions, construction methods, thread types, SPI, labelling, and packing instructions. Adherence to these is mandatory.
8. **International Standards:** Many exporters must comply with ISO standards, OEKO-TEX certification, and AQL (Acceptance Quality Limit) guidelines. These standards ensure uniformity, safety, and reliability across global markets.

2.1.2 Methods to Handle and Correct Defects in Garment Production

Despite strict controls, defects are inevitable in mass manufacturing. Managing them is key to quality assurance.

Types of Defects and Quality Inspection Techniques in Garment Production

A crucial part of garment production lies in the identification and management of defects. These imperfections can originate from a variety of sources including raw materials, stitching errors, or finishing flaws. Addressing them effectively ensures a high level of product quality, minimizes waste, and enhances buyer satisfaction.

Defect Types	Inspection Techniques
Fabric Defects	• **Misprints:** Occur mainly in printed fabrics due to improper registration or colour overlap. • **Colour Bleeding:** Happens when dye runs from one section of the fabric to another, especially during washing. • **Dye Stains:** Spots or streaks caused by excess or uneven dye application. • **Holes:** Punctures or tears in the fabric from mechanical or handling damage. • **Off-grain Fabric:** When the warp and weft threads are not aligned at right angles, resulting in twisted garments after sewing.
Stitching Defects	• **Open Seams:** Occur when stitches break or are too far apart, creating gaps. • **Skipped Stitches:** Missing stitches along a seam that weaken the garment's durability. • **Loose or Tight Tension:** Inconsistent stitch tension can lead to thread breakage or puckering. • **Seam Puckering:** Unintended gathers along a seam caused by incorrect thread tension, needle size, or fabric handling.
Measurement and Fit Issues	• **Disproportionate Lengths:** Sleeves, hems, or panels may not match required dimensions. • **Inconsistent Armholes:** Unequal or incorrectly shaped armholes can impact fit and comfort. • **Misaligned Pockets:** Poorly placed or uneven pockets ruin the symmetry and appearance of the garment.
Finishing Faults	• **Stains:** Grease, oil, or handling marks found after stitching. • **Poor Pressing:** Uneven or wrinkled appearance due to improper ironing. • **Loose Threads:** Untrimmed threads can give a sloppy appearance. • **Wrong Labelling:** Incorrect or missing size, brand, or care labels can lead to product rejection.

Table 2.1.1: Types of Defects and Quality Inspection Techniques

Inspection Techniques

Inspection techniques are strategically carried out at different stages of the production cycle to catch defects early and prevent further processing of faulty garments.

1. **Inline Checking**

   This refers to real-time inspection at various workstations during the stitching process:

   - Quality checkers observe specific operations such as pocket attachment, zipper fixing, or collar stitching.
   - Helps detect issues early before they progress to the next stage.
   - Commonly uses visual aids, defect charts, and inspection formats.

2. **End-line Checking**

   This final stage inspection is performed once the garment is fully stitched:

   - Ensures the product meets the buyer's specifications and aesthetic expectations.
   - Involves measurement verification, visual inspection, and basic functional checks (e.g., buttoning, zipper closing).
   - Only garments passing this inspection proceed to pressing and packing.

3. **AQL Inspection (Acceptance Quality Limit)**

   AQL is a statistical method of inspecting a specific number of samples from a lot to decide if the batch should be accepted or rejected:

   - Based on predefined levels of tolerance for defects.
   - Ensures balance between quality assurance and inspection cost.
   - Widely used by global buyers and third-party auditors.

4. **Defect Handling Approaches**

   Addressing defects promptly and effectively is crucial for maintaining production flow and meeting delivery deadlines. The following are commonly adopted practices:

5. **Defect Tagging**
   - Faulty garments or parts are tagged using color-coded markers or stickers.
   - Tags identify the nature of the defect and guide operators or checkers for correction.
   - Prevents defective products from mixing with approved goods.
6. **Repair Stations**
   - Dedicated sewing machines or technicians handle minor repairs directly on the line.
   - Allows quick resolution of issues such as broken stitches or misaligned trims.
   - Reduces bottlenecks and rework accumulation.
7. **Root Cause Analysis (RCA)**
   - A systematic approach to uncover why defects are happening.
   - Involves data collection, trend analysis, and brainstorming sessions.
   - Helps eliminate recurring defects rather than just fixing symptoms.
8. **Feedback Mechanism**
   - Quality feedback is shared in real time with sewing operators and supervisors.
   - Reinforces learning and encourages preventive action.
   - Improves operator skill and accountability for quality.

These integrated inspection and defect handling mechanisms enable factories to deliver consistent quality, reduce waste, and meet international standards. They also foster a culture of continuous improvement within the production floor.

2.1.3 Tools and Equipment for Garment Construction

Proper tools increase precision, efficiency, and safety in garment manufacturing.

Sewing Machines and Special Attachments

In garment production, sewing machines form the backbone of the manufacturing process. Various machines serve different purposes depending on the stitching type and the part of the garment being assembled. The following are commonly used machines along with their special attachments:

Single Needle Lockstitch Machine:

- This is the most versatile and widely used sewing machine in the apparel industry.
- It creates a straight stitch and is ideal for general garment construction.
- Known for its precision and neat finish.

Fig. 2.1.7: Single Needle Lockstitch Machine

Overlock Machines:

- Used primarily for edge finishing.
- Prevents fraying and gives a clean look to inside seams.
- Commonly used in knitwear.

Fig. 2.1.8: Overlock Machine

Flatlock Machines:

- Used for decorative seams and joining panels, especially in sportswear and lingerie.
- Produces flat, comfortable seams.

Fig. 2.1.9: Flatlock Machine

Bartack Machines:

- Strengthens areas under stress, such as pocket corners and belt loops.
- Uses dense stitching in a tight zigzag pattern.

Fig. 2.1.10: Bartacking Machine

Buttonhole and Button Stitch Machines:

- Automatically create precise and consistent buttonholes and attach buttons quickly.
- Critical for time-saving in finishing operations.

Fig. 2.1.11: Button Stitch Machine

Special Attachments:

- Include seam guides, edge binders, folders, hemmers, and elastic feeders.
- These attachments increase production efficiency and ensure uniformity across garments.
- Reduce operator skill dependency and improve overall garment quality.

Cutting Tools

Cutting tools are essential for accurately shaping the fabric components that form the garment. Depending on production volume and garment complexity, different cutting tools are used:

Straight Knife Cutter:

- Ideal for bulk fabric cutting.
- Can cut multiple layers of fabric with uniformity.
- Suitable for straight-line or slightly curved cuts.

Band Knife Cutter:

- Primarily used for intricate or detailed patterns.
- The continuous loop blade offers precision in cutting complex shapes.

Round Knife Cutter:

- Designed for small pattern components or short runs.
- Offers better maneuverability for curves and delicate cuts.

Laser Cutters:

- Used for high-precision cutting of complex and detailed shapes.
- Excellent for high-value garments requiring intricate designs.
- Reduces fabric fraying due to its heat-sealing effect.

Cutting Tables and Spreading Machines:

- Cutting tables provide a flat, stable surface for accurate layout.
- Spreading machines layer fabric uniformly, minimizing wrinkles and tension.
- Improves fabric utilization and reduces human error.

Fig. 2.1.12: Cutting Tools

Finishing Tools

Finishing is a crucial stage where the final appearance and quality of the garment are enhanced. This involves pressing, trimming, and overall grooming of the finished item.

Steam Ironing Tables:

- Equipped with vacuum and steaming features for smooth pressing.
- Provides shape and finish to the final garment.

Boilers and Steam Generators:

- Generate consistent steam pressure for pressing operations.
- Ensure garments are crease-free and professionally finished.

Form Finishers:

- Shaping equipment used for garments like suits, jackets, and shirts.
- Maintain structural integrity and enhance drape quality.

Thread Trimmers:

- Remove excess threads and trims to provide a clean look.
- Essential for quality finishing before final inspection.

Lint Removers:

- Remove lint, dust, and loose fibres from garments.
- Ensures a neat presentation for buyers or retail.

Maintenance Practices

Proper maintenance of machines and tools is vital for consistent quality, operator safety, and production efficiency. The following practices help prolong equipment life and prevent breakdowns:

Routine Calibration:

- Sewing machines should be calibrated for stitch length, thread tension, and presser foot pressure.
- Cutting tools should be checked for depth and accuracy.

Sharpening Blades:

- Regular sharpening of cutting knives ensures smooth cuts.
- Dull blades cause fraying, uneven cuts, and fabric damage.

Lubrication:

- Regular oiling of sewing machine components prevents overheating and frictional damage.
- Increases machine lifespan and reduces downtime.

Cleaning and Dust Removal:

- Machines should be cleaned daily to remove lint, thread, and dust.
- Prevents clogging and reduces maintenance costs.

Preventive Maintenance Scheduling:

- A schedule for regular checks and servicing helps identify potential issues early.
- Involves inspecting belts, motor alignment, and tension settings.

By integrating the right machinery with appropriate attachments and maintaining them regularly, apparel production units can ensure high-quality output, improve efficiency, and maintain consistent performance across operations. The choice of equipment also depends on garment type, fabric characteristics, and production volume, making machinery selection and upkeep a strategic part of quality garment manufacturing.

2.1.4 Types of Garment Patterns and Their Application

Patterns guide the conversion of design into wearable pieces and ensure proper sizing and fit.

Pattern Types

1. **Basic Block (Sloper)**

   The basic block is the starting point for all pattern development. It represents a standard size and fit for a particular garment type without any stylistic features like pleats, gathers, or embellishments.

   - **Purpose:** To serve as a reference shape that mimics the human body.
   - **Use Case:** It is primarily used to develop other design-oriented patterns.
   - **Features:** Includes accurate body measurements and straight seam lines but lacks design details.

   The basic block is typically created for the torso (bodice), skirt, trouser, or sleeve, and is made to represent a generic form before any design interpretation.

2. **Working Pattern**

   A working pattern is a version derived from the basic block that has been altered to include specific design elements like flare, fullness, gathers, pleats, or stylized necklines.

   - **Purpose:** To reflect the designer's vision and style lines.
   - **Use Case:** Used during the development phase to test proportions and styling.
   - **Features:** May include temporary markings and allowances for design corrections.

   It's essentially the "experimental canvas" where design ideas are applied and adjusted before finalization.

3. **Production Pattern**

   A production pattern is the finalized and accurate version used for actual garment production.

   - **Purpose:** To guide cutting and sewing processes in the factory.
   - **Use Case:** Used directly on fabric to cut parts.
   - **Features:** Includes seam allowances, grain lines, drill holes, notches, and cutting instructions.

   It is essential that the production pattern is error-free, as it directly influences the garment's fit and assembly accuracy.

4. **Graded Patterns**

   Grading is the process of increasing or decreasing the size of the base pattern to create other sizes in the size range (e.g., S, M, L, XL).

   - **Purpose:** To produce garments in multiple sizes while maintaining proportions.
   - **Use Case:** Essential for mass production and size inclusivity.
   - **Features:** Maintains style and fit consistency across different sizes.

Modern software tools have made grading more precise and time-efficient compared to manual grading methods.

5. **Marker Plan**

   A marker plan is a blueprint that shows the optimized layout of all pattern pieces on the fabric before cutting.

   - **Purpose:** To maximize fabric utilization and minimize waste.
   - **Use Case:** Used during the cutting process in mass production.
   - **Features:** Includes all sizes and styles in one layout and considers fabric grain, print direction, and shrinkage.

   A well-planned marker can significantly reduce fabric consumption and contribute to cost savings in production.

Pattern Making Techniques

Pattern creation involves various techniques that can be manual or digital. The method chosen often depends on the production scale, desired accuracy, and time constraints.

1. **Manual Drafting:** Manual drafting is the traditional and still widely practiced technique where patterns are drawn by hand on pattern paper using drafting tools.
   - **Tools Used:** Pattern paper, hip curve, L-square, French curve, measuring tape, scissors, notcher.
   - **Advantages:**
     - Offers a deep understanding of garment construction.
     - Useful for small-scale or customized production.
   - **Limitations:**
     - Time-consuming.
     - Prone to human error.
     - Not easily stored or duplicated.

   This method is especially common in boutique or bespoke clothing operations where personalization and craftsmanship are key.

2. **CAD (Computer-Aided Design) Pattern Making:** CAD systems have revolutionized pattern making by allowing digital drafting and editing with high accuracy.
   - **Popular Software:** Gerber, Lectra, Optitex, Tukatech, Reach CAD.
   - **Advantages:**
     - Precision and accuracy in measurements and lines.
     - Easy to duplicate, modify, and store patterns digitally.
     - Faster grading and marker creation.
   - **Use Case:** Ideal for medium to large-scale manufacturers and export houses.
   - **Output:** Patterns can be plotted or digitally transferred for cutting.

   CAD also integrates with other modules such as inventory and production planning, making it a key element in smart manufacturing systems.

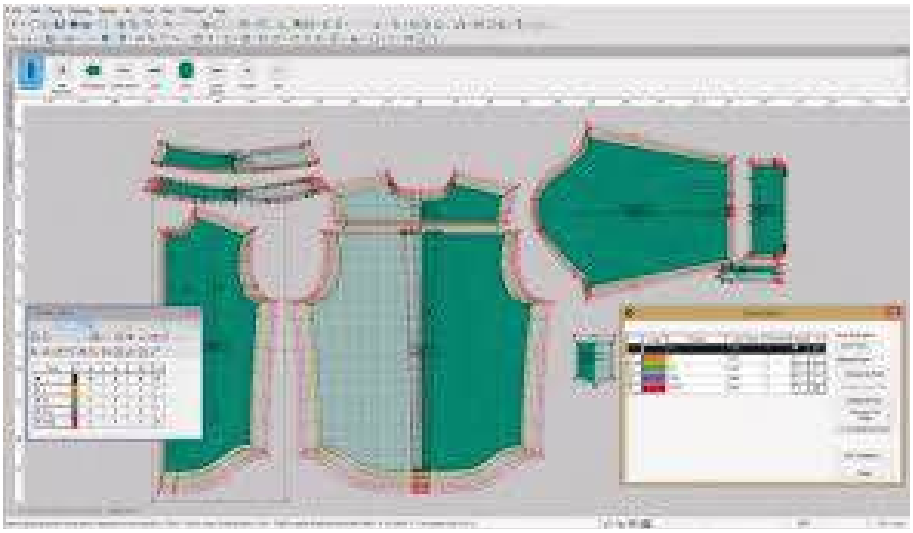


Fig. 2.1.14: Computer – Aided Design

3. **3D Virtual Sampling:** 3D pattern making and virtual sampling are cutting-edge techniques that simulate how garments will look and fit using digital avatars.
   - **Tools Used:** CLO3D, Browzwear, Optitex 3D.
   - **Advantages:**
     - Reduces the need for physical samples, saving time and material.
     - Allows real-time fit analysis and style visualization.
     - Enables remote collaboration with designers and buyers.
   - **Use Case:** Fast fashion, ecommerce design, and sustainability-conscious brands.

   Virtual sampling can dramatically reduce lead times and improve first-time sample approval rates, offering a competitive edge in fast-moving markets.

2.1.5 Garment Production Process – From Raw Material to Finished Product

A garment goes through multiple stages, each vital to its final quality and appeal.

The garment production process is a multi-stage operation that transforms raw materials into finished apparel products. Each step is essential in maintaining quality, meeting delivery schedules, and ensuring buyer satisfaction. Below is a detailed breakdown of the sequential production steps followed in a standard garment manufacturing unit:

1. **Material Sourcing and Testing**

   Before production begins, the procurement of raw materials like fabrics, trims, threads, labels, and accessories takes place. These materials are sourced based on buyer specifications and are subjected to rigorous testing.

- **Fabric Testing includes:**

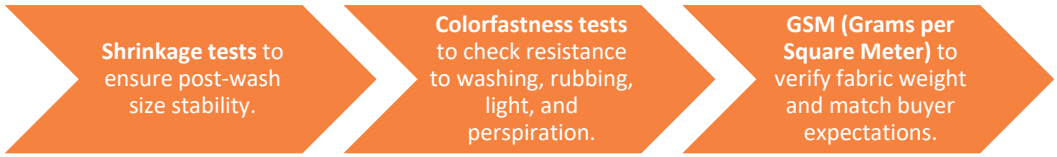


Fig. Fabric Testing

- **Trims Testing involves checking:**
  - Strength and durability of zippers, buttons, and snaps.
  - Compatibility of interlinings and fusing materials.
  - Label print fastness and thread quality.

Only materials that meet the quality benchmarks are approved for production. This early quality control stage helps prevent large-scale rejections later.

2. **Pattern Making and Sampling**

After material approval, the design team provides sketches, mood boards, or technical packs (tech packs), which guide the pattern makers in drafting the first version of the garment.

- **Pattern Development includes:**
  - Creating basic blocks and modifying them to match the design features.
  - Adding seam allowances, grain lines, and notches to finalize the production pattern.
- **Sampling Process:**
  - A physical sample is stitched using actual or substitute fabric.
  - The sample is sent to the buyer for fit checks, aesthetic review, and construction approval.
  - Sampling may involve multiple iterations before final approval is given to proceed with bulk production.

3. **Fabric Cutting and Bundling**

Once patterns are finalized and samples approved, bulk fabric cutting begins.

- **Fabric Laying:** The fabric is laid in multiple layers on a cutting table using manual or automatic spreading machines.
- **Marker Planning:** Patterns are arranged on the fabric using marker layouts to minimize wastage.
- **Cutting Process:** Fabric is cut using straight knife, band knife, or computerized laser cutting machines.

After cutting:

- Each set of components (front, back, sleeve, collar, etc.) is bundled per garment size and style, with proper tags for tracking.

4. **Sewing Line Operations**

The bundled fabric pieces are sent to the sewing department, where the production line is organized based on an assembly-line workflow.

- Operators are assigned specialized tasks (e.g., attaching sleeves, hemming, or collar setting).
- QC Checkers inspect semi-finished garments at various checkpoints (inline inspection).

- WIP (Work-in-Progress) is monitored to detect bottlenecks or quality issues early.

Smooth operation of the sewing line is critical to maintaining production targets and minimizing defects.

5. **Trimming and Defect Checking**

   After stitching, each garment undergoes a trimming and cleaning process.

   - Loose threads are trimmed using thread snippers or electric trimmers.
   - Unwanted elements like extra labels, chalk marks, or fabric lint are removed.
   - Defect Tagging: Faulty garments are tagged and sent for minor repairs (like skipped stitches or broken seams).

   This step ensures the garment is clean, professionally finished, and free from visible flaws.

6. **Pressing and Final Inspection**

   Garments are then pressed using steam irons, vacuum pressing tables, or form finishers, depending on the fabric and garment type.

   - After pressing, garments go through a final quality inspection, which includes:
     - Checking measurements against size charts.
     - Verifying label placements, trims, and finishing quality.
     - Ensuring compliance with buyer specifications.

   Only garments that pass this inspection are cleared for packing.

7. **Packing and Dispatch**

   The approved garments are then packed according to buyer-specific Standard Operating Procedures (SOPs).

   - **Packing Instructions include:**
     - Folding method (flat, hanger, or box folding).
     - Placement of hangtags, polybags, barcodes, and labels.
     - Carton dimensions, labelling, and stacking order.

   Once packed, the goods are stored in the dispatch area for shipment, often managed through third-party logistics (3PL) or freight forwarding agencies.

   Garment production is not just about stitching fabric—it's a complex, multi-layered process involving coordination, precision, and a clear understanding of buyer expectations. Every step, from material sourcing to dispatch, must be carefully managed to maintain quality and timely delivery. Behind the line operations, support teams like PPC, QA, and Merchandising work in sync to enable a seamless production environment. A strong grasp of these production steps and support systems is vital for anyone pursuing a career in the apparel industry, particularly in quality control, operations, or production management.

Support Activities in Garment Production

To ensure the smooth execution of the production cycle, several key support functions operate behind the scenes:

Supportive Teams	Responsibilities
Production Planning and Control (PPC)	The PPC team is responsible for scheduling, material flow, and resource planning. • They forecast timelines for fabric arrival, cutting, stitching, and delivery. • They coordinate with various departments to balance workloads and avoid delays. • PPC also manages production updates and highlights potential risks in advance.
Quality Assurance (QA) Team	While QC checkers focus on product-level quality, the QA team oversees process-level compliance. • They establish quality standards and SOPs for each operation. • Conduct AQL (Acceptance Quality Limit) audits at different stages. • Ensure that buyer audits, social compliance checks, and factory certifications are met. QA plays a preventive role to reduce errors before they occur.
Merchandising Team	The merchandisers act as the bridge between the factory and the buyer. • They handle sampling, approvals, BOM (Bill of Materials), and T&A (Time & Action) plans. • Communicate design clarifications, material substitutions, or delays to the buyer. • Maintain records of each transaction, making sure documentation and compliance are in place. They are key to ensuring the buyer's vision is effectively translated into the final product.

Table 2.1.2: Support Activities in Garment Production

UNIT 2.2: Materials, Work Environment, and Quality Control

Unit Objectives

By the end of this unit, the participants will be able to:

1. Inspect the work area for hazardous materials and outline the measures for ensuring a safe working environment.
2. Explain the importance of maintaining a clean and organized work area to support efficient garment production.
3. Discuss the various types of garments and their components, explaining their roles in the production process.
4. Identify and describe the main types of raw materials used in garment construction, such as fabric, trims, and accessories.
5. Explore the different types of defects that may occur in raw materials and how they impact garment construction.
6. Analyze various types of samples, such as prototype samples, and explain their significance in the production cycle.

2.2.1 Work Area Inspection and Hazard Control

A safe and hazard-free work environment is essential in garment manufacturing. With numerous machines, cutting tools, and electrical systems in use, the potential for accidents is high if safety protocols are not followed. Inspections for hazardous materials, such as flammable chemicals (used in printing or finishing), oil leaks from machines, broken needles, or exposed wiring, must be conducted daily.

Workplace Hazards and Their Control Measures in the Garment Industry

Garment manufacturing environments are fast-paced and machinery-intensive, involving a wide range of materials, equipment, and human labour. With high levels of manual handling, repetitive motions, and the use of chemical substances, the garment industry can pose several occupational hazards. Ensuring workplace safety is not just a legal or compliance requirement but also a moral responsibility and an operational necessity for long-term success and productivity.

Fig. 2.2.1: Workplace Hazard

Creating a safe and healthy workplace begins with identifying potential hazards and implementing proactive measures to eliminate or control them. This content explores the common types of hazards found in garment production units and the corresponding control measures that organizations must adopt to maintain a safe, efficient, and legally compliant environment.

Common Hazards in the Garment Manufacturing Environment

1. **Chemical Hazards:** The use of chemicals in the garment sector is widespread. From fabric dyeing and printing to cleaning agents and adhesives used in product finishing, workers are often exposed to various chemical substances.
    - **Examples include:**
        - Cleaning solvents used to remove oil stains from fabrics.
        - Dyes and pigments used in textile coloration processes.
        - Adhesives and sealants used for fusing, embroidery patches, and labelling.
    - **Risks:**
        - Skin irritation, respiratory problems, eye burns.
        - Long-term exposure may lead to chronic conditions like asthma or dermatitis.
        - Spillage or improper storage can lead to fires or chemical burns.
2. **Mechanical Hazards:** Mechanical risks arise from the use of equipment and machines in processes like cutting, stitching, fusing, and finishing. These machines often have high-speed moving parts that can cause injuries if not properly guarded or maintained.

- **Examples include:**
    - Cutting machines and band knives.
    - Sewing machines with needle movement and sharp presser feet.
    - Button-fixing and rivet machines, which apply pressure at high speeds.
    - Pressing machines that involve heat and pressure.
- **Risks:**
    - Cuts, amputations, crush injuries.
    - Burns from hot surfaces.
    - Entanglement of loose clothing or hair in rotating parts.

3. **Ergonomic Hazards:** Ergonomics deals with the design of workspaces and job tasks to suit the worker's physical capabilities and reduce strain or injury. In garment factories, where tasks are highly repetitive, improper workstation design can cause musculoskeletal disorders (MSDs).
    - **Common ergonomic issues include:**
        - Poor seating or workstation posture.
        - Continuous stitching for long hours without breaks.
        - Lifting heavy bundles of fabric without mechanical assistance.
        - Incorrect table height leading to neck, back, or wrist strain.
    - **Risks:**
        - Shoulder, neck, and back pain.
        - Carpal tunnel syndrome, tendonitis.
        - Chronic fatigue or reduced productivity.

4. **Electrical Hazards:** Garment factories rely heavily on electricity for lighting, machinery operation, and climate control. Faulty wiring, overloaded sockets, and lack of grounding can present serious electrical risks.
   - **Examples of electrical hazards:**
     - Improperly installed equipment.
     - Damaged cords or plugs.
     - Overuse of extension cords for multiple machines.
     - Uncovered electrical panels or exposed live wires.
   - **Risks:**
     - Electric shocks, fires, and short circuits.
     - Injuries or fatalities from electrocution.
     - Property damage and operational disruption.

Control Measures for Workplace Safety

A proactive safety culture includes identifying risks, conducting assessments, and implementing control mechanisms. These control measures can be administrative, engineering-based, or procedural.

1. **Personal Protective Equipment (PPE):** PPE is the first line of defence for workers who cannot completely eliminate exposure to hazards. Employers must ensure proper provision, usage, and maintenance of PPE.
   - **Examples of PPE used in garment units:**
     - **Gloves:** For protection from cuts or chemical exposure.
     - **Face masks:** To avoid inhaling dust, fabric particles, or fumes.
     - **Safety glasses:** During cutting or trimming operations.
     - **Aprons and full-body overalls:** For chemical handling.
     - **Earplugs or earmuffs:** In high-noise areas (e.g., printing machines).
   - **Implementation Tips:**
     - Train employees on correct usage.
     - Replace damaged PPE promptly.
     - Make PPE mandatory in high-risk zones.

Fig. 2.2.2: PPE

2. **Engineering Controls and Infrastructure Improvements:** Engineering controls focus on eliminating hazards at the source or isolating workers from them.
   - **Examples:**
     - **Machine guarding:** Installing protective covers around moving parts of sewing, cutting, or pressing machines.
     - **Exhaust and ventilation systems:** Used to remove chemical fumes, dust, and airborne particles.
     - **Enclosed wiring systems:** To avoid contact with live wires.
     - **Emergency stop switches:** For all machinery.
   - **Additional Infrastructure Improvements:**
     - Anti-slip flooring in wet or chemical areas.
     - Adequate lighting in all working and storage spaces.
     - Proper layout of machines to avoid congestion and ensure safe passage.
3. **Fire Safety Measures:** Fires in garment factories can be catastrophic, especially when flammable chemicals or fabric waste is present.

   Fire safety measures include:
   - Installation of fire extinguishers and fire hydrants at strategic locations.
   - Availability of fire blankets in chemical-handling areas.
   - Clearly marked emergency exits with pathways free of obstruction.
   - Regular fire drills to train employees on evacuation procedures.
   - Fire alarms and smoke detectors in every production section.

   Additional Best Practices:
   - Maintain Material Safety Data Sheets (MSDS) for all chemicals.
   - Segregate flammable materials in fireproof cabinets.

Fig. 2.2.3: Fire Extinguishers

4. **Routine Audits and Inspections:** Routine safety audits help in identifying risk-prone areas and prompt corrective action.

   Types of inspections:
   - Daily floor checks for spills, leaks, or obstructions.
   - Weekly machine inspections for wear and tear.

- Monthly electrical audits by certified professionals.
- Annual structural safety audits (especially in multi-storeyed units).

Audit findings should be documented and followed up with corrective and preventive actions (CAPA).

5. **Safety Signage and Emergency Preparedness:** Communication plays a key role in maintaining safety awareness.
   - **Examples of safety signage:**
     - "Wear Gloves," "Danger – High Voltage," "Exit Here," "No Smoking."
     - Pictorial signs for multilingual or illiterate workers.
     - Directional signs for fire exits and assembly points.
   - **Emergency Preparedness Measures:**
     - First Aid kits fully stocked and accessible.
     - Emergency contact numbers displayed in common areas.
     - Trained first responders or floor marshals on every shift.
     - Tie-ups with nearby hospitals or fire departments for crisis response.
6. **Employee Training and Awareness Programs:** No control measure is effective unless employees are trained to understand and implement it. Safety training must be continuous and role-specific.
   - **Topics for training include:**
     - Safe machine handling.
     - PPE usage and hygiene practices.
     - Fire response drills and first aid basics.
     - Identifying and reporting hazards.
     - Correct lifting techniques to prevent strain.

Training sessions can include classroom instruction, posters, simulation drills, and peer-led demonstrations. Refreshers should be conducted quarterly or when new equipment is introduced.

2.2.2 Clean and Organized Work Area

In the garment manufacturing industry, maintaining a clean and organized workspace is not just a matter of hygiene—it is directly linked to productivity, safety, and quality. Production units involve numerous manual and machine-based operations, and any disturbance or disorganization in the work environment can lead to inefficiencies, increased defect rates, and potential safety hazards.

Importance of a Clean and Well-Organized Workplace

A clean environment ensures that production flows smoothly without unnecessary interruptions. For example, if a tailor wastes time searching for tools or if a workstation is cluttered with fabric scraps, it can delay production timelines and disrupt line balancing. Additionally, garments that come into contact with unclean surfaces may suffer from stains or fabric damage, compromising their quality.

Benefits of a Clean and Organized Work Area:

- **Increased Efficiency:** When tools and materials are placed in designated locations, workers can access them without delays, leading to faster production cycles.
- **Better Quality Control:** Clean surfaces reduce the risk of garment contamination from oil, dust, or leftover trims. This minimizes quality-related rejections.
- **Enhanced Safety:** Uncluttered pathways and workstations reduce the risk of trips, falls, or accidents caused by scattered tools or materials.
- **Improved Morale and Discipline:** A tidy environment cultivates a sense of responsibility and professionalism. Workers tend to take more pride in their tasks when their workspace is well-maintained.
- **Support for Lean Manufacturing Practices:** A clean setup aligns with lean production systems, which focus on reducing waste and optimizing workflow.

Cleanliness Protocols in the Apparel Industry

To maintain consistent cleanliness standards, factories should implement structured policies. These protocols must be enforced through regular training and audits to ensure every worker participates in maintaining their work area.

Standard Cleanliness Practices:

- **End-of-Shift Cleaning:** Workers should clean their machines, sweep their stations, and dispose of waste material before ending their shift.
- **Color-Coded Waste Bins:** Factories often use separate bins for fabric scraps, thread waste, packaging materials, and hazardous items. This aids in recycling and ensures safe disposal.
- **Daily Machine Maintenance:** Sewing machines, cutting tables, and other equipment must be wiped down and checked regularly to prevent oil leaks and accumulation of lint or debris.
- **Clean Floor Policies:** Floors must be kept dry and free of scraps to prevent accidents. Anti-slip mats and clearly marked pathways help enhance safety.

Role of Supervisors and Quality Controllers:

Supervisors must perform routine inspections to ensure compliance with cleanliness norms. Quality controllers should also monitor workstations to prevent contamination that could affect garment inspection outcomes.

Maintaining a clean and organized workspace is not a one-time effort—it must become part of the organization's culture. The consistent application of cleanliness protocols leads to a significant reduction in avoidable rework, improves worker satisfaction, and contributes to the timely delivery of quality garments.

2.2.3 Types of Garments and Their Components

The apparel industry is vast and produces a wide variety of garments, each differing in construction, purpose, and complexity. Understanding the types of garments and their various components is essential for any professional involved in garment manufacturing or quality control. This knowledge allows workers to inspect, assemble, and finish garments with precision and meet customer expectations.

Types of Garments

Garments can be categorized based on usage, style, market demand, and customer segment. The primary categories include:

1. **Outerwear:** Includes jackets, overcoats, trench coats, windcheaters, and hoodies. These garments are generally made with thicker, weather-resistant fabrics and include additional elements like linings, padding, or zippers for functionality and warmth.

Fig. 2.2.4: Outwear Overcoats

2. **Innerwear:** Refers to undergarments such as bras, panties, camisoles, slips, and thermal wear. These are usually made from soft, stretchable, and breathable fabrics for comfort and fit.

Fig. 2.2.5: Innerwear Camisoles

3. **Bottoms:** This category includes trousers, pants, jeans, skirts, palazzos, and shorts. Construction accuracy is crucial here, especially in measurements, fitting, and seam alignment.

Fig. 2.2.6: Bottom wear Jeans

4. **Tops:** Shirts, t-shirts, blouses, tunics, and tank tops fall under this category. Tops can vary widely in their design elements—such as collars, sleeves, and prints—and require attention to symmetry and finishing.

Fig. 2.2.7: Shirt

5. **Ethnic Wear:** Includes kurtas, salwar kameez, sarees, lehengas, and sherwanis. These garments often incorporate embellishments, embroidery, and traditional design patterns and demand high levels of craftsmanship.

Fig. 2.2.8: Ethnic Wear Long Kurtis

6. **Athleisure and Sportswear:** Track pants, leggings, sports bras, active t-shirts, and jackets fall under this category. They use specialized fabrics like Lycra, spandex, and dry-fit materials for flexibility and moisture management.

Fig. 2.2.9: Active wear Sports Set

Components of a Garment

Regardless of type, most garments consist of several critical components that collectively define their performance, functionality, and appeal.

1. **Main Fabric:** The base material from which the garment is made. It must meet specifications regarding weight, weave, colour fastness, and shrinkage.

Fig. 2.2.10: Main Fabric

2. **Lining:** Often used in jackets, skirts, and dresses, linings provide comfort and structure. They also enhance the appearance and wearability of the garment.

Fig. 2.2.11: Lining

3. **Interlining:** Applied inside collars, cuffs, plackets, and waistbands to provide stiffness or shape retention. It may be fusible or sewn-in, depending on the garment.

Fig. 2.2.12: Interlining Fabric

4. **Trims and Accessories:** Includes buttons, zippers, lace, drawcords, labels, piping, ribbons, and hook-and-loop closures. These are not only functional but also add to the garment's style. Misplacement or poor-quality trims can result in customer complaints or returns.

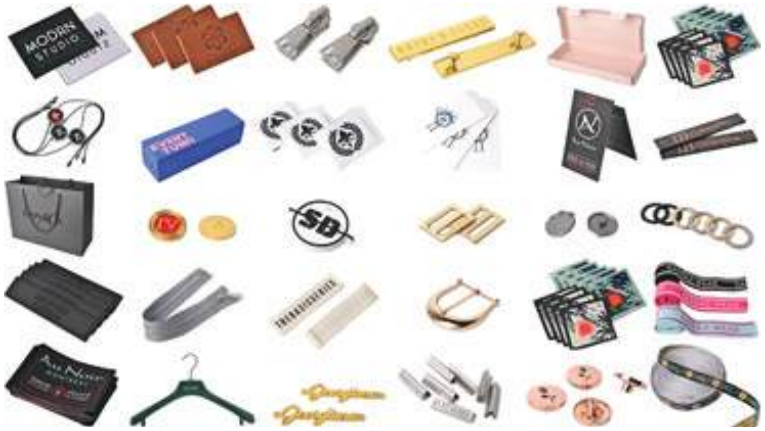


Fig. 2.2.13: Trims and Accessories

5. **Stitching Thread:** The thread used must match the garment's colour and strength requirements. Threads vary in composition (polyester, cotton, nylon) and are selected based on the fabric and garment function.

Fig. 2.2.14: Stitching Thread

6. **Fasteners and Closures:** Include zippers, velcro, hooks, snaps, and eyelets. These components must be tested for durability and ease of use.

Fig. 2.2.15: Hooks Closures

7. **Labels and Tags:** These provide vital information such as size, care instructions, fabric content, and brand identity. Missing or incorrect labels can lead to regulatory issues.

Fig. 2.2.16: Size Tags

Quality Control and Component Verification

Every component must be verified for:

- Conformance to specification.
- Proper attachment (e.g., stitching quality, alignment).
- Compatibility with other components (e.g., a stiff interlining on a soft fabric can cause imbalance).
- Functionality testing (e.g., zip movement, buttonhole strength).

Faulty components or incorrect usage can compromise the garment's overall performance and marketability. Hence, all components should be sourced from reliable vendors and inspected upon receipt and before use in the production line.

By understanding garment classifications and their corresponding components, production staff can contribute to better planning, faster defect identification, and higher customer satisfaction. This foundation also enables better inventory control, reduced wastage, and improved compliance with buyer specifications.

2.2.4 Raw Materials in Garment Construction

Raw materials form the backbone of the garment industry. Every garment starts with raw materials like fabric, trims, threads, and embellishments. The choice and quality of these inputs not only affect the aesthetic value but also influence garment durability, functionality, and consumer satisfaction.

Fabric Selection and Types

Fabrics are selected based on the purpose of the garment, end-user comfort, care requirements, durability, and style. Major fabric classifications include:

Fabric Type	Selection Basis
Natural Fibre	• **Cotton:** Soft, breathable, and widely used for casual and comfort wear. • **Silk:** Luxurious, lightweight, used for high-end fashion and formal wear. • **Wool:** Offers warmth; used in winter wear like suits and coats. • **Linen:** Highly breathable and best suited for summer garments.

Fabric Type	Selection Basis
Synthetic Fibres	• **Polyester:** Durable, wrinkle-resistant, and widely used in blended fabrics. • **Nylon:** Lightweight, strong, often used in sportswear. • **Acrylic:** Wool-like substitute, often used in sweaters and outerwear.
Blended Fabrics	• Combine properties of both natural and synthetic fibres. • **Examples:** Cotton-polyester blends for durability and comfort.
Special Fabrics	• Functional Fabrics like moisture-wicking, antimicrobial, UV-protective materials are used in sports and activewear. • Eco-friendly Fabrics such as bamboo, hemp, or recycled polyester are gaining popularity due to sustainability trends.

Table 2.2.1: Fabric Classifications

1. **Trims and Accessories**

   Trims enhance garment construction and include:

   - **Functional trims:** Zippers, buttons, velcro, hooks, and elastics.
   - **Decorative trims:** Lace, beads, sequins, embroidery, and piping.
   - **Labelling items:** Main labels, care labels, and size tags.

   The compatibility of trims with the fabric is essential. For example, a heavy metal zipper may not suit lightweight chiffon fabric.

2. **Thread Selection**
   - Threads must be compatible in colour, tensile strength, and elongation.
   - Polyester threads are generally used for their strength and shrink resistance.
   - Cotton threads are used in garments requiring natural composition.
3. **Testing Raw Materials:** Before bulk usage, raw materials undergo various quality tests:
   - **GSM (grams per square meter):** Measures fabric weight.
   - **Tensile and tear strength tests:** Evaluate resistance to pulling or tearing.
   - **Colourfastness tests:** Test resistance to washing, rubbing, and sunlight.
   - **Shrinkage tests:** Evaluate dimensional changes post-washing.
   - **Abrasion resistance tests:** Important for denim, workwear, etc.

   Testing ensures materials meet the buyer's specifications and legal standards, preventing costly rework.

2.2.5 Defects in Raw Materials and Their Impact on Garment Construction

Defects in raw materials can significantly disrupt garment quality and production timelines. Identifying, documenting, and resolving these defects is crucial for seamless operations and maintaining buyer trust.

Common Fabric Defects

1. **Weaving or Knitting Defects:**
   - **Slubs:** Thick places in yarn that cause irregularities.
   - **Snags:** Pulled threads creating loops or runs.
   - **Broken ends or picks:** Broken warp or weft yarns.
   - **Uneven dyeing or shade variation:** May result in garments that don't match in colour.
2. **Printing and Finishing Defects:**
   - **Off-registration:** Misalignment of patterns during printing.
   - **Colour bleeding:** Occurs when dye migrates from one part to another.
   - **Chemical stains or residues:** From improper finishing processes.
3. **Physical Contaminants:**
   - **Foreign fibres:** Different-coloured fibres or materials unintentionally mixed.
   - **Grease/oil stains:** From machinery or transportation.

Trims and Accessories Defects

- **Zippers:** Jammed, broken teeth, or incompatible sizing.
- **Buttons:** Weak stitching, breakage, colour fading.
- **Elastics:** Poor elasticity or early slackening.
- **Threads:** Fraying, snapping, colour mismatch.

Impact on Garment Construction

- **Aesthetic Issues:** Shade variations and surface defects affect the look.
- **Fit Problems:** Shrinkage or stretch in fabrics impacts measurements.
- **Stitching Defects:** Weak or irregular threads cause seam breakage.
- **Reduced Lifespan:** Poor materials wear out quickly, affecting customer retention.
- **Production Delays:** Replacing defective materials halts operations.
- **Increased Cost:** Rework, scrap, and buyer penalties raise production costs.

Preventive Measures

- 100% fabric inspection using systems like the 4-point inspection method.
- Pre-production testing and approvals.
- Supplier evaluation and material specification audits.
- Batch-wise testing of all materials and trims.
- Record-keeping and traceability for future defect analysis.

2.2.6 Importance of Samples in Garment Production

Samples are vital checkpoints that align buyer expectations with production capabilities. They help reduce errors, align teams, and validate quality before scaling production.

Types of Samples and Their Purpose

1. **Proto Sample**
   - First physical version based on design sketch or CAD.
   - Used to evaluate the feasibility of the style.
2. **Fit Sample**
   - Evaluates garment fit, balance, and proportion.
   - Used with live models or mannequins.
3. **Size Set Sample**
   - Created for each size (S, M, L, etc.) to test grading accuracy.
4. **Pre-Production Sample (PPS)**
   - Made with actual production fabric and trims.
   - Must be approved before bulk production begins.
5. **TOP Sample (Top of Production)**
   - Taken from initial production lot.
   - Verifies that bulk output matches PPS and buyer requirements.
6. **Shipment Sample**
   - Sent before dispatch to confirm final product quality.

Role in Quality Assurance

- Acts as a visual and technical reference for production, QC, and buyers.
- Prevents miscommunication between design and manufacturing teams.
- Helps buyers assess material quality, construction, and finishing.
- Ensures compliance with packaging, labelling, and measurements.

Sample Evaluation Criteria

- **Fit and measurements:** Conformity to size chart and grading logic.
- **Material and trims:** Must match approved materials.
- **Construction quality:** Seam strength, stitch density, finishing.
- **Aesthetics:** Colour accuracy, embellishments, silhouette.
- **Labelling and packaging:** Placement, readability, compliance with buyer SOPs.

Sampling Challenges

- Fabric availability for early-stage samples.
- Time constraints in high-volume fast fashion cycles.
- Cost management when developing multiple rounds of samples.

Importance in Buyer Communication

- Helps build confidence in vendor capability.
- Serves as a commitment benchmark for future bulk orders.
- Enables smooth order approvals and reduces chances of bulk rejection.

The quality of garments largely depends on three foundational pillars—raw materials, defect management, and sampling procedures.

- Raw materials should be carefully chosen, tested, and verified for consistency in strength, shade, and finish.
- Defects, if undetected, can disrupt production, reduce profit margins, and damage brand reputation. Early detection through robust inspection systems is vital.
- Samples ensure alignment between design, buyer expectations, and production reality. They act as the reference standard that controls the entire manufacturing process.

In an industry where competition is fierce and buyers demand excellence, manufacturers must embed these practices deeply into their operations. Doing so ensures timely production, customer satisfaction, and long-term business growth.

Summary

- Explores the quality standards for raw materials and final garments.
- Emphasizes methods for defect identification and control.
- Introduces garment construction tools and machines.
- Discusses different garment pattern types and design formats.
- Details the end-to-end garment production process.

Exercise

Multiple-choice Question:

1. Which of the following is not a type of garment pattern?
   a. Block pattern
   b. Drafted pattern
   c. Digital pattern
   d. Lining pattern

2. What is the primary purpose of a garment spec sheet?
   a. Inventory tracking
   b. Quality control
   c. Design and measurement reference
   d. Label printing

3. What defect is most likely caused by faulty tension settings in machines?
   a. Oil stain
   b. Skipped stitches
   c. Uneven seam
   d. Colour bleeding

4. Which tool is used for pattern making?
   a. Tension disc
   b. Tailor's chalk
   c. Seam ripper
   d. French curve

5. The final quality check is done:
   a. Before pattern cutting
   b. After packaging
   c. After stitching and before finishing
   d. During fabric selection

Descriptive Questions:

1. Define the role of a spec sheet in garment production.
2. Name two common tools used in garment construction.
3. What causes seam puckering in stitched garments?
4. What is the function of control charts in QC?
5. Mention one defect and how it is rectified.

Notes

Scan the QR codes or click on the link to watch the related videos

https://youtu.be/WTlFD2MQdbM?si=z5_uYqjL568WR3Kb

Types of Defects in Fabric Quality Assurance in Garment Production

https://youtu.be/GOKJAlQzhoc?si=orEJTalDz-bZsOj9

Tools used in Garment Construction

https://youtu.be/ub_WXoT6boA?si=D9xV0chO_9nW8lYh

Pattern Making class

Skill India
कौशल भारत-कुशल भारत

सत्यमेव जयते
GOVERNMENT OF INDIA
MINISTRY OF SKILL DEVELOPMENT
& ENTREPRENEURSHIP

N·S·D·C
RE IMAGINE FUTURE

APPAREL MADE-UPS HOME FURNISHING
SECTOR SKILL COUNCIL

3. Identify and Assess the Quality of Raw Material

Unit 3.1 - Quality Control and Documentation in Production

AMH/N1401

Key Learning Outcomes

By the end of this module, the participants will be able to:

1. Maintain the documents of production and inspection.
2. Explain the hierarchy followed in an industry.
3. Explain the steps involved in monitoring the quality during various stages of production.
4. Inspect various types of raw materials for any defect.
5. Check that the fabric and other raw material meet the specified quality standard.
6. Inspect the accuracy of pattern and template before cutting of fabric.
7. Check the accuracy of the template before cutting the fabric.
8. Check the setting of the machines and the attachments as per the required production standard.
9. Prepare the control chart.
10. Analyse the details in documents related to production and inspection like trim card, measurement chart, types of samples.
11. Complete the required documents related to production and inspection.

UNIT 3.1: Quality Control and Documentation in Production

Unit Objectives

By the end of this unit, the participants will be able to:

1. Describe the process of maintaining production and inspection documents throughout the manufacturing process.
2. Explain the hierarchy structure in the industry and its impact on the production workflow.
3. Outline the steps involved in monitoring and ensuring quality during various stages of production.
4. Discuss how to inspect different types of raw materials to identify potential defects.
5. Explain how to verify that fabric and other raw materials meet the specified quality standards.
6. Illustrate the procedure for inspecting the accuracy of patterns and templates before cutting fabric.
7. Elaborate on the process of checking template accuracy prior to fabric cutting.
8. Describe how to ensure machines and attachments are set according to the required production standards.
9. Explain how to prepare and use control charts in the production process.
10. Discuss how to analyze production and inspection documents such as trim cards, measurement charts, and sample types.
11. Explain the importance of completing all required documents related to production and inspection.

3.1.1 Maintaining Production and Inspection Documents

In the apparel manufacturing industry, maintaining accurate and comprehensive production and inspection documentation is essential for ensuring product quality, operational consistency, and buyer satisfaction. These documents act as the backbone of a structured quality control system. They not only help track each step of the production process but also serve as crucial reference points for inspections, audits, and continuous improvement efforts.

Types of Raw Materials in Garment Production

To inspect effectively, one must first understand the types of raw materials used in garment manufacturing. The primary raw materials include:

- **Fabric:** The most essential element, available in woven, knitted, or non-woven forms. Fabrics vary in fibre composition (cotton, polyester, viscose, etc.), structure, colour, and finish.
- **Trims:** Functional and decorative elements such as buttons, zippers, hooks, snaps, cords, and Velcro.
- **Accessories:** Labels, hang tags, elastic bands, interlining, shoulder pads, and drawstrings.
- **Sewing threads:** Vital for seam strength and appearance; must match the garment's colour, durability, and performance expectations.
- **Embellishments:** Lace, beads, sequins, embroidery threads, or other decorative additions.

Each type of material has its own set of quality parameters that need to be verified before approval for production use.

Fig. 3.1.1: Types of Raw Material

Importance of Documentation in Garment Manufacturing

Garment production is a highly detailed and process-intensive activity that involves numerous steps—ranging from fabric inspection and cutting to stitching, finishing, and final inspection. At every stage, different materials, specifications, personnel, and machinery come into play. Without proper documentation, it becomes nearly impossible to manage, trace, or improve these processes.

Maintaining detailed production and inspection documents enables manufacturers to:

- Ensure all activities are aligned with buyer specifications.
- Monitor quality checkpoints and identify deviations early.
- Track responsibility for various processes and outcomes.
- Provide data for future planning and process optimization.
- Satisfy regulatory and buyer compliance requirements.
- Establish traceability in case of product recalls or complaints.

Well-maintained documentation also acts as legal and operational proof during third-party audits or buyer assessments. It reduces dependency on individual memory and helps maintain consistency across multiple batches or production cycles.

Types of Key Documents in Production and Inspection

1. **Production Schedules:** These outline timelines for each process—from sourcing and cutting to sewing and finishing. They include start and end dates, resource allocation, line targets, and shift plans. Maintaining these helps in managing deadlines and tracking productivity.
2. **Process Flow Charts:** These diagrams visually map the entire manufacturing process, identifying each operation and its sequence. They help staff understand their roles and offer insights into workflow optimization.
3. **Inspection Checklists:** Used during inline and final inspections, these documents list specific criteria such as stitching quality, labelling, measurements, and packaging. They standardize the inspection process and ensure uniformity.
4. **Deviation Reports:** Whenever a product or process deviates from set standards, a deviation report is generated. This report includes the nature of the defect, root cause analysis, corrective actions taken, and preventive measures to avoid recurrence.

5. **Trim Cards and Accessory Charts:** These documents contain detailed information about all trims and accessories used—like buttons, labels, zippers, and threads. They list supplier details, placement instructions, and quality standards. Cross-verifying trims with these cards during production helps prevent mix-ups or mismatches.
6. **Sample Approval Sheets:** These documents record buyer feedback and approval on various sample stages—proto, fit, size set, and pre-production (PP). The approved samples act as a benchmark for bulk production, and deviations from these standards can result in rejections.
7. **Measurement Charts:** Measurement charts list garment dimensions for each size and include tolerance limits. These are critical for ensuring that final garments meet sizing specifications. QA teams use these during final inspections to verify garment accuracy.
8. **Rework Logs:** If any defects are found during inspections, rework logs document the issues, how they were corrected, and who handled the task. This helps in tracking recurring problems and employee performance.
9. **Final Inspection Reports:** These summarize the findings from the last stage of quality checks before shipment. They often include Acceptable Quality Level (AQL) data, packaging checks, and sign-offs from QA supervisors.

Best Practices for Maintaining Documents

- **Organized Filing System:** Documents should be sorted by order, date, or category (raw materials, in-process, final inspection). Physical and digital folders must be labelled clearly to ensure easy retrieval.
- **Version Control:** Updated documents should reflect changes with date stamps, version numbers, or change logs. This ensures that all departments work with the most current information.
- **Access Control:** Limit document editing rights to authorized personnel only, especially for inspection criteria and buyer approvals. This avoids confusion and data manipulation.
- **Data Backups:** For digital records, backups should be scheduled regularly and stored securely, either on cloud servers or external hard drives.
- **Audit Trail Maintenance:** Any edits, additions, or deletions in the document must be logged to ensure transparency. Digital systems with audit trail capabilities are ideal for this purpose.
- **Integration with ERP Systems:** Many garment manufacturers now use ERP (Enterprise Resource Planning) systems to automate document flow. These platforms allow real-time data entry, centralized storage, and better inter-department coordination.

Role in Continuous Improvement and Compliance

Consistent documentation not only maintains daily operations but also supports Kaizen (continuous improvement), Six Sigma, and other quality initiatives. Analysing historical records helps identify:

- Frequently occurring defects.
- Production line inefficiencies.
- Training needs for staff.
- Machine maintenance requirements.

Additionally, international standards like ISO 9001, SA8000, and buyer-specific compliance protocols heavily rely on documented evidence. Whether it's a social compliance audit or a technical evaluation by the buyer, production and inspection documents demonstrate due diligence and systematic quality control.

Training and Accountability

Maintaining documents is not the sole responsibility of the QA team. All stakeholders—from storekeepers and cutters to sewing line supervisors—should be trained in filling out and managing records relevant to their function. Every document should have space for names, signatures, and timestamps, which builds accountability and ownership.

Regular internal audits should be conducted to:

- Ensure completeness and accuracy of records.
- Identify outdated formats or duplicate entries.
- Verify that all documentation aligns with buyer instructions and production realities.

Production and inspection documentation is a critical, though often underappreciated, aspect of garment manufacturing. These records serve as the foundation for maintaining quality, ensuring buyer compliance, facilitating smooth workflow, and supporting continuous improvement. When maintained effectively, they reduce errors, enhance accountability, and foster a culture of transparency and precision. For any quality-focused garment manufacturer, documentation isn't just paperwork—it's a strategic asset that supports performance, reliability, and long-term success.

3.1.2 Hierarchy Structure in Garment Industry

The garment manufacturing industry is a dynamic and labour-intensive sector that thrives on coordination, precision, and efficiency. A well-defined organizational hierarchy is essential for managing these aspects effectively. The hierarchy structure not only facilitates clear communication and role distribution but also enhances productivity, quality control, and decision-making throughout the production line.

In any apparel production setup—whether a small unit or a large-scale export house—the presence of a structured chain of command ensures that responsibilities are delegated appropriately, authority is respected, and accountability is maintained at all levels. For professionals entering the industry or working on the production floor, understanding this structure is critical to navigate tasks, report issues, and collaborate with teams.

1. **Top Management**

   At the apex of the garment industry hierarchy sits the Top Management, which usually includes the Managing Director, Factory Owner, CEO, or General Manager depending on the organization's scale. Their primary role is strategic: overseeing business direction, financial planning, policy formation, and major decision-making. While they may not be involved in day-to-day operations, their influence is reflected in investments, production goals, and long-term planning.

   Top management is also responsible for:

   - Defining the company's vision and mission.
   - Approving buyer deals, budgets, and timelines.
   - Monitoring profitability and growth indicators.
   - Ensuring compliance with industry regulations and buyer standards.

   Their involvement is crucial in high-level negotiations, audits, and addressing critical escalations from the lower levels of management.

2. Middle Management

Middle management forms the executional core of the hierarchy. This level includes:

- Production Managers
- Merchandising Managers
- Quality Assurance (QA)/Quality Control (QC) Heads
- Planning and Industrial Engineering (IE) Managers
- Maintenance Managers

These individuals act as the bridge between top management and operational staff. They are responsible for implementing the company's production and quality strategies, monitoring performance, and ensuring that operational targets are achieved within deadlines and budgets.

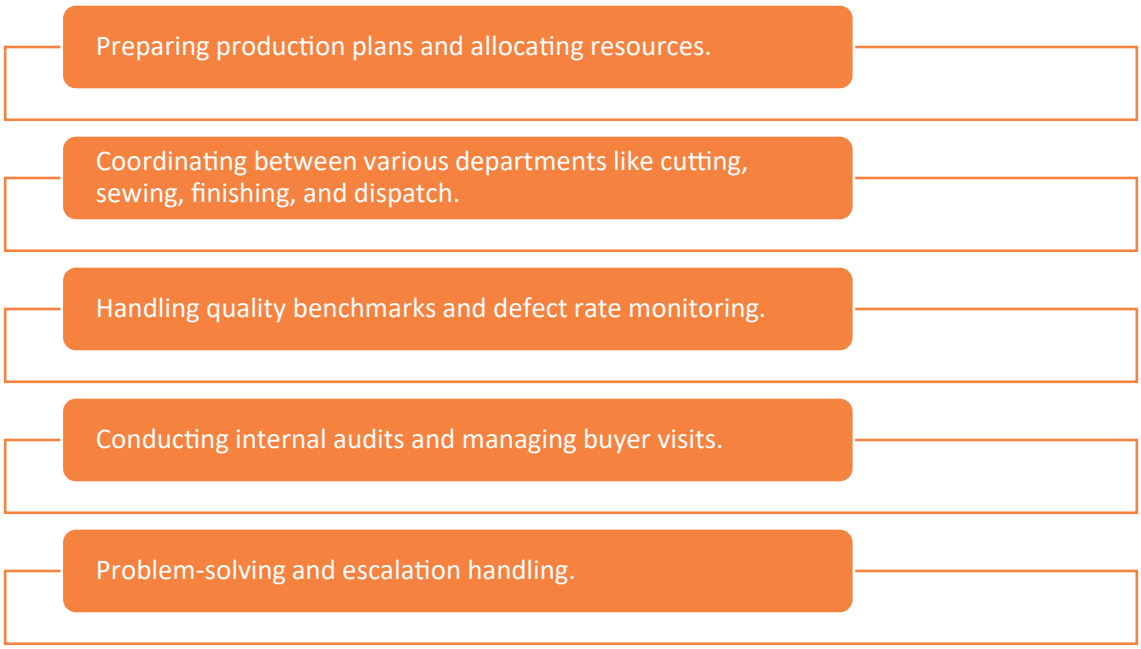


Fig. 3.1.2: Key Responsibilities of Middle Management

Middle managers need strong leadership and coordination skills to translate the company's strategic vision into actionable tasks.

3. Supervisory Staff

This level includes Line Supervisors, Line Leaders, and Section Heads. These professionals work closely with the workers and are the first point of contact for problem-solving on the shop floor. Their job is to manage small teams, maintain workflow, report delays or issues, and ensure that the team adheres to quality and quantity targets.

Responsibilities:

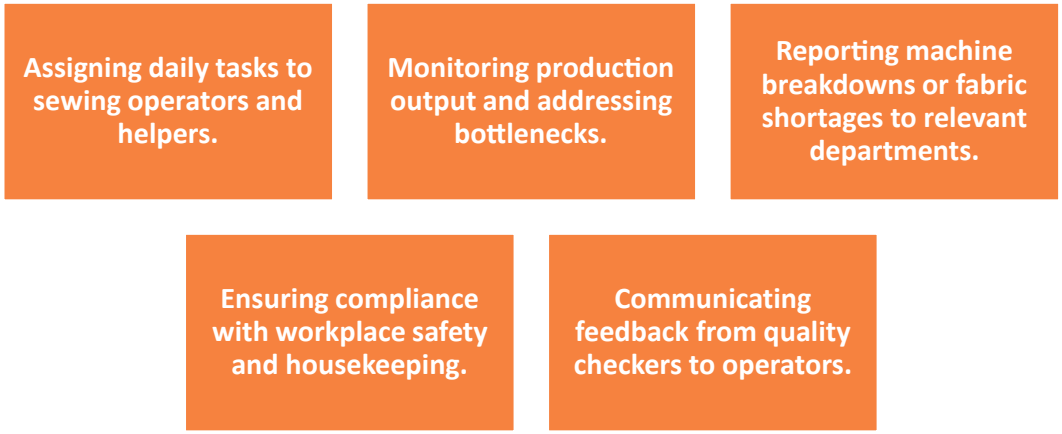


Fig. 3.1.3: Responsibilities of Supervisory Staff

Supervisors play a key role in frontline quality control and are essential for real-time issue resolution.

4. **Quality Control Personnel**

Quality assurance is embedded at multiple levels in the hierarchy to ensure garments meet the required specifications. QA/QC staff are placed across departments, including cutting, stitching, finishing, and packing.

This group includes:

- Inline Checkers
- Endline Inspectors
- Quality Auditors
- Final Quality Controllers

They follow SOPs (Standard Operating Procedures) and buyer protocols to detect, document, and reduce defects. QC personnel also coordinate with supervisors and line managers to implement corrective actions.

Their responsibilities include:

- Sampling and testing fabric and trims.
- Checking fit, measurements, labelling, and appearance.
- Reporting major defects and initiating rework.
- Documenting inspection reports and preparing audit logs.
- Conducting quality awareness sessions for workers.

5. **Operational Workers**

The backbone of the garment industry is its operational workforce, which includes:

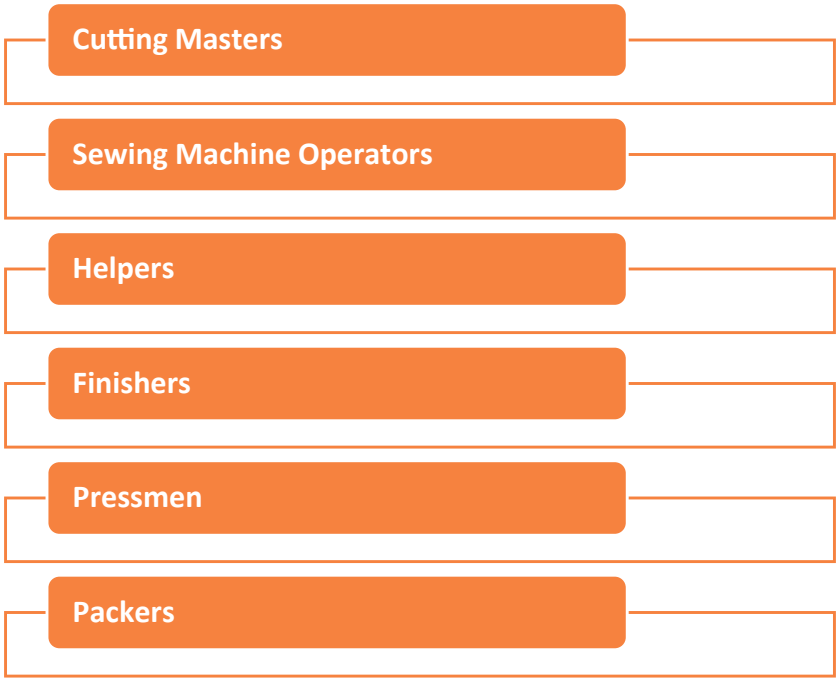


Fig. 3.1.4: List of Operational Workers

Each worker specializes in a specific task and contributes to the cumulative productivity of the line. Despite being at the base of the hierarchy, their role is indispensable. Training and skilling initiatives are often targeted at this group to ensure quality and consistency.

Operational workers report directly to their line supervisors and receive instructions on daily production goals, quality standards, and technical improvements. Their timely execution and adherence to instructions directly affect production timelines and output quality.

6. **Support Departments**

Apart from the core production team, garment factories also have various support functions:

- **HR Department:** Manages hiring, payroll, grievance redressal, and labour law compliance.
- **Stores Department:** Handles fabric and trim inventory, issue logs, and supplier coordination.
- **Maintenance Team:** Ensures smooth functioning of machines, electricals, and safety systems.
- **Compliance and Safety Team:** Monitors health and safety regulations, fire safety, and audits.

These departments interact with different hierarchy levels to support production continuity and legal compliance.

7. **Communication Flow in the Hierarchy**

In a garment unit, both vertical and horizontal communication are essential. Vertical communication allows messages to flow from top to bottom—such as policy changes or production targets—and from bottom to top—like escalation of issues or reporting delays.

- Horizontal communication takes place within departments. For example:
- QA personnel coordinate with production teams to address defects.
- Merchandisers interact with planning departments to update buyer specifications.

Effective communication ensures:

- Faster decision-making.
- Transparency in operations.
- Efficient coordination and problem-solving.
- Timely updates and escalations.

8. **Role of Hierarchy in Quality Control**

   Quality control responsibilities are shared across levels:

   - Top management defines quality vision and buyer engagement.
   - QA managers set inspection criteria and compliance benchmarks.
   - Line supervisors enforce in-process quality checks.
   - Operators follow instructions and flag irregularities.

This multi-tiered approach allows defects to be caught early, reducing rework and wastage. It also embeds accountability at every level, ensuring ownership of both product and process quality.

The hierarchy structure in the garment industry is designed to maintain operational efficiency, quality assurance, and effective communication. Each level has defined roles and interacts with others to ensure timely production, cost control, and buyer satisfaction. For new entrants in the industry, understanding this structure is vital for smooth integration, effective collaboration, and career growth. Whether one is an operator or a quality checker, knowing where to report, how to escalate issues, and who is responsible for what can significantly improve personal performance and the overall workflow of the organisation.

3.1.3 Monitoring and Ensuring Quality During Production

Quality monitoring in garment production is a systematic and continuous process that ensures every stage of production complies with set quality standards. Rather than waiting until the end of the line to identify defects, modern garment factories embed quality checks into the entire workflow—from raw material inspection to final packing. This proactive approach minimizes rework, enhances customer satisfaction, and helps maintain brand reputation. Let's examine the key stages of this process in detail:

1. **Pre-Production Checks:** Pre-production checks are essential groundwork activities conducted before actual garment production begins. These quality checkpoints act as a preventive mechanism, ensuring that all inputs and parameters are approved and aligned with buyer specifications.

Steps for Pre-Production Checks	Description
Lab Dips	For dyed garments, fabric swatches (lab dips) are prepared to match the colour standards provided by buyers. Only upon approval are bulk dyeing operations started. Variations in shade can lead to garment rejection, so this step is critical in colour quality assurance.
Trim and Accessory Approvals	All trims—such as buttons, zippers, labels, elastics, and threads—are submitted for buyer approval. Trims must meet functional and aesthetic requirements. For instance, zipper pull strength or colourfastness might be tested.
Pattern Verification	Garment patterns must be checked for accuracy in shape, grading (sizing), and alignment with the tech pack. An incorrect pattern can affect the fit and look of the final garment.

Steps for Pre-Production Checks	Description
Line Setting and Trial Runs	Before mass production, a trial run is conducted to evaluate line balancing, machinery settings, and operator readiness. Quality personnel observe sample stitching to identify any technical or human errors. Adjustments are made based on findings.

Table 3.1.1: Pre-Production Checks

2. **Inline Inspections:** Inline quality inspections are conducted during the production process. Inspectors are stationed at critical control points (CCPs) along the sewing line to monitor operations in real time. The goal is to detect and correct errors before they accumulate or move further down the line.

   Common Inline Checks Include:

   - **Seam Strength & Stitching Quality:** Checking for skipped stitches, loose threads, or uneven seam lines.
   - **Component Matching:** Ensuring pockets, panels, and collars are attached correctly.
   - **Size and Symmetry:** Left and right panels of the garment should mirror each other.
   - **Machine Tension Settings:** Monitoring machine performance to prevent recurring issues like puckering or thread breakage.

   Inline inspectors maintain checklists and reject tags, which are shared with line supervisors. This encourages immediate corrective action and fosters a culture of accountability.

3. **End-Line Inspections:** End-line inspection is the final checkpoint in the sewing line. This step ensures that the completed garment meets all construction and appearance specifications before it moves to finishing and packing.

   Inspection Criteria:

   - **Measurement Accuracy:** Garments are measured against the spec sheet to verify size conformity.
   - **Stitch Count & Cleanliness:** Each seam is checked for the correct number of stitches per inch (SPI) and for cleanliness—no oil stains, chalk marks, or thread tails.
   - **Aesthetic Quality:** Final inspection includes checking prints, embellishments, embroidery, and trims to ensure they match the approved sample.

   Only garments that pass the end-line inspection move to the finishing section. Rejected pieces are tagged and sent for rework.

4. **Random Sampling & AQL (Acceptance Quality Limit):** After the garments have passed inline and end-line checks, statistical quality control (SQC) is applied using the AQL system. This is typically conducted by the quality assurance team or third-party inspectors.

   How AQL Works:

   - A batch (lot) is selected randomly for sampling.
   - Sample size and rejection criteria are determined using AQL tables (e.g., AQL 2.5 for general garments).
   - If the number of defects found in the sample is within the acceptance threshold, the lot passes.
   - If defects exceed the acceptable limit, the entire lot may be rejected or rechecked.

AQL inspections ensure that mass production adheres to a defined quality standard. It also helps prevent quality problems from reaching customers.

5. **Feedback Loop and Corrective Action:** One of the most important elements of quality monitoring is the feedback loop, where quality findings are documented and communicated to relevant departments.

   Key Practices Include:

   - **Rework Instructions:** Defective garments are tagged with rework details. Operators and supervisors are informed about how to fix the issue.
   - **Preventive Actions:** Root cause analysis is done for repeated defects. For example, if needle breakage causes frequent holes in fabric, the machine setting or needle type may need changing.
   - **Quality Reports:** Daily inspection reports help management analyse trends and identify problem areas. These are discussed during production meetings.
   - **Training Interventions:** If repeated errors are traced to operator mistakes, targeted training is arranged.

   This continuous improvement cycle ensures long-term reduction in defect rates and helps meet buyer expectations consistently.

6. **Benefits of Proactive Quality Monitoring:** Implementing quality monitoring at every stage of garment production offers multiple benefits:
   - **Reduced Rework and Waste:** Early detection of faults saves time and materials.
   - **Higher Buyer Satisfaction:** Consistent quality leads to repeat orders and brand trust.
   - **Increased Efficiency:** Quick problem-solving prevents production delays.
   - **Audit Readiness:** Detailed quality documentation makes external audits easier and successful.
   - **Worker Awareness:** Quality monitoring promotes a culture where workers understand the importance of quality in their roles.

   Quality monitoring is no longer confined to the final inspection. In the competitive apparel manufacturing environment, success depends on embedding quality consciousness into every production stage. From lab dips and pattern checks to inline inspections and AQL sampling, each step helps in delivering defect-free garments. Most importantly, the feedback loop ensures that learning from past errors becomes a foundation for future excellence. With proper training, collaboration, and documentation, garment manufacturers can ensure high-quality output that meets global standards and satisfies buyers across the world.

3.1.4 Inspection of Raw Materials for Defects

The foundation of any high-quality garment lies in the quality of its raw materials. No matter how skilled the craftsmanship or how sophisticated the machinery, if the base materials are flawed, the final product will reflect those deficiencies. Therefore, inspecting raw materials is not just an initial step—it is a critical quality control process that determines the success of the entire production cycle.

1. **Importance of Raw Material Inspection:** Raw material inspection acts as the first checkpoint in quality assurance. Materials received from suppliers are checked for conformity with the buyer's specifications and technical package (tech pack). These checks help:
   - Prevent quality defects in finished garments.
   - Ensure seamless workflow during production.

- Minimize wastage due to unusable fabric or trims.
- Avoid delays caused by last-minute material replacements.
- Improve buyer satisfaction and reduce returns or complaints.

Identifying defects early reduces cost and effort in downstream processes such as stitching, finishing, and packaging.

2. **Fabric Inspection Parameters:** Fabrics form the primary base of any garment, and as such, they undergo the most thorough inspection. Both visual and technical evaluations are carried out to ensure that the fabric is fit for production.

   - **Color Inconsistencies**

     One of the most common issues in fabric inspection is uneven dyeing. This may appear as shade variation across the roll or within different rolls of the same fabric lot. Visual inspection under standard light conditions (e.g., D65 light) helps detect such discrepancies. Color swatches (lab dips) previously approved by the buyer serve as reference points.

     Impact: If unnoticed, shade variations can result in mismatched panels in the same garment, leading to aesthetic flaws and rejections.

   - **Holes, Snags, and Slubs**

     Holes and snags are physical damages caused during weaving or handling. Slubs (thick or uneven yarn portions) may also affect the garment's appearance.

   - **Detection Method:** Visual inspection while fabric is unrolled on a light box or inspection table. Some factories use automated inspection machines with cameras and defect-mapping software.

     Impact: Such flaws weaken the fabric's structural integrity and result in rework or waste.

   - **Off-Grain or Skewed Weaves**

     Off-grain fabrics occur when the weft (horizontal threads) do not run perpendicular to the warp (vertical threads). This can lead to distortion in the final garment after stitching or washing.

   - **Testing:** Stretching the fabric to see if it returns to shape, or marking a right-angle square and observing distortion.

     Impact: Affects garment drape and symmetry, especially in striped or checkered fabrics.

   - **Contamination or Foreign Fibers**

     Black dots, plastic particles, or different-colored yarns embedded in the fabric are considered contaminants. These may enter the material during spinning, weaving, or packing.

     Impact: Even a small visible contaminant can ruin the look of a white or light-colored garment and often leads to rejection.

   - **Dye Migration or Bleeding**

     In multi-color fabrics or prints, dyes may bleed during washing or ironing, causing discoloration or color transfer.

   - **Tests Conducted:** Rubbing fastness (dry and wet), washing fastness, and perspiration fastness are tested in the lab or using portable kits.

     Impact: Garments may fail post-sale use tests, leading to consumer dissatisfaction.

3. **Trims and Accessories Inspection**

   Trims and accessories are the supporting components of a garment—zippers, threads, buttons, hooks, laces, elastics, and labels. These may appear small but play a significant role in both functionality and visual appeal.

- **Size and Dimension Checks**

  Each trim item must match the size mentioned in the tech pack or bill of materials. For instance, a 5 mm button should not be replaced with a 7 mm one, as it may not fit the buttonhole.

- **Finish and Color Matching**

  Metal trims must be rust-free, smooth-finished, and color-matched to the garment's theme. Threads must be shade-matched and of consistent thickness.

  Impact: Poor finish or mismatched trims can make the garment look cheap or unfinished.

- **Strength and Durability Testing**

  Accessories like zippers and snaps must be tested for functional strength. Pull tests, fatigue tests, and torsion tests are conducted to ensure these items do not break during usage.

  Example: A zipper may be tested for 100+ opening and closing cycles to simulate repeated consumer use.

- **Compatibility and Placement Accuracy**

  Trims must be compatible with fabric types. For instance, a heavy metal button on a lightweight fabric may cause sagging or tearing.

  Impact: Improperly matched trims can cause sewing issues or even damage garments during use or washing.

4. **Documentation and Reporting**

   Each inspected batch of fabric and trims must be documented. Key records include:

   - Fabric inspection reports
   - Trims test certificates
   - Colour approval sheets
   - Deviation notes for rejected or conditionally approved materials

   These reports are shared with the quality assurance (QA) team and merchandisers to take appropriate action—such as rejection, return to supplier, or conditional use.

5. **Consequences of Ignoring Raw Material Inspection**

   Failure to inspect raw materials at the start can have cascading effects:

   - Defective garments may pass unnoticed until the final stage.
   - Rework leads to production delays and cost escalation.
   - Excessive defects can jeopardize shipment deadlines.
   - Damaged reputation and loss of business from buyers.
   - Higher rejection rates during internal or third-party audits.

   Hence, raw material inspection must be treated as a quality gate that protects the entire production process.

Raw material inspection is not merely a procedural formality—it is a strategic quality control measure that safeguards the integrity of garment production. From detecting shade variation in fabrics to verifying the strength of zippers, every check plays a vital role in ensuring that the finished garment meets quality expectations. A robust inspection protocol helps avoid costly mistakes later in production and reinforces the manufacturer's commitment to quality excellence. With proper tools, trained inspectors, and strict adherence to standards, apparel manufacturers can build quality from the ground up—one fabric roll and one trim at a time.

3.1.5 Verifying Quality Standards for Fabric and Materials

After While visual inspections serve as the first filter in raw material quality control, laboratory testing provides objective data on whether materials meet the desired technical and performance standards. These tests evaluate how fabrics and trims will perform during production and in real-life usage. If raw materials fail to meet these specifications, the entire production process—and ultimately the customer experience—is at risk.

Garment buyers and brands often define strict quality benchmarks in their technical packs, which must be followed rigorously by manufacturers. These may include global standards such as,

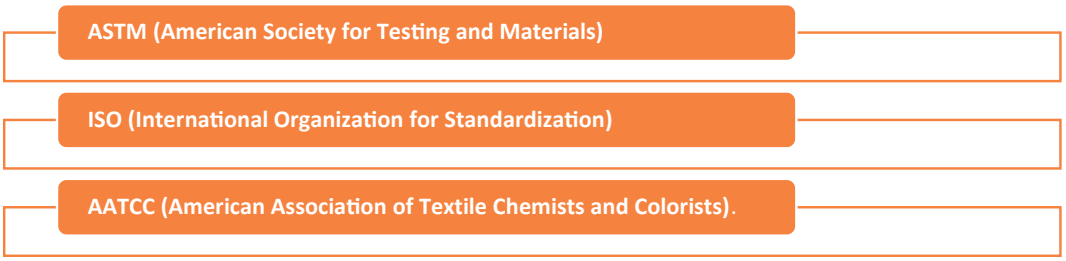


Fig. 3.1.5: Garment Buyers and brands

The critical fabric and trim testing parameters and their significance in ensuring garment quality and compliance have been provided below:

1. **Fabric Testing Parameters**

   Fabric is the primary component of any garment, and its physical properties must be precisely assessed to ensure it is suitable for cutting, sewing, wearing, and washing. Below are the most important tests conducted:

   - **GSM (Grams per Square Meter) – Fabric Weight**

     Definition: GSM measures the weight of the fabric per square meter and helps determine the thickness, density, and intended use of the fabric.

     Significance:

     - A T-shirt may require fabric of 160–180 GSM, while denim pants may use fabric above 300 GSM.
     - Any deviation can affect drape, stretch, and wearability.

     Testing Method: A GSM cutter extracts a circular fabric sample, which is weighed using a digital scale.

   - **Shrinkage Test**

     Definition: Measures how much a fabric will shrink after washing or exposure to moisture and heat.

     Significance:

     - Fabrics that shrink excessively can distort garment shape, resulting in poor fit and customer dissatisfaction.
     - Shrinkage beyond ±3% is usually considered unacceptable by most brands.

     Testing Method: A marked sample (usually 50x50 cm) is washed and ironed per specific standards. The dimensional change is then recorded.

- **Colourfastness Tests**

  These tests evaluate the resistance of fabric dyes to various conditions.

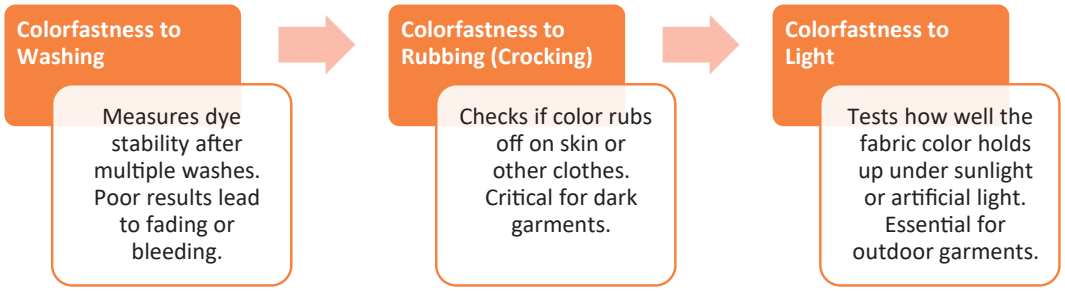


Fig. 3.1.6: Colourfastness Tests

Testing Method: AATCC or ISO methods are used involving washing machines, crock meters, or exposure to xenon light chambers. The results are compared against a grey scale for staining and fading.

Tear and Tensile Strength

- **Tear Strength:** Measures the force needed to propagate a tear once it has started.
- **Tensile Strength:** Measures the force required to pull the fabric apart.

Significance:

- Fabrics must withstand stitching, handling, and wearing without damage.
- Essential for workwear, sportswear, and children's garments.

Testing Method: Machines like the Universal Testing Machine (UTM) apply force until the fabric fails.

- **Pilling Resistance:** Evaluates the fabric's tendency to form small fibre balls (pills) on the surface due to friction.

  Significance:

  - Pilling gives garments a worn-out look prematurely.
  - It is more common in synthetic blends and brushed fabrics.

  Testing Method: The Martindale or ICI Pilling Tester simulates fabric rubbing to assess pilling formation over time.

2. **Trim and Accessory Testing:** Trims, although smaller in proportion to fabric, contribute significantly to garment aesthetics, functionality, and safety. These include zippers, threads, buttons, snaps, labels, and elastic bands.

   - **Compatibility and Size**

     Significance:

     - Trims must match the design in size, color, and material.
     - For example, using a large zipper on a lightweight blouse can damage the fabric.

     Testing Method: Visual and manual checks against the buyer's tech pack or BOM (Bill of Materials).

- **Strength and Durability Tests**

  Each trim must withstand the stress it will face during wear and care cycles.

  - **Zippers:** Tested for pull strength, smoothness, and locking mechanism.
  - **Buttons/Snaps:** Assessed for pull-off resistance using specialized gauges.
  - **Threads:** Checked for tensile strength and knot slippage.

  Significance:

  - Weak zippers can break.
  - Loose buttons or fragile threads lead to garment failure.
  - In children's garments, broken trims pose a choking hazard, making these tests legally important.

  Washability and Colorfastness: Just like fabric, trims should maintain their color and finish after laundering.

  Example: A metallic button must not rust or lose plating after 5+ wash cycles.

- **Toxicity and Compliance Testing:** Some brands (especially in the EU and US) require tests for chemical compliance:
  - Lead, nickel, or formaldehyde levels must be within safe limits.
  - AZO dye content is regulated under REACH (Registration, Evaluation, Authorisation and Restriction of Chemicals) in Europe.

  Significance:

  - Non-compliance can result in customs rejection, fines, or recalls.

3. **Documentation of Test Results:** All tests performed on raw materials are documented in Test Reports or Certificates of Analysis (COA). These documents are:
   - Shared with merchandisers and quality managers.
   - Stored for buyer audits and certifications (like ISO 9001 or SA8000).
   - Used to authorize material release to production floors.

   In case of deviations, re-testing, supplier replacement, or conditional approvals are processed via a structured protocol.

Testing raw materials after the initial inspection is an indispensable part of quality control in garment manufacturing. Visual checks can only detect surface-level issues, while standardized lab testing uncovers how materials will perform under stress, over time, and through various conditions. From GSM and shrinkage to tensile strength and chemical compliance, each test contributes to building a garment that is not only beautiful but durable, comfortable, and compliant with buyer and legal standards. Investing in robust raw material testing helps manufacturers reduce defects, avoid buyer rejections, and build long-term trust with clients across the globe.

3.1.6 Inspecting Pattern and Template Accuracy

In the garment production process, precision starts long before fabric cutting and stitching—it begins with the accuracy of patterns and templates. These tools are essential blueprints used in converting design concepts into physical garments. Even minor inaccuracies in patterns or templates can result in poorly fitting garments, compromised aesthetics, excess fabric waste, production delays, and increased costs due to rework or rejections.

Therefore, inspecting the accuracy of patterns and templates before production begins is a crucial step in quality assurance. This inspection ensures the intended design, size, and function of each garment are maintained and that all pieces can be assembled correctly during the sewing process.

1. **Understanding Patterns and Templates**

   Patterns refer to the 2D representations of garment pieces that are traced and cut from fabric to construct a complete garment. These patterns may be drafted manually or digitally using CAD software and then translated into templates made from paper, cardboard, or plastic, which guide fabric cutting.

   Each pattern or template includes:

   - The shape and size of a garment section (like a sleeve or bodice).
   - Important markings such as grainlines, notches, darts, pleats, and seam allowances.
   - Design details like pocket placements, embroideries, or trims.

   Before these patterns are approved for bulk production, they must undergo a detailed inspection for dimensional and functional accuracy.

2. **Accuracy Matters**

   Inaccurate patterns lead to a range of production and quality issues:

   - Poor fitting garments that don't match customer specifications.
   - Misaligned components, such as collars not fitting necklines or sleeves not matching armholes.
   - Incorrect grading, affecting size standardization.
   - Wasted materials, increasing production costs.
   - Time lost in troubleshooting, rework, or even rejection of entire batches.

   By contrast, precise patterns and templates ensure consistent, high-quality garments that meet both design aesthetics and buyer expectations.

3. **Responsibilities of QA in Pattern Inspection**

   The Quality Assurance (QA) team plays a key role in verifying that patterns and templates:

   - Follow the buyer's tech pack specifications.
   - Are complete and consistent.
   - Meet garment engineering standards for functionality, comfort, and fit.

   QA inspection is performed on:

   - Paper or cardboard patterns.
   - Digital files from CAD systems.
   - Sample fabric cutouts for pilot testing.

4. Critical Aspects of Pattern and Template Inspection

Pattern and Template Type	Inspection Criteria
Seam Allowances	• Seam allowance is the extra space around the pattern used for stitching. • QA checks that the correct width (commonly 1/4", 3/8", or 1/2", depending on the design) is consistently added to all edges. • Missing or inconsistent seam allowances result in size discrepancies and structural instability.
Grainline Accuracy	• Grainlines indicate the direction the pattern piece should be placed on fabric. • Proper alignment ensures the garment falls, stretches, and behaves as intended. • Misaligned grainlines can cause twisting, draping errors, or size variations after washing.
Notches, Darts, and Symbols	• Darts shape the garment for better fit (especially in bust, waist, or hip areas). • Other markings (fold lines, drill holes, button placements) must be clear and correct. • Misplaced or missing notches and darts lead to sewing errors and defective products.
Shape and Design Conformity	• QA verifies whether each pattern piece matches the approved tech pack or sample garment in terms of design, silhouette, and functionality. • This includes checking for proper curve shaping, symmetry, and completeness of design elements (e.g., pleats or gathers).
Size Grading	• Garments come in multiple sizes, so grading (size scaling) must be accurate and proportionate. • QA ensures that the difference between sizes follows the grading rules without distorting garment proportions. • Poor grading can lead to ill-fitting garments for various sizes in the same style.5. Inspection Methods and Tools

Table 3.1.2: Critical Aspects of Pattern and Template Inspection

Manual Inspection

- Using rulers, curves, measuring tapes, and reference patterns.
- Side-by-side comparison of current patterns with master samples or approved patterns.
- Overlaying patterns on dress forms or mannequins to assess shape accuracy.

Digital Verification

- CAD software allows precise checking of:
  - Measurements and grading increments.

- Symmetry and matching curves.
- Seam compatibility across all pattern pieces.

Trial Sample Check

- A trial fabric cut using the pattern is stitched to form a sample garment.
- QA checks the garment's fitting, construction ease, and alignment of all components.
- If approved, the pattern is signed off for production.

5. **Documentation and Traceability**

   After inspection:

   - A pattern verification report is filled out, noting any deviations found and actions taken.
   - The approved version is marked and saved as the master pattern.
   - Any revisions are version-controlled to avoid confusion on the production floor.

   This ensures traceability in case issues arise during production or post-delivery.]

6. **Common Issues Identified During Inspection**
   - Missing seam allowances on one side.
   - Notches not matching between front and back panels.
   - Dart positions inconsistent across sizes.
   - Collar patterns too small for neckline.
   - Templates distorted due to poor storage or handling.

   QA teams must address these issues promptly to prevent bottlenecks later.

7. **Best Practices for Template Management**
   - Store templates in dry, flat environments.
   - Label each template with size, style, and pattern version.
   - Keep digital backups of all patterns.
   - Conduct periodic audits of template sets used in active production.

Inspecting pattern and template accuracy is a proactive quality measure that prevents defects and ensures garment consistency, fit, and compliance with buyer expectations. In a high-speed, quality-driven garment industry, this step cannot be overlooked. A robust QA protocol that inspects not only the measurements but also the functionality, alignment, and construction logic of each pattern piece lays the foundation for flawless mass production and buyer satisfaction.

3.1.7 Ensuring Template Accuracy Before Cutting

In the garment manufacturing industry, template accuracy is a critical factor that significantly influences the quality and consistency of the final product. Templates—also known as patterns—serve as the blueprint for cutting each component of a garment. Whether created digitally using CAD software or manually on pattern paper, these templates dictate the size, shape, seam allowance, and alignment of every panel that makes up a garment.

Even a minor inaccuracy in templates can result in misaligned seams, poor garment fit, fabric wastage, and expensive rework or rejections. Therefore, ensuring template accuracy before initiating the cutting process is not just a quality control measure but a foundational practice for operational excellence.

1. **Role of Templates in Garment Manufacturing**

   Templates are the standardized shapes of garment parts like sleeves, collars, bodices, waistbands, and pockets. They may exist as:

   - Paper patterns for manual cutting.
   - Cardboard templates used repeatedly for marker making.
   - Digital CAD files used in computerized cutting machines.

   They define:

   - Garment dimensions and allowances.
   - Placement points for embroidery, buttons, pleats, and seams.
   - Fabric grain alignment and cut direction.

   Templates ensure uniformity and sizing consistency across mass production batches, which is essential in export-quality garments where tolerance levels are minimal.

2. **Importance of Template Accuracy**

   Errors at the template stage cascade through the production process, affecting every subsequent step:

   - Inaccurate templates may lead to tight or loose fits.
   - Misaligned cut pieces can cause sewing challenges and aesthetic issues.
   - Defects may only be detected at finishing or post-production, making rework expensive.
   - Incorrect template measurements can lead to non-conformance to buyer specifications and potential shipment rejections.

3. **Quality Assurance (QA) Role in Template Verification**

   Before the cutting process begins, Quality Assurance teams conduct a detailed validation of templates. This verification includes checking against:

   - Approved CAD files or master patterns.
   - Sample garments.
   - Measurement specifications from the buyer's tech pack.

   This pre-cutting verification process is often called a Template Audit, which involves both visual inspection and measurement validation.

4. **Key Aspects Checked During Template Verification**

Key aspects	Verification Criteria
Fabric Grain Line Alignment	• Each template includes a grain line indicator that shows how it should be laid on the fabric. • Misalignment with the fabric grain can affect garment drape, stretch, and stability. • QA ensures grain lines are parallel to the fabric selvedge as required.

Key aspects	Verification Criteria
Accurate Measurements and Shape	• Length, width, and shape contours must match the approved measurements within specified tolerances. • Templates should be checked using rulers, measuring tapes, or even overlay comparison with approved digital patterns.
Symmetry and Balance	• Front and back panels, left and right sleeves, and side seams must mirror each other accurately. • Uneven templates cause imbalance, especially noticeable in fitted garments like shirts, dresses, or trousers.
Markings and Notches	Templates must clearly indicate: • Seam allowances. • Dart positions. • Fold lines. • Placement markers for zippers, buttons, pleats, embroidery, or pockets.
Template Distortion	• Curved edges where there should be straight lines. • Shrunken or stretched templates due to paper or cardboard deformation.

Table 3.1.3: Key Aspects Checked During Template Verification

5. Material and Storage of Templates

To ensure long-term accuracy, templates must be:

- Made from durable material such as high-density paper, plastic, or cardboard.
- Stored flat or hung in designated pattern storage areas.
- Labelled properly with size, style, version number, and department.

Damaged or outdated templates must be replaced or updated promptly. A periodic audit should be conducted to ensure templates in storage match the latest design revisions.

6. Integration with CAD Systems

Modern garment units increasingly rely on CAD (Computer-Aided Design) software to create and verify templates:

- Patterns can be automatically graded for size variations.
- Tolerances can be controlled with precision.
- Markers can be generated to optimize fabric utilization.

However, even with CAD, a physical check of printed patterns or initial cut samples remains necessary to catch issues related to plotting, printer calibration, or operator error.

7. Trial Cutting and Sample Verification

Once templates are verified, a trial cut is often performed using sample fabric. This sample cut undergoes:

- Pilot sewing to assess construction ease and fit.

- Measurement checks on the assembled garment.
- Feedback analysis from QA and production teams.

Only after successful validation is the go-ahead given for bulk cutting.

8. SOP for Template Accuracy Verification (Suggested)

- Receive approved templates from the pattern department.
- Cross-check with CAD file/tech pack for consistency.
- Visually inspect each template for distortion or damage.
- Measure critical dimensions against approved specs.
- Verify marking accuracy and legibility.
- Perform sample layout on fabric to confirm grain direction.
- Document findings and approve for cutting.

This SOP ensures consistency and traceability in the template approval process.

Template accuracy is a non-negotiable aspect of garment quality assurance. Since cutting marks the beginning of mass production, any error at this stage magnifies across hundreds or thousands of pieces. Therefore, verifying that templates are accurate, well-marked, distortion-free, and aligned with approved designs is essential. By investing time and care into this process, manufacturers ensure better fitting garments, fewer production issues, and higher buyer satisfaction. In a competitive and quality-sensitive industry like apparel exports, such precision directly contributes to reputation, profitability, and long-term growth.

3.1.8 Machine and Attachment Setup Verification

Before starting the line, machines and attachments must be calibrated according to the production requirements. Key checks include:

- Stitch type and length settings.
- Needle size and thread compatibility.
- Attachments like folders, binders, and guides are securely fitted.
- Oil levels and lubrication points are adequate.
- Test runs confirm uniformity and tension balance.

Improper machine setup can cause skipped stitches, fabric damage, and production downtime. Hence, routine checks and preventive maintenance are mandatory to maintain consistent output and product quality.

Preparation and Use of Control Charts

Control charts are statistical tools used to monitor process consistency. They track parameters like:

- Stitch per inch (SPI)
- Measurement deviations
- Rejection percentages
- Machine downtime

A control chart typically displays data points across a time axis, with upper and lower control limits. If readings fall outside these limits, corrective actions are triggered. QA teams use these charts during audits and root cause analysis (RCA). This systematic approach reduces variability, improves predictability, and enhances overall quality performance.

3.1.9 Analysing Documents like Trim Cards and Measurement Charts

During production, several documents are analysed for consistency and compliance:

- **Trim Cards:** Contain detailed specifications of trims—type, colour, supplier, size, and placement method.
- **Measurement Charts:** Define dimensions for each size, along with acceptable tolerances.
- **Sample Types:** Include proto samples, fit samples, and pre-production (PP) samples. Each serves a distinct validation purpose and is compared against the bulk output.

Careful analysis of these documents ensures the production aligns with buyer expectations. Any deviation triggers communication with the merchandising team and possible adjustments in the production plan.

3.1.10 Completing Production and Inspection Documentation

Timely and accurate documentation is the backbone of compliance and traceability. Key documents to be completed include:

- Daily production reports
- Defect tally sheets
- Rework logs
- Inspection reports (inline, end-line, and final)
- Trim utilization reports
- Sample approval logs

These are compiled and signed off by responsible personnel (QA heads, supervisors, merchandisers). Document completion ensures accountability, supports audits, and provides data for process improvement. It also ensures all stakeholders—from factory to buyer—are aligned on expectations and results.

Summary

- Responsible personnel such as QA heads, supervisors, and merchandisers compile and sign off documents.
- Document completion establishes accountability in the production process.
- Records support both internal and external audits.
- Documentation provides valuable data for process improvement.
- Completed documents ensure alignment between factory teams and buyers.
- They confirm that production outcomes meet agreed expectations.
- Proper sign-off verifies that all quality and process checks are completed.
- Documentation strengthens transparency and trust in the supply chain.

Exercise

Multiple-choice Question:

1. Which document outlines trim placement and colour?
   a. Packing slip
   b. Trim card
   c. Spec sheet
   d. Measurement chart

2. What is a key purpose of raw material inspection?
   a. Improve worker speed
   b. Ensure production targets
   c. Avoid material-based defects
   d. Reduce costs

3. Which tool is essential for pattern verification?
   a. Stitch tester
   b. Metal detector
   c. Template board
   d. Weighing scale

4. Who signs off the production QC reports?
   a. Tailor
   b. Line operator
   c. QC supervisor
   d. Merchandiser

5. Control charts help in:
   a. Waste reduction
   b. Real-time defect monitoring
   c. Export documentation
   d. Safety management

Descriptive Questions:

1. What is the purpose of a trim card?
2. Name a key role in the quality control hierarchy.
3. Define a control chart in production.
4. Why is pattern checking important?
5. What is checked during raw material inspection?

Notes

Scan the QR codes or click on the link to watch the related videos

https://youtu.be/PrLjrCnXDDs?si=K1ieJRmJOV1a9gc7

QUALITY CHECKPOINTS IN GARMENT PRODUCTION

https://youtu.be/022ejRl4i5c?si=ZTcMOuKnMFtg6huE

Inspection Procedure for raw materials

https://youtu.be/_yXkoDkvtMw?si=-rMQ9phALj0Wlccj

Inspection Process in Garment Industry

Skill India
कौशल भारत-कुशल भारत

सत्यमेव जयते
GOVERNMENT OF INDIA
MINISTRY OF SKILL DEVELOPMENT
& ENTREPRENEURSHIP

N·S·D·C
RE>IMAGINE FUTURE

APPAREL MADE-UPS HOME FURNISHING
SECTOR SKILL COUNCIL

4. Identify and Assess the Quality in Sewing Room

Unit 4.1 - Garment Stitching and Quality Control

AMH/N1402

Key Learning Outcomes

By the end of this module, the participants will be able to:

1. Identify the process of stitching the garment.
2. Identify stitching defects in construction of the garment like uneven stitch length, thread incompatibility, curling, shading, uneven panels, pulling or puckering, stretching and needle damage.
3. Inspect the stitching area for any type of hazardous material.
4. Check that the stitching area is clean.
5. Inspect the quality during the stitching process.
6. Inspect the sewing machine controls like thread tension, needle, attachments, bobbin foot pressure before and during stitching.
7. Identify the methods of handling the stitching defects.

UNIT 4.1: Garment Stitching and Quality Control

Unit Objectives

By the end of this unit, the participants will be able to:

1. Describe the process involved in stitching a garment from start to finish.
2. Discuss the different types of stitching defects that can occur during garment construction, including uneven stitch length, thread incompatibility, curling, shading, uneven panels, pulling or puckering, stretching, and needle damage.
3. Illustrate how to inspect the stitching area for any potential hazardous materials.
4. Explain how to verify that the stitching area is maintained clean and safe for work.
5. Outline the procedures for inspecting the quality of the stitching process throughout its course.
6. Elaborate on how to check sewing machine controls such as thread tension, needle, attachments, bobbin, and foot pressure both before and during the stitching process.
7. Discuss various methods for addressing and handling stitching defects effectively.

4.1.1 The Garment Stitching Process: Step by Step

Garment stitching transforms cut fabric pieces into a wearable item through a series of organized operations:

1. **Preparation and Lay Up**
   - Operators receive bundled fabric pieces sorted by size/style.
   - Inspectors briefly check for proper cutting alignment and panel completeness.
2. **Setting Up the Workstation**
   - The machine is calibrated: thread tension, needle type, foot pressure, and bobbin thread are checked.
   - Attachments—folders, binders, guides—are placed for operations like hemming or piping.
3. **Sewing Sequence**
   - Assembly follows a predefined sequence (e.g. shoulder seams → side seams → sleeves → collar → hem).
   - Specialized machines (overlock, flatlock, buttonhole, bartack) are used for precise operations.
4. **Inline Inspection**
   - QC checkers inspect live output at fixed checkpoints on the line.
   - Checks include seam alignment, by-hand turning, stitch length, and tension.
5. **Bundle End Point Quality Check**
   - After specific operations (e.g. pocket stitching or side seams), bundles are inspected before moving forward.
6. **Completion of Stitching**
   - Final operations like attaching labels, buttons or closing waistbands are done.
   - End Line Inspection
   - Completed pieces are measured, stitched again for quality if needed, and prepared for finishing or packing.
   - Throughout, precise coordination between operators, QA staff, and supervisors ensures a continuous, quality focused flow.

4.1.2 Types of Stitching Defects in Garment Construction

Several defects can occur during stitching. Recognizing and categorizing them is essential:

- **Uneven Stitch Length:** Small and large stitches alternate due to fluctuating tension or inconsistent feed mechanisms.

Fig. 4.1.3: Uneven Stitch

- **Thread Incompatibility:** Using thread of different fibre types or strength than specified can cause breakage or poor seam elasticity.
- **Curling or Shading:** Occurs when tension is wrong, especially on knit fabrics. One side appears curled or discoloured.
- **Uneven Panels:** Front/back, left/right seams misaligned due to cutting inaccuracy or operator misplacement.
- **Pulling or Puckering:** Caused by high tension, improper presser foot pressure, or incompatible stitch density.
- **Stretching:** Stretch of fabric in seam area due to aggressive foot feed or fabric stretch not correctly managed.
- **Needle Damage:** Broken or bent needles leave holes or needle scars in delicate fabrics.

Each defect not only impacts aesthetics and fit but may also result in garment rejection, especially for export-quality work. QC teams must be trained to spot these quickly.

4.1.3 Inspecting the Stitching Area for Hazardous Materials

Maintaining a safe and hazard-free stitching workspace prevents injuries and ensures productive operations:

- **Thread Spools and Lint Accumulation:** Lint-free zones are essential to prevent machine fires.
- **Oil or Grease Spillage:** Regularly clean near motors or needle guards to avoid slipping hazards.
- **Sharp Attachments:** Ensure that fold guides, blade-mounted folders, or binding clips are shielded or stowed safely.
- **Loose Electrical Wires:** Must be properly secured, especially around power outlets, motors, and lights.

- **Chemical Residues:** Laundered labels, fusible adhesives, or finishing sprays may leave irritants; proper ventilation and PPE are necessary.

Inspectors should carry a checklist and report any hazards immediately for corrective action.

4.1.4 Ensuring Clean and Safe Stitching Area Maintenance

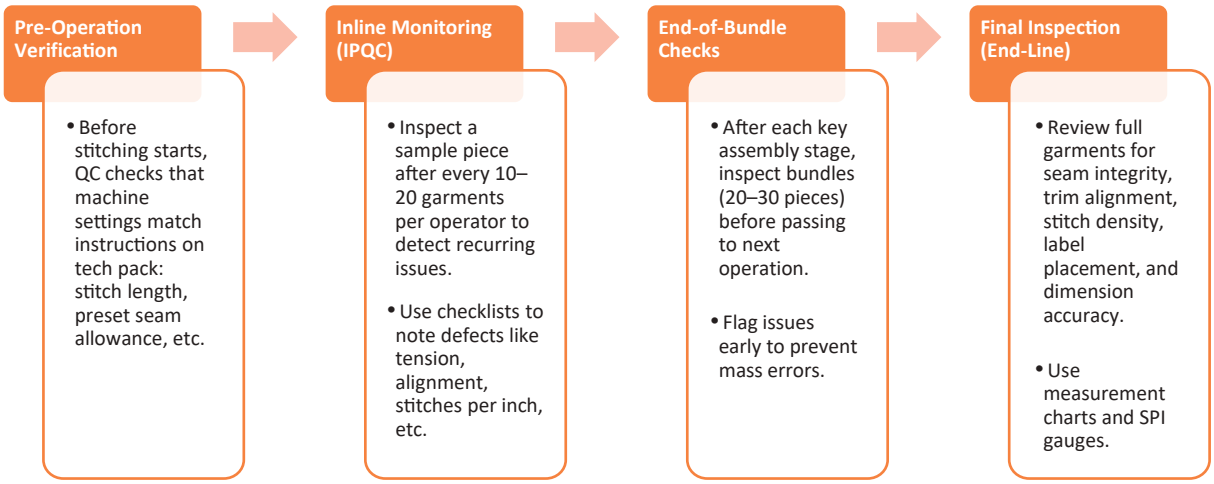
To support efficient stitching with minimal defects:

- **Daily Cleaning Schedule:** Operators clean their stations at shift start and end—dust lint, thread bits, and metal shavings.
- **Organized Layout:** Thread spools, scissors, and small tools should be placed away from stitching area to avoid misplacement.
- **Adequate Lighting:** Prevents eye fatigue and helps detect stitching errors early.
- **Safety Signage and Ergonomic Setup:** Chairs and machine heights must be comfortable; footrests and anti-fatigue mats reduce strain.
- **Routine Spot Checks by QA Supervisors:** Encourage adherence to housekeeping and safe practices.

Clean, safe environments reduce the likelihood of mistakes and injuries.

4.1.5 Inspecting Stitching Quality During the Process

Multiple checkpoints are used to maintain stitching quality across the line:



All inspection results should be logged in daily QC reports.

4.1.6 Checking Sewing Machine Controls Before and During Stitching

Proper machine setup is vital. Key checks include:

- **Thread Tension Setting:** Ensure upper and lower tension match fabric characteristics; test on scrap fabric.
- **Needle Selection:** Correct size and type for fabric (e.g. ballpoint for knits, sharp for woven). Replace needles regularly.
- **Bobbin Winding:** Even and full bobbins prevent tension issues. Change bobbins when nearing end.

Fig. 4.1.4: Bobbin Winding

- **Foot Pressure:** Foot pressure too high leads to fabric distortion; too low causes skipped stitches. Adjust per fabric thickness.
- **Attachments Fitted Correctly:** Check that binders, folders, hemmers are aligned and clean.
- **Lubrication and Machine Cleaning:** Regular oiling and lint removal maintain sewing consistency.

Operators should perform a short test stitch panel at start of shift and after any maintenance before restarting bulk stitching.

4.1.7 Addressing and Handling Stitching Defects

Effective defect resolution includes:

- **Defect Tagging**

  Faulty garments are tagged (color-coded sticker or marking) and removed from flow.

- **Operator Feedback and Retraining**

  Discuss defects with individual operators; demonstrate correct techniques or adjust workstation ergonomics.

- **Machine Re Calibration**

  Inspectors collaborate with supervisors to re-adjust tension, foot pressure, or machine timing to resolve recurring defects.

- **Spell Check Workstation**

  If defects persist, halt the line temporarily to correct issues without letting errors propagate.

- **Root Cause Analysis (RCA)**

  For pattern-level or systemic defects, QA teams use RCA tools (Fishbone diagram or 5 Whys) to identify and resolve underlying causes.

- **Documentation**

  Record defect type, operator, machine, fabric code, and corrective actions in a rework log or quality report. Use this data to track trends.

Resolving defects promptly keeps quality levels high and minimizes waste.

Unit 4.1 provides a full framework for understanding garment stitching and performing effective quality control. Starting from the step-by-step workflow of stitching operations, it covers common defect types, safe stitching environment, quality monitoring checkpoints, machine setup, and defect handling methods. By implementing thorough inspection protocols and proactive corrective measures, quality professionals help ensure that garments meet buyer expectations and industry standards—leading to higher first-pass yield, fewer rejections, and increased customer trust.

Summary

- Garment stitching involves a sequence of operations from fabric preparation to final inspection.
- Workstations must be correctly set up with proper machine calibration, attachments, and tools.
- Common stitching defects include uneven stitch length, thread incompatibility, curling, uneven panels, puckering, stretching, and needle damage.
- The stitching area must be inspected for hazards such as lint buildup, oil spills, sharp attachments, loose wires, and chemical residues.
- Clean and organized workstations with adequate lighting and safety measures support efficient and safe stitching.
- Machine controls such as thread tension, needle type, bobbin winding, foot pressure, and lubrication must be checked regularly.
- Defects are handled through tagging, operator feedback, machine recalibration, line stoppage, root cause analysis, and documentation.
- Consistent inspection and corrective actions help maintain quality, reduce waste, and meet buyer standards.

Exercise

Multiple-choice Question:

1. Which is a stitching defect?
   a. Fabric shade variation
   b. Open seam
   c. Hole
   d. Colour migration

2. What helps ensure safe stitching operations?
   a. Using blunt needles
   b. Wearing loose clothing
   c. Maintaining machine guards
   d. Working without breaks

3. Why inspect after stitching?
   a. Avoid overproduction
   b. Ensure stitching consistency
   c. Speed up packaging
   d. Check pricing

4. Which control is checked on sewing machines?
   a. Voltage
   b. Thread tension
   c. Light angle
   d. Needle colour

5. When should hazardous material be checked?
   a. After packaging
   b. Before stitching
   c. At shipping
   d. Post-production

Descriptive Questions:

1. List two stitching defects.
2. What is checked in a stitching area for safety?
3. Define thread tension in stitching.
4. Mention a stitching quality parameter.
5. Why is stitching inspection essential?

Notes

Scan the QR codes or click on the link to watch the related videos

https://youtu.be/ruvgwm9R25I?si=3kI0kLrPOXTWUfW7

How Ready Made Shirts are Made

https://youtu.be/2cS8c2Y2MC8?si=qvmg4WqXlwhbxbxk

MOST COMMON DEFECTS IN GARMENTS

Skill India
कौशल भारत-कुशल भारत

सत्यमेव जयते
GOVERNMENT OF INDIA
MINISTRY OF SKILL DEVELOPMENT
& ENTREPRENEURSHIP

N·S·D·C
RE>IMAGINE FUTURE

APPAREL MADE-UPS HOME FURNISHING
SECTOR SKILL COUNCIL

5. Correction of Stitching Defects

Unit 5.1 - Maintaining Quality in Stitching and Monitoring

AMH/N1402

Key Learning Outcomes

By the end of this module, the participants will be able to:

1. Maintain the required quality during stitching.
2. Analyse product specification, the data and results of quality monitoring.
3. Record product specification, the data and results of quality monitoring in the required format.
4. Prepare control charts to monitor quality during production according to workplace procedures.
5. Correct the stitching defects like uneven stitch length, thread incompatibility, curling, shading, uneven panels, pulling or puckering, stretching and needle damage.
6. Reject the parts or garment which do not meet the quality specifications.
7. Check the stitched garment meet the parameters of the quality standard.

UNIT 5.1: Maintaining Quality in Stitching and Monitoring

Unit Objectives

By the end of this unit, the participants will be able to:

1. Explain how to maintain the required quality during the stitching process.
2. Discuss how to analyse product specifications, data, and results of quality monitoring in the production process.
3. Illustrate how to record product specifications, data, and results of quality monitoring in the appropriate format.
4. Describe how to prepare control charts for quality monitoring during production, in line with workplace procedures.
5. Outline methods for correcting stitching defects such as uneven stitch length, thread incompatibility, curling, shading, uneven panels, pulling or puckering, stretching, and needle damage.
6. Elaborate on how to identify and reject parts or garments that fail to meet the quality specifications.
7. Explain how to check the final stitched garment to ensure it meets the required quality parameters.

5.1.1 Maintaining Required Quality During Stitching

Maintaining quality during the stitching stage of garment production is one of the most critical activities in the apparel manufacturing process. High-quality stitching ensures the garment not only meets aesthetic and functional standards but also provides the durability and finish required by customers and brands. Stitching defects can directly lead to garment rejection, increased costs, and reduced customer satisfaction. Hence, implementing robust quality control practices in this phase is essential.

Factors Affecting Stitching Quality

Several factors influence the quality of stitching:

1. **Operator Skill:** Operators must be well-trained and skilled in various sewing techniques, including the handling of different fabrics, seam types, and stitch formations. Even minor errors in handling can result in uneven stitches, seam puckering, or skipped stitches.
2. **Machine Maintenance:** Stitching machines must be regularly maintained and calibrated to ensure smooth operations. Poor machine condition may result in frequent thread breakage, tension issues, or even fabric damage.
3. **Fabric Characteristics:** Different fabrics respond differently to stitching. For instance, knit fabrics may stretch during stitching, while woven fabrics require precise seam alignment. Fabric compatibility with machines and needles is also important.
4. **Thread Type and Quality:** Using the correct thread type—cotton, polyester, core-spun, etc.—and ensuring its compatibility with the fabric and stitch type is essential for strength and appearance.
5. **Correct Stitch Type and SPI (Stitches Per Inch):** Depending on the garment's use and design, choosing the right stitch type (lock stitch, chain stitch, overlock, etc.) and SPI is crucial. Incorrect settings can lead to weak seams or distorted designs.
6. **Environment and Lighting:** Adequate lighting and clean workspaces are often overlooked but play a vital role in ensuring precision and reducing errors.

Standard Operating Procedures (SOPs)

To ensure uniform quality, SOPs must be followed at each stage of stitching. SOPs define the procedures for:

- Seam positioning and alignment
- Needle size selection
- Thread tension settings
- Stitch density control
- Use of guides and attachments
- Operator handling methods for curved seams, corners, and layered fabrics

Fig. 5.1.1: Standard Operating Procedures (SOPs)

These SOPs are typically created based on buyer requirements, internal QA systems, and industry standards. They help reduce operator subjectivity and improve repeatability.

Process Controls and Checkpoints

To maintain continuous quality, stitching operations include various quality checkpoints, such as:

- **First Piece Approval:** The first stitched piece from every operator is checked for conformity before full production.
- **Inline Checks:** Quality inspectors check garments at specific points in the stitching line to ensure ongoing quality.
- **End-of-Line Inspection:** A comprehensive inspection of finished stitched panels to catch any remaining defects.

Checkpoints are often focused on high-risk operations such as:

- Placket and collar stitching
- Sleeve and armhole joints
- Hemming and bottom seams
- Zipper and pocket attachment

Role of Supervisors and Quality Checkers

Supervisors and inline quality checkers play a vital role in ensuring adherence to quality parameters. Their responsibilities include:

- Training operators on correct stitching methods
- Providing immediate feedback on defects
- Monitoring hourly performance
- Assisting in resolving technical issues
- Escalating recurring problems to maintenance or QA teams

Line balancing and real-time monitoring also help optimize workflow and minimize idle time, which often results in rushed work and quality compromise.

Preventive vs. Corrective Approach

The best approach to stitching quality is prevention rather than correction. This includes:

- Conducting machine trials before shift start
- Using approved sample garments as visual references
- Regular calibration of stitch length and tension
- Conducting daily operator briefings on quality expectations
- Implementing mistake-proofing tools (e.g., guides, sensors, checklists)

Corrective actions like unpicking and re-stitching not only consume time but may weaken fabric integrity and lead to garment damage. Therefore, avoiding errors through planned quality assurance is more cost-effective and sustainable.

5.1.2 Analysing Product Specifications, Data, and Quality Monitoring Results

Achieving high-quality stitching is not possible without a strong framework for analyzing technical specifications and quality data. From the initial tech pack to daily inspection sheets, data-driven quality management is essential to make informed decisions, drive improvements, and ensure consistent production outcomes.

Understanding Product Specifications

Garment specifications are provided through tech packs or buyer manuals. These documents include:

Fig. 5.1.2: Garment Style and Design Illustrations

These specs form the blueprint for production and serve as the standard reference for all inspections and quality evaluations.

Quality teams must be able to interpret these specs accurately and communicate them to the stitching floor. For instance, if a shirt collar requires 12 SPI lock stitch using core-spun thread, any deviation from this can result in failed audits or rejections.

Tools for Quality Monitoring

Several tools and forms are used to capture real-time and cumulative quality data during stitching operations:

1. **First Piece Inspection (FPI):** Verifies the first stitched garment by an operator or machine.
2. **Hourly Tally Sheets:** Records the number of pieces checked and defects found per hour.
3. **In-line and End-line Inspection Reports:** Summarize daily defect types, quantities, and lines affected.
4. **Defect Tags or Labels:** Attached to garments to track defect history.
5. **Quality Scorecards:** Measures performance across KPIs.
6. **Checklists for Specific Operations:** Used to verify plackets, collars, sleeves, etc.

These data sources are compiled and analysed to track quality trends over time.

Analysing Quality Metrics

Some of the most commonly used **Key Performance Indicators (KPIs)** in stitching quality include:

- **Defect Percentage:** Total defects per 100 units produced.
- **First Pass Yield (FPY):** Percentage of garments passing inspection on the first attempt.
- **Rework Percentage:** Volume of garments requiring correction.
- **Right First Time (RFT):** Measures the accuracy of production without any rework.
- **Line Efficiency vs. Quality Scores:** Balancing productivity with quality.

These indicators help production managers and QA teams to pinpoint weak areas. For instance, if a particular line has a high rework rate, it may be due to operator training gaps, faulty machines, or unclear work instructions.

Identifying Root Causes

Once data reveals a trend, Root Cause Analysis is performed using tools such as:

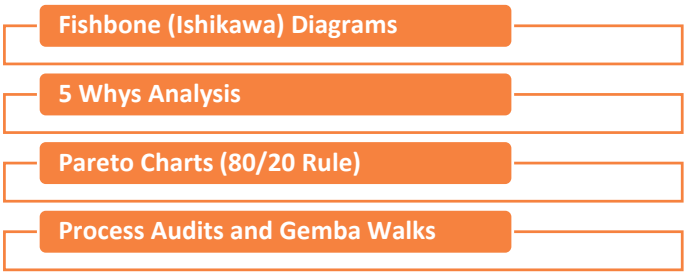


Fig. 5.1.3: Tools used for Root Cause Analysis

Example: If skipped stitches are frequently reported on plackets, possible causes may include dull needles, incorrect SPI, or improper presser foot pressure. Once identified, targeted training or machine servicing can be implemented.

Using Data for Continuous Improvement

Data analysis is not just for reporting defects—it's a tool for continuous improvement. By reviewing trends weekly or monthly, managers can:

- Modify SOPs and inspection points
- Plan operator skill enhancement programs
- Adjust machine settings proactively
- Benchmark performance between lines or factories
- Improve communication between departments

The feedback loop created by data analysis helps reduce defects over time and enhances product reliability.

Buyer Requirements and Audit Readiness

Buyers often require factories to present quality data as part of compliance and audit readiness. They may ask for:

- Monthly quality dashboards
- Defect trend charts
- CAPA (Corrective and Preventive Action) reports
- Sample retention records
- Inline defect breakdown reports

Well-documented analysis and consistent quality monitoring help factories build trust with buyers and reduce the chances of shipment delays due to rejections.

5.1.3 Recording Specifications and Monitoring Results

Accurate documentation is a cornerstone of quality control in garment manufacturing. The ability to trace every stage of production not only helps identify problems but also ensures accountability, compliance, and continuous improvement.

Importance of Documentation:

Documentation ensures that each garment meets the required standards before it reaches the customer. It provides a record of how quality was monitored, what deviations occurred, and how they were addressed. In case of complaints, audits, or product recalls, documented data serves as a factual reference.

Types of Documents and Their Role:

Documents	Specific Roles
Inline Inspection Sheets	• Filled by quality checkers on the sewing line. • Track defects such as puckering, open seams, wrong stitch types, or skipped stitches. • Record the machine number, operator ID, type of defect, and corrective action taken.
End-Line Quality Reports	• Conducted after stitching is complete. • Used to assess overall garment quality before forwarding to the finishing section. • Scores are often calculated as a percentage of passed vs rejected garments.
Hourly Output and Defect Sheets	• Maintained by line supervisors or quality auditors. • Help evaluate productivity and defect trends throughout the day. • Useful for real-time monitoring and prompt action.
Stitching Audit Reports	• Summarize findings from periodic audits (daily/weekly). • Highlight recurring defects, root causes, and action plans. • Serve as a communication tool between production and quality teams.
Tech Pack Checklists	• Cross-reference between physical product and buyer specifications. • Include details such as stitch type, SPI (stitches per inch), seam width, pocket placement, trim details, etc. • Ensures accuracy and compliance with buyer expectations.

Table 5.1.1: Types of Documents and Their Role

Manual vs Digital Documentation:

- Traditional systems rely on paper-based records, which can be misplaced or damaged.
- Digital solutions like ERP (Enterprise Resource Planning) or QMS (Quality Management System) platforms offer real-time data entry, instant retrieval, and data analytics features.
- Benefits include improved efficiency, reduced paperwork, instant reporting, and fewer transcription errors.

Best Practices for Recording:

- Use standardized templates and ensure all fields are filled.
- Entries should be legible, objective, and timely.
- Include photos where applicable to illustrate defects.
- Use version control for specification documents to avoid outdated references.

Role of Staff and Training:

- Documentation is not limited to the quality team—production supervisors, line operators, and even maintenance staff contribute.

- Training should focus on accuracy, confidentiality, and the importance of documentation in decision-making.
- Regular internal audits should verify completeness and correctness of documentation practices.

Impact of Accurate Records:

- Enable trend analysis for process improvement.
- Serve as evidence for certifications and buyer audits.
- Help assess individual operator performance and training needs.
- Improve accountability and transparency in the production process.

5.1.4 Preparing Control Charts for Quality Monitoring

Control charts are statistical tools used to visualize variations in stitching quality and help in proactive decision-making. Rather than reacting to problems after they occur, control charts enable prevention by highlighting deviations early.

Concept of Process Variation:

All manufacturing processes exhibit variation. Control charts help differentiate between:

- **Common Cause Variation:** Inherent to the process (e.g., operator fatigue, material variability).
- **Special Cause Variation:** Due to specific issues (e.g., needle breakage, incorrect thread tension).

Benefits of Control Charts:

- Identify trends and shifts in the process.
- Enable quick responses to abnormalities.
- Assist in maintaining process stability.
- Provide a visual summary for management decisions.

Steps to Prepare a Control Chart:

Steps	Preparation
Select Parameters to Monitor	• Common quality parameters include: o Stitch density (SPI) o Seam strength o Number of defects per 100 pieces o Hourly defect rates o First-pass yield percentage
Data Collection	• Collect consistent data over a defined time frame. • Use tally sheets, inspection forms, or digital tools to record values. • Ensure uniform sampling methodology (e.g., 10 garments per hour per operator).

Steps	Preparation
Establish Control Limits	• Calculate Upper Control Limit (UCL) and Lower Control Limit (LCL) using historical data or acceptable tolerance ranges. • Example: If standard SPI is 10, the UCL may be 11, and the LCL may be 9.
Plot Data Points	• Use graphs with X-axis representing time (e.g., shift or date) and Y-axis representing the quality parameter. • Plot average, UCL, and LCL lines. • Identify any data points outside control limits or abnormal patterns (e.g., cycles or sudden shifts).
Interpret and Act	• If data points are consistently within control limits, the process is stable. • Points outside the control limits indicate a problem requiring immediate correction. • Take action such as machine calibration, operator retraining, or material review.

Table 5.1.2: Steps to Prepare a Control Chart

Types of Control Charts:

- **X-Bar and R Chart:** Used when sample sizes are consistent, and you need to track averages and ranges.
- **P Chart:** Tracks proportion of defective items in a sample.
- **C Chart:** Used for the count of defects per unit when the sample size is constant.

Involving the Team:

- Control charts should be visible on the production floor.
- Encourage line operators to participate in reading and updating charts.
- Use daily review meetings to analyse charts and plan preventive actions.

Digitizing Control Charts:

- Many QMS platforms now offer automated charting tools.
- Data is pulled in real time from inspection systems.
- Alerts can be set when values breach control limits.
- Charts can be shared with management across locations instantly.

Link with Continuous Improvement:

- Charts become input for Kaizen events, root cause analysis, and Six Sigma initiatives.
- Encourage a culture of data-driven decision-making.
- Combine control charts with Pareto analysis to prioritize improvement efforts.

5.1.5 Correcting Stitching Defects

In any production line, even with rigorous quality control processes, stitching defects can occur due to various mechanical, material, or human factors. The key to maintaining high-quality standards lies not only in identifying these defects but in promptly correcting them and preventing their recurrence. This requires a systematic and collaborative approach involving line operators, quality checkers, and maintenance teams.

Common Stitching Defects and Their Causes

1. **Uneven Stitch Length:** This occurs when the stitches are inconsistent in size. Causes include irregular fabric feeding, faulty feed dogs, or operator inconsistencies. It can impact the visual appeal and structural integrity of the garment.
2. **Thread Incompatibility:** When the thread type does not match the fabric, it may result in breakage, weak seams, or mismatched aesthetics. Using the correct thread in terms of fiber, thickness, and color is essential.
3. **Curling:** Stretch or light-weight fabrics often curl at the edges, leading to misalignment and poor seam quality. This can be resolved with fabric stabilization or adjusting the presser foot pressure.
4. **Shading:** Variations in fabric or thread batches can cause visible shading differences. Proper batch control and segregation practices are needed to maintain consistency.
5. **Uneven Panels:** If fabric panels are not cut or aligned properly, it can lead to mismatched seams. This requires correction at the cutting or stitching stage.
6. **Puckering:** This defect causes the fabric to wrinkle along seams, often due to incorrect thread tension, needle size, or sewing speed. Correcting machine settings can resolve this issue.
7. **Stretching:** Over handling stretchable fabric or improper feed mechanisms can cause garments to lose their original shape.
8. **Needle Damage:** Dull, bent, or incorrect needle size can damage fabric, leaving holes or snags.

Corrective Action Process

To address these defects effectively, the process typically follows these steps:

- **Detection:** Quality checkers detect defects either during inline inspections or end-line reviews.
- **Root Cause Analysis:** Using tools like fishbone diagrams or 5 Whys, the root cause of recurring defects is identified.
- **Corrective Measures:** Depending on the issue, actions may include:
  - Adjusting stitch length or SPI (stitches per inch)
  - Replacing faulty needles or presser feet
  - Calibrating thread tension
  - Stabilizing stretch fabrics
  - Re-training operators on proper handling techniques
- **Re-inspection:** All corrected garments must be re-checked to ensure quality compliance.

Additionally, defect analysis meetings are held daily to review the previous day's defect trends, share findings, and plan preventive actions.

Continuous Improvement

- Feedback loops from audits and inspections
- Use of real-time quality dashboards in ERP/QMS systems
- Operator performance ratings linked to defect rates
- Incentives for zero-defect achievements

By creating a culture of ownership and quality consciousness, stitching defects can be significantly minimized.

5.1.6 Rejecting Non-Compliant Parts or Garments

Despite all preventive and corrective actions, there are instances where certain garments fail to meet the required standards and cannot be repaired without compromising the design, durability, or functionality. In such cases, rejection is the only viable option.

Types of Non-Compliance

- **Critical Defects:** Affect safety or usability (e.g., broken seams, open stitches)
- **Major Defects:** Affect function or appearance (e.g., incorrect stitching, shading)
- **Minor Defects:** Do not affect usage but are aesthetically undesirable (e.g., slight thread visibility)

Critical and major defects that cannot be corrected must be rejected to protect brand image and ensure customer satisfaction.

Rejection Process

1. **Defect Grading:** Trained quality personnel grade defects as per pre-established criteria.
2. **Segregation:** Rejected items are placed in a designated area, separate from the production line.
3. **Tagging and Labelling:** Each rejected garment is tagged with the reason for rejection and logged into a rejection register.
4. **Documentation:**
    - Rejection Sheet
    - Defect Log Book
    - Line-wise and operator-wise rejection reports
5. **Disposition Decision:**
    - **Reprocessing:** If feasible, garments are reworked under supervision.
    - **Downgrading:** Items are labeled as seconds for non-export use.
    - **Scrapping:** In cases of unrepairable damage, garments are discarded following environmental protocols.

Only authorized QA managers or designated personnel can approve final rejection decisions to ensure objectivity.

Impact and Benefits of Non-Compliance

- Prevents customer complaints and returns
- Reduces the cost of post-shipment claims
- Enhances factory accountability and documentation
- Improves buyer confidence and long-term relationships

Rejecting substandard garments, though it may seem wasteful, is essential for maintaining brand credibility in competitive global markets.

5.1.7 Final Inspection of Stitched Garments

The final inspection is the concluding quality gate before garments are moved to finishing, packaging, and shipment. It ensures that all buyer specifications, design requirements, and functional needs are met. This stage verifies not only technical compliance but also presentation and packaging readiness.

Key Parameters Checked During Final Inspection

1. **Visual Check:**
   - Cleanliness (no stains or oil marks)
   - Stitch integrity and finish
   - Correct label placement
   - No skipped stitches or open seams
2. **Measurement Check:**
   - Measurements are compared against tech pack specs
   - Size tolerance is verified using measuring tapes and templates
3. **Aesthetic Evaluation:**
   - Fabric shade matching
   - Symmetry of panels
   - Garment shape and drape
4. **Functional Testing:**
   - Pocket strength
   - Zipper and button operation
   - Seam stretch for elasticated garments
5. **Packaging and Presentation:**
   - Correct folding
   - Placement of tags and barcodes
   - Carton labelling as per buyer instruction

AQL (Acceptable Quality Limit) Sampling Method

AQL is a statistical method used to determine the sample size and acceptance criteria:

- **Lot Size:** Total pieces in the batch
- **Sample Size:** Randomly selected based on AQL chart (e.g., 80 pieces for 1,200 lot)

- **Acceptance Criteria:**
  - AQL 2.5 → Accept 5, Reject 6 (for major defects)
  - AQL 4.0 → Accept 7, Reject 8 (for minor defects)

If the number of defects exceeds the allowed threshold, the entire lot is either rejected or subjected to 100% inspection.

Final Approval and Documentation

- Pass/Fail Tagging: Approved garments receive a "Passed" tag with inspector details.
- Final Inspection Report: Documents all findings, signed by quality supervisor and production manager.
- Audit Summary: Shared with top management and buyer if needed.

Final Inspection is essential due to the following reasons:

- Acts as the last defence line before shipment
- Boosts buyer satisfaction and repeat orders
- Prevents cost and reputation damage from faulty shipments
- Provides a documented trail of quality control efforts

Final inspection is a non-negotiable step that reflects the factory's commitment to excellence. It safeguards the entire effort put into design, material selection, stitching, and finishing.

Quality control is a 360-degree responsibility shared across multiple roles in the garment production ecosystem. Defect correction, garment rejection, and final inspection are integral to the goal of delivering world-class apparel products.

- Defect correction ensures immediate and root-level resolutions
- Rejection protocols maintain quality integrity by removing irreparable flaws
- Final inspection guarantees product compliance, customer satisfaction, and brand trust

Together, these procedures ensure that the final garment aligns with buyer expectations and global export standards—ultimately contributing to customer loyalty, operational efficiency, and business success.

Summary

- Maintaining stitching quality in garment production requires skilled operators, well-maintained machines, correct materials, and suitable environmental conditions.
- Standard Operating Procedures guide consistent stitching methods, while quality checkpoints like first-piece approval, inline checks, and end-of-line inspections ensure ongoing quality control.
- Supervisors and quality checkers monitor performance, provide feedback, resolve issues, and prevent defects through training, calibration, and mistake-proofing tools.
- Product specifications from tech packs must be accurately interpreted, with quality data collected using inspection sheets, defect tags, and scorecards to track trends and identify root causes.
- Accurate documentation of inspections, defects, and specifications supports traceability, accountability, audits, and continuous improvement.
- Control charts help monitor process variation, detect abnormalities early, and support preventive action and continuous quality enhancement.
- Defect correction involves detection, root cause analysis, corrective measures, re-inspection, and feedback loops to minimize recurrence.
- Garments with non-repairable critical or major defects are rejected through a documented process, while final inspection using AQL sampling ensures compliance with buyer requirements before shipment.

Exercise

Multiple-choice Question:

1. Why use a control chart?
   a. Train new employees
   b. Track defect frequency
   c. Record production targets
   d. Evaluate machinery cost

2. Rejection of a garment is necessary when:
   a. A small spot is found
   b. Defect is unrepairable
   c. Order is less
   d. Shipment is late

3. Who monitors stitching quality?
   a. Tailor
   b. Line manager
   c. Quality checker
   d. Ironing staff

4. Which data is recorded during stitching QC?
   a. Fabric price
   b. Stitch per inch
   c. Export tariff
   d. Customer location

5. Final inspection helps in:
   a. Fabric cost reduction
   b. Compliance assurance
   c. Design improvement
   d. Product promotion

Descriptive Questions:

1. Define final garment inspection.
2. Mention a control chart type used.
3. Why is stitching spec recording important?
4. What is a non-compliant garment?
5. Who approves rejection?

Notes

Scan the QR codes or click on the link to watch the related videos

https://youtu.be/o4Y_xuZht4o?si=o2UBM6R6SOgOv5HL

Garment Inspection – Stitching, Measurements, and Finishing

Skill India
कौशल भारत-कुशल भारत

सत्यमेव जयते
GOVERNMENT OF INDIA
MINISTRY OF SKILL DEVELOPMENT
& ENTREPRENEURSHIP

N·S·D·C
RE>IMAGINE FUTURE

APPAREL MADE-UPS HOME FURNISHING
SECTOR SKILL COUNCIL

6. Identify and Assess the Quality After Finishing of Garment

Unit 6.1 - Quality Control in Production Stages

AMH/N1403

Key Learning Outcomes

By the end of this module, the participants will be able to:

1. Explain the corrective measures taken at various stages of production like thread cutting, cleaning, pressing (ironing), packaging.
2. Inspect the stitching area for any type of hazardous material.
3. Check that the stitching area is clean.
4. Identify the quality parameters to inspect the finished garment.
5. Identify the stages of finishing like cutting the threads, cleaning the garment, ironing and packaging.
6. Identify the pressing operations.
7. Identify packing operations.

UNIT 6.1: Quality Control in Production Stages

Unit Objectives

By the end of this unit, the participants will be able to:

1. Explain the corrective measures taken during various stages of production, including thread cutting, cleaning, pressing (ironing), and packaging.
2. Discuss the inspection process for hazardous materials in the stitching area.
3. Describe the methods used to ensure that the stitching area remains clean and safe.
4. List the quality parameters to consider when inspecting the finished garment.
5. Outline the key stages of finishing, such as cutting threads, cleaning garments, ironing, and packaging.
6. Identify and describe the pressing operations involved in garment finishing.
7. Elaborate on the packing operations and their role in maintaining quality standards.

6.1.1 Corrective Measures During Production and Finishing

In the apparel manufacturing industry, quality assurance does not end with the completion of stitching. Various stages of production that follow—including thread trimming, spot cleaning, ironing, and packaging—play a vital role in determining the final quality of the garment. Corrective measures applied during these stages help reduce rework, avoid customer complaints, and preserve the brand's image. Proactive quality control (QC) monitoring ensures that defects are detected early and corrected efficiently before they reach the customer.

Thread Cutting

Loose threads can significantly impact garment appearance and cause stitching unraveling if left unchecked. Thread trimming is often carried out immediately after stitching using electric thread trimmers or hand scissors. However, if performed carelessly, the process can either miss loose ends or inadvertently damage the fabric.

Fig. 6.1.1: Thread Cutting

Quality inspectors ensure that:

- Every seam and edge is checked for visible loose threads.
- Trimming tools are sharp, clean, and suitable for the fabric type.
- No fraying or cuts are caused by trimming devices.

Corrective action includes re-clipping missed threads before the garment moves to pressing. In cases where trimming damages the seam, the garment may need partial restitching. QC inspectors must also examine whether trimmers are trained properly and if lighting at the trimming station is adequate to spot tiny loose threads.

Spot Cleaning and Stain Removal

Stains or marks from chalk, machine oil, or dust can appear on garments during cutting, sewing, or handling. Spot cleaning must be performed promptly using appropriate cleaning agents to avoid setting the stain deeper into the fabric.

Fig. 6.1.2: Stain Removal Machine

Key QC practices include:

- Identifying stain type (oil-based, water-soluble, ink, etc.).
- Using fabric-compatible cleaning solutions—e.g., water-based solutions for cotton and solvents for synthetic fibers.
- Ensuring the use of protective gloves and ventilation when handling cleaning agents.

Garments that do not respond to initial stain removal undergo a second attempt. If the stain persists and alters the appearance or texture, the garment may be reworked or rejected, depending on the severity.

Pressing/Ironing

Pressing enhances the visual appeal and finishing of garments. However, improper ironing techniques can lead to:

- Shine marks or burn spots, especially on delicate or dark fabrics.
- Flattened texture or uneven pressing.
- Misaligned shapes or impressions of seams through the fabric.

Quality control ensures:

- Steam iron temperatures are matched to fabric types.
- Operators use protective cloths for delicate materials.
- Steam and pressure settings are regularly tested for consistency.

Fig. 6.1.3: Pressing

If pressing causes defects, garments may be re-pressed, manually adjusted, or sent back for finishing correction. QC teams inspect both pre- and post-press garments to validate finish quality.

Packaging

Packaging is the final layer of presentation and protection. Errors at this stage—such as incorrect folding, labeling errors, or barcode issues—can result in rejections by buyers or confusion during shipment.

QC teams verify:

- Fold styles are as per buyer specification.
- Correct polybag type and thickness is used.
- Barcodes are aligned and scannable.
- Moisture-absorbent materials are added when necessary.

Fig. 6.1.4: Packing

Improperly packed garments are immediately removed and reprocessed. For export garments, moisture protection, labelling per country requirement, and carton dimension accuracy are essential for successful customs clearance and buyer satisfaction.

6.1.2 Inspection of Hazardous Materials in the Stitching Area

A quality product is not just defined by stitch perfection or aesthetic appeal. It also depends on a safe and hazard-free work environment, particularly in the stitching area where multiple machines, materials, and workers are concentrated. Safety and quality control intersect at this stage, as many hazards can lead to defects or even production shutdowns. Hazard inspections reduce downtime, prevent injuries, and support sustainability compliance goals for global buyers.

Thread and Lint Hazards

Lint, thread scraps, and fabric dust are a constant by-product of the stitching process. When left unmanaged, these can accumulate and:

- Clog sewing machines and reduce their precision.
- Create fire risks, especially in machines with motor heat or near electrical points.
- Obstruct ventilation systems and increase air pollution within the workspace.

QC teams conduct regular lint removal audits, ensure that thread suckers or vacuum systems are installed and operational, and that cleaning is part of the shift-end checklist.

Oil and Lubricant Leaks

Sewing machines require periodic lubrication to function smoothly. However, oil leaks can:

- Leave stains on garments—especially noticeable on light-coloured or thin fabrics.
- Create slippery floors, increasing the chance of worker injury.

QC inspectors:

- Check for overfilled reservoirs and worn-out gaskets that may cause leaks.
- Ensure proper oil trays or absorbent mats are in place.
- Isolate any garments that may have been stained and send them for spot treatment.

Garments that cannot be cleaned effectively are quarantined and reviewed for possible rework or rejection.

Sharp Tools and Hardware Exposure

Stitching workstations involve sharp-edged tools like scissors, awls, trimming knives, and folders. When not properly stored, they can:

- Injure operators or co-workers.
- Scratch or damage garments accidentally.

QC checks ensure:

- Tools are returned to designated holders or magnetic strips after use.
- Blade guards are used where applicable.
- Trimming blades are frequently replaced to avoid fabric damage.

Injury logs and tool maintenance schedules help keep the area safe and productive.

Electrical Safety

Sewing lines consist of power cords, pedal switches, and motor-controlled machines, making them susceptible to electrical risks.

Common hazards include:

- Exposed wires.
- Loose plug points or overused extension boards.
- Machines overheating due to poor maintenance.

Fig. 6.1.5: Exposed Wires

QC officers:

- Inspect machine cables during shift changes.
- Log faulty sockets and tag machines for repair.
- Check that circuit breakers and surge protectors are in place and functional.

Electrical defects are flagged immediately, and machines are removed from the floor until fixed. Training in emergency response for minor electrical accidents is often mandated.

Chemical Exposure in the Stitching Area

While most chemicals are reserved for the finishing section, sometimes adhesive sprays, softeners, or odour removers are used near stitching areas.

Unregulated chemical presence can cause:

- Breathing issues among workers.
- Risk of contamination or chemical burns if spilled.

QC ensures:

- Chemicals are stored outside stitching lines.
- Only trained operators handle chemical usage.
- PPE such as gloves and masks are available and used.

Material Safety Data Sheets (MSDS) are to be kept within access at all times, and stitching staff must be trained in basic chemical handling awareness.

6.1.3 Cleaning and Safety Maintenance in the Stitching Area

Maintaining cleanliness and safety in the stitching area is not just a matter of aesthetics—it directly impacts product quality, employee productivity, and compliance with occupational health and safety standards. A well-maintained stitching floor minimizes disruptions, prevents product contamination, and reduces accidents and injuries, thereby improving the overall workflow and output of the garment production process.

Daily Cleaning Routines and Housekeeping Protocols

Daily cleaning is the most fundamental part of housekeeping in a stitching area. At the beginning and end of each shift, operators are required to clean their stations by removing thread trimmings, fabric scraps, and any lint accumulations. These remnants, if left unchecked, can contaminate garments or jam machine components. Supervisors ensure cleaning supplies like small handheld vacuums, brooms, and lint collectors are available for quick clean-ups.

Mid-shift inspections are conducted by QC supervisors to ensure cleaning protocols are being followed continuously—not just at the beginning or end of the day. Stitching operators are instructed to pause work briefly for minor cleaning if an excess accumulation of thread or lint is noticed, especially around moving machine parts.

Additionally, periodic deep cleaning is scheduled weekly, which includes cleaning under the machines, dusting high ledges, and servicing ventilation filters to prevent dust build-up. Wet mopping should be avoided during production hours to prevent slipping hazards.

Fig. 6.1.6: Daily Cleaning Routine

Organized Layout and Material Segregation

A clutter-free and organized layout significantly reduces the chance of accidents and misplacement of important tools and trims. Each workstation should have dedicated trays or pegboards for holding scissors, measuring tapes, threads, and bobbins. Walkways and passage zones should be clearly marked

and kept free from obstacles. Proper separation of raw materials, trims, finished garments, and waste helps reduce confusion and potential quality mix-ups.

Stitching floor layouts must also accommodate emergency exits, equipment spacing for operator movement, and designated zones for supervisors and quality controllers. Operators should be discouraged from storing personal belongings at their work desks, as this can contribute to disorganization and distraction.

Lighting, Ventilation, and Ergonomics

Adequate lighting is critical in stitching areas to avoid quality errors and reduce eye strain among operators. Poorly lit areas may result in missed defects such as skipped stitches or stain spots. LED task lights above each machine improve visibility without causing overheating. Natural light should be maximized where possible, and artificial lighting must be checked regularly for bulb failures or flickering.

Ventilation ensures a healthy airflow and helps maintain a comfortable working temperature. Exhaust fans or HVAC systems must function efficiently to remove heat, odours, or fumes from machine oil, cleaning solvents, or nearby pressing stations.

Ergonomics play a major role in operator performance. Sewing chairs must be height-adjustable and equipped with back support. Footrests, anti-fatigue mats, and padded arm supports help reduce fatigue and musculoskeletal strain. Frequent breaks and workstation rotation are encouraged to avoid repetitive stress injuries.

Safety Signage and Use of Personal Protective Equipment (PPE)

Clearly visible safety signage should be posted throughout the stitching area. Important signs include:

- "Keep Aisles Clear" at every passageway.
- "No Oil Spillage" near machine zones.
- "Use Eye and Hand Protection" near sharp tool areas.
- “Switch Off Machine When Not in Use” near idle workstations.

Operators must also be trained in the proper use of PPE. This includes wearing:

- Dust masks in lint-heavy areas,
- Gloves when handling sharp tools or rough fabric,
- Ear plugs in high-noise environments,
- Safety glasses in areas where trimming or snipping is frequent.

Fig. 6.1.7: Safety Signage

Availability and accessibility of PPE must be ensured by the supervisor, and damaged PPE should be immediately replaced. Compliance to PPE usage is often checked as part of daily audits.

Incident Reporting and Safety Monitoring

An effective incident reporting system must be in place to log near-misses, minor injuries, or any unsafe conditions observed. These logs are reviewed weekly by the quality and safety teams to identify recurring hazards and take preventive action.

Workers are encouraged to report unsafe conditions anonymously if needed, with no fear of repercussions. Safety briefings are held monthly, and safety drills (e.g., fire or evacuation) are conducted quarterly to ensure readiness.

The overall cleaning and safety practices contribute to a professional work environment that supports high productivity, fewer reworks, and reduced absenteeism due to injuries or illness. Ultimately, investing in a clean and safe stitching area is investing in long-term production efficiency and quality reliability.

6.1.4 Quality Parameters for Finished Garment Inspection

The final garment inspection stage is the last checkpoint before products are dispatched to buyers. It ensures that only garments that meet quality and compliance standards make it to market. Failure to maintain inspection rigor can result in customer complaints, rejections, and costly returns, harming both reputation and profitability.

Final inspections focus on a set of critical quality parameters, typically based on buyer-approved tech packs, internal quality SOPs, and industry best practices. Let's explore the key criteria:

Measurement Compliance and Size Accuracy

Each garment must be measured against the approved spec sheet or size chart. Critical dimensions include chest/bust, shoulder width, sleeve length, garment length, waist, hip, and armhole.

Inspectors measure at least 10% of garments from each batch or lot. The allowed tolerance range (e.g., ±1 cm) is predefined in the tech pack. Garments outside this tolerance are either re-measured, reworked, or rejected.

Common size issues include:

- Excessively short sleeves,
- Uneven hem lengths,
- Incorrect waist or neck sizes.

Accurate measurements are crucial for fit and customer satisfaction, especially for branded or export orders.

Stitching Quality and Construction Integrity

Final inspectors assess seam integrity and construction features, looking for:

- Consistent stitch density (SPI)
- Balanced tension (no loose threads or puckering)
- Reinforced stress points (e.g., bar tack on pockets or plackets)

- Even seam allowances
- Matching pattern alignment at seams (especially for checks or stripes).

Skipped stitches, unravelling seams, or off-track topstitching are flagged. Such defects indicate either poor machine maintenance or operator error and must be addressed promptly.

Visual Appearance and Cleanliness

Aesthetic appeal is a key factor in garment acceptance. Inspectors check for:

- No visible stains (oil, ink, handling marks),
- No lint or thread remnants,
- No holes, fabric defects, or discoloration,
- Smooth pressing with no shine marks or burn effects.

Fig. 6.1.8: Factors for Visual Appearance and Cleanliness

Garments are also compared for shade consistency, especially in dyed or printed batches. Variations in shade can occur due to batch dyeing or poor fabric lot management. Any garment with major appearance issues is quarantined for further review.

Trim and Label Application Accuracy

All trims, fasteners, and embellishments must be securely attached and functionally appropriate. Key checks include:

- Buttonholes aligned properly,
- Zippers smoothly functioning,
- Hooks and eye closures in correct position,
- Decorative elements (e.g., lace, appliqué) sewn symmetrically.

Brand labels, size tags, and care instructions must be present, securely stitched or heat-sealed, and readable. Missing or incorrect labels lead to non-compliance and possible shipment rejections.

Seam Strength and Stretch Test

Seam strength is tested using a basic manual stretch or pull test. Inspectors apply moderate force at key stress points—side seams, shoulder joins, crotch seams, waistbands—to check if the stitch holds or breaks.

A garment failing this test may indicate weak thread quality, improper SPI, or skipped reinforcement. Such garments are not passed unless re-stitched and retested.

Packaging Conformity and Buyer Specifications

Before boxing and dispatching, packaging is checked to ensure compliance with the buyer's SOP:

- Folding style must match brand standards,
- Polybag dimensions and type must align with garment type,
- Barcode stickers must be placed in the specified position,
- Hanger, clips, or collar stays must be added where specified.

Improper folding or over-packing can lead to creases or permanent shape distortion. Packaging defects, although minor, often leave a poor impression and reduce buyer confidence.

Defect Classification and Disposition

Defects are classified into:

- **Critical:** Causes harm or renders the garment unusable (e.g., broken needles in seam, hazardous chemical residue).
- **Major:** Affects appearance or fit (e.g., wrong size label, open seam, fabric tear).
- **Minor:** Doesn't impact function (e.g., loose thread, minor misprint).

Garments with critical or major defects are not shipped without correction. Each failed garment is tagged, recorded, and either reworked, downgraded, or rejected depending on buyer agreement.

6.1.5 Key Finishing Stages: Thread Cutting, Cleaning, Ironing, Packaging

The finishing department plays a critical role in the overall garment production process. Even if stitching is flawless, poor finishing can lead to customer dissatisfaction, garment rejections, and damage to the brand's reputation. Finishing operations are the last set of interventions done on the garment before it reaches packaging and dispatch. It ensures that garments are not only clean and presentable but also functionally correct and ready for end use.

Let us explore the main stages of garment finishing in detail:

1. **Thread Cutting:**

   After sewing operations, garments often have loose thread ends and trimmings left near seams, hemlines, and buttonholes. These threads must be cut cleanly to avoid a messy appearance and prevent thread pulls.

   - Operators use scissors, snips, or motorized thread trimmers for this task.
   - It's essential that thread ends are cut close enough to avoid unravelling, but not so close that the seam gets weakened.
   - QC personnel perform spot checks to ensure thread ends are not missed or unevenly cut. Improper thread cutting is considered a minor but visible defect in AQL inspections.

2. **Spot or Surface Cleaning:**

   During manufacturing, garments might get stained due to oil, chalk, dirt, pen marks, or operator mishandling. Spot cleaning ensures the garment appears fresh and defect-free.

   - Techniques include using solvent pens, mild detergents, diluted chemicals, or ultrasonic cleaners.

- The cleaning process must be gentle enough to avoid fabric damage, color fading, or bleeding.
- QC inspectors are trained to identify acceptable and non-acceptable stains and ensure no visible marks remain on the garment surface.

3. **Pressing / Ironing:**

Pressing provides the garment with its final shape and removes creases developed during handling. It also enhances the appearance by flattening seams, shaping collars or lapels, and setting pleats.

Types of pressing methods include:

- **Steam Table Press:** Used for structured garments like formal shirts or pants.

Fig. 6.1.9: Steam Table Press

- **Vacuum Pressing Table:** Ensures creases are gently removed and fabric retains its shape, ideal for synthetic fabrics and delicates.
- **Buck Press / Manual Press:** Utilized for giving a flat, consistent finish to panels like shirt backs or pant legs.
- **Form Finishers:** Inflatable dummies for garments like jackets or trousers that ensure 3D shape retention.
- **Tunnel Finishers:** Automated conveyor-type systems where garments pass through steam and air jets for high-volume finishing.

QC checks during pressing include:

- Monitoring steam temperature, pressure, and dwell time based on fabric types.
- Ensuring no shine marks, scorching, or deformation occurs.
- Verifying correct shape formation of pleats, darts, and collars.
- Making sure final pressed garments are handled carefully to retain shape until packaging.

4. **Final Inspection:**

This is the most crucial checkpoint before garments are packed and dispatched.

- AQC (Advanced Quality Control) inspectors pick random samples from batches using AQL (Acceptable Quality Level) standards, commonly 2.5.

- Garments are inspected for measurement accuracy, visual defects, functional components, cleanliness, and packaging readiness.
- Defective garments are marked, segregated, logged, and sent back for rework.
- The inspection report is signed and documented as part of buyer compliance.

5. **Folding and Packaging:**

   Packaging is done according to buyer guidelines which specify folding style, use of hangers, tag placement, bagging material, and carton details.

   - Folding is usually done with the help of folding templates to maintain consistency. Shirts, for example, may require collar stays and clips.
   - Polybags may be clear or printed, with specified thickness and size. They often carry size stickers, barcodes, and warning labels.
   - Garments are sealed in bags either manually or with heat sealers.
   - Cartons are packed with specific garment quantities, arranged in layers, and labeled correctly with PO numbers, style codes, and buyer logo.

QC responsibilities during packaging:

- Ensuring correct hanger usage where applicable.
- Checking silica gel or desiccant pouch placement to prevent moisture damage.
- Confirming carton weight limits are adhered to (to avoid box burst).
- Verifying final shipping mark compliance with export/buyer norms.

6.1.6 Pressing Operations in Garment Finishing

Pressing operations in finishing help transform the sewn garment into a refined product ready for the consumer. It plays a dual role: aesthetic enhancement and functional stabilization.

Common Pressing Equipment and Techniques:

1. **Steam Iron Pressing:**

   Common in all factories, steam irons are used for small areas like collars, cuffs, waistbands, and sleeve plackets. Pressing boards are often shaped to match garment zones.

2. **Vacuum Press Tables:**

   These tables suck moisture and air from the garment during pressing, allowing fabric to dry quickly and retain its pressed form. This is particularly important for delicate or synthetic fabrics prone to shine.

3. **Manual or Buck Press:**

   These presses sandwich the garment between heated top and bottom plates covered in padded material. Used for pressing large panels like jackets or shirts.

4. **Form Finishers:**

   Inflatable mannequins that support and press garments from inside using steam and air jets. They help retain the garment's 3D structure and are ideal for tailored garments.

5. **Tunnel Finishers or Conveyor Pressing Systems:**
   Suited for mass production, these systems automatically move garments through a heated tunnel where steam and air jets press them uniformly.

QC Checks During Pressing:

Temperature Settings

- Must be fabric-specific to avoid damage.

Steam & Time Monitoring

- Over steaming or excessive pressing can lead to fabric shine, yellowing, or shrinking.

Shaping Quality

- Proper shape retention of garment features like pleats, darts, lapels, and curved seams is crucial.

Visual Cleanliness

- No iron marks, water spots, or leftover creases should be visible.

Operational Efficiency

- Pressing lines are observed for bottlenecks or downtime to maintain production flow.

Fig. 6.1.10: QC inspection during Pressing

6.1.7 Packaging Operations and Their Role in Quality Assurance

Packaging is not just the final operation in garment production—it is the interface between the factory and the end customer. It ensures that garments are presented professionally, remain undamaged during transit, and meet all compliance standards.

Key Packaging Operations:

- **Folding Pattern Compliance:**
  Each buyer has detailed folding guidelines, often with diagrams. QC ensures:
  - Uniformity in folds.
  - Use of folding boards or templates.
  - Correct positioning of trims and embellishments to avoid damage during folding.
- **Bagging:**
  - Polybags are selected based on garment type and buyer requirements.
  - QC checks for clarity, cleanliness, and correct printing (style code, barcode, size).
  - Bag holes for ventilation (if required) are checked.

- **Sealing:**
  - Polybags are sealed using tape, adhesive strips, or heat.
  - Improper sealing may lead to moisture penetration or contamination.
- **Carton Packing:**
  - Cartons are assembled, labelled, and filled as per buyer's pack list.
  - Carton strength is tested to avoid collapse during stacking.
  - Orientation of garments inside cartons (e.g., fold inward, front outward) is verified.

Fig. 6.1.11: Carton Packing

- **Inserts and Add-ons:**
  - Silica gel packs for moisture control.
  - Tissue paper to protect prints.
  - Fragrance sheets or brand booklets if required.
  - QC confirms these are present, correctly placed, and safe.
- **Hygiene and Pest Control:**
  - Final inspection ensures no insect contamination, pet hair, or unwanted items.
  - Some shipments require humidity indicators or temperature-sensitive tags, which are inspected before sealing.

Final Carton Check and Dispatch Readiness:

- Carton labels must match the shipping instructions exactly.
- Any damage to cartons, incorrect barcodes, or missing tags can result in shipment rejections or penalties.
- Final outbound QA confirms quantity, quality, and packaging compliance before garments are loaded into containers.

By the time garments leave the finishing and packaging section, they should meet all visual, functional, and presentation requirements of the buyer. Any deviation found here is not only costly in terms of rework but also risks the business relationship and brand image.

Unit 6.1 covers the full span of finishing and post-stitching production stages—from thread trimming and spot cleaning to pressing, inspection, and packaging—detailing how to maintain quality at each step. Through corrective measures, hazard checks, area cleanliness, final garment evaluation, pressing best practices, and packaging accuracy, participants gain the tools needed to ensure that every garment delivered is defect-free, presentable, and ready for shipment. This unit equips quality professionals and production supervisors to uphold stringent standards while optimizing workflow and reducing rejection rates.

Summary

- Stitching starts with preparing and laying up cut fabric pieces in bundles, followed by setting up calibrated workstations.
- The sewing process follows a defined sequence using specialized machines for different operations.
- Inline inspections and bundle quality checks are carried out to ensure accuracy before moving forward.
- End line inspections verify measurements, seam quality, and finishing readiness.
- Defects like uneven stitches, curling, puckering, or needle damage are identified and addressed quickly.
- The stitching area must remain clean, well-lit, organized, and free from hazards.
- Machine controls including tension, needle type, bobbin winding, and lubrication are checked before and during stitching.
- Defect handling involves tagging, operator retraining, machine adjustments, and proper documentation.

Exercise

Multiple-choice Question:

1. When is thread cutting inspected?
   a. Post-packaging
   b. Post-ironing
   c. During finishing
   d. Pre-production

2. What is checked in finished garments?
   a. Fabric GSM
   b. Label design
   c. Seam strength
   d. Ironing temp

3. Which is part of finishing operations?
   a. Yarn spinning
   b. Sewing
   c. Cleaning
   d. Pattern drawing

4. Safety inspection ensures:
   a. Pricing accuracy
   b. Employee retention
   c. Hazard control
   d. Design compliance

5. Hazardous material detection is:
   a. A legal requirement
   b. Customer preference
   c. Production bonus
   d. Sales initiative

Descriptive Questions:

1. List three quality checks during finishing.
2. Define ironing in garment finishing.
3. Why inspect packaging?
4. What are garment finishing operations?
5. Name a finished garment defect.

Notes

Scan the QR codes or click on the link to watch the related videos

https://youtu.be/2sc_m8eU5rM?si=QOGmrYqWsF10dwWn

Thread Trimming Machine | Thread Trimmer

Skill India
कौशल भारत-कुशल भारत

सत्यमेव जयते
GOVERNMENT OF INDIA
MINISTRY OF SKILL DEVELOPMENT
& ENTREPRENEURSHIP

N·S·D·C
RE IMAGINE FUTURE

APPAREL MADE-UPS HOME FURNISHING
SECTOR SKILL COUNCIL

7. Inspect the Finished Garment

Unit 7.1 - Finishing and Quality Control in Garment Production

AMH/N1403

Key Learning Outcomes

By the end of this module, the participants will be able to:

1. Demonstrate ironing of the garment.
2. Demonstrate the packaging of the garments.
3. Prepare control charts to monitor quality during production.
4. Perform finishing process on the stitched garment like trimming the threads, cleaning.
5. Check the finished garment after it has been cleaned and ironed.
6. Take corrective action in case of any mendable defect.
7. Reject the pieces which do not meet the quality.
8. Record the observations in a desired format.

UNIT 7.1: Finishing and Quality Control in Garment Production

Unit Objectives

By the end of this unit, the participants will be able to:

1. Demonstrate the process of ironing garments to ensure proper finishing.
2. Illustrate the steps involved in packaging garments for final delivery.
3. Explain the preparation of control charts used to monitor quality throughout the production stages.
4. Describe the finishing processes performed on the stitched garment, such as trimming threads and cleaning.
5. Discuss the process of checking the finished garment after cleaning and ironing to ensure quality standards.
6. Outline the actions to take when a mendable defect is found during inspection.
7. Explain the procedure for rejecting garments that fail to meet the required quality standards.
8. Record and document observations related to the finishing process in the required format.

7.1.1 Ironing Garments for Proper Finishing

Ironing is not just a cosmetic step in garment production—it is integral to the garment's structural and visual appeal. As one of the final operations before packaging, ironing enhances the garment's appearance by removing wrinkles, shaping its silhouette, and locking design features like pleats, creases, and darts into place. The process contributes significantly to the perceived quality of the garment, directly impacting customer satisfaction.

The ironing process begins with assessing the fabric type and adjusting heat and steam settings accordingly. Cotton and linen, for example, require higher temperatures, while synthetics like polyester or nylon need lower heat to prevent melting or shine marks. Blended fabrics typically need medium heat and moderate steam.

Industrial garment ironing involves specialized equipment, including:

1. **Steam Irons:** These are widely used for general ironing and work well for most areas of the garment.
2. **Vacuum Tables:** These are used in tandem with steam irons to quickly remove moisture and help set the fabric, ideal for delicate or stretchy fabrics.
3. **Form Finishers:** Inflatable mannequins that apply steam and air pressure to shape garments such as jackets and trousers.
4. **Buck Presses:** Used for specific garment parts like lapels, waistbands, or structured panels, providing pressure and heat for crisp shaping.

Operators must be well-trained in using these machines and understanding garment construction. For example, ironing collars, cuffs, pleats, darts, and hems demands precision and a consistent technique to avoid over-pressing or causing distortion. Improper ironing can lead to issues such as:

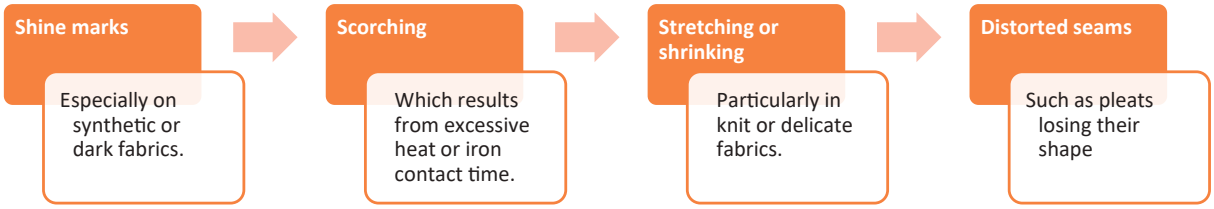


Fig. 7.1.1: Issues during Ironing

Another crucial aspect is equipment cleanliness. Ironing surfaces, iron shoes, and vacuum tables must be clean to avoid transferring stains, rust, or fabric debris onto the garments. Moisture build up in steam lines must also be drained regularly to prevent water spotting.

In some cases, a final pressing may follow garment inspection to touch up minor wrinkles formed during handling. This ensures the garment retains its fresh, finished look when presented to the customer or packed for shipping.

7.1.2 Packaging Garments for Final Delivery

Once garments are properly ironed and inspected, they enter the final packaging phase. Though it may seem like a straightforward task, packaging is a critical process that ensures the garment's quality is preserved during transit, storage, and retail display. The packaging stage also reflects brand image and compliance with buyer-specific instructions and sustainability commitments.

The packaging process generally includes:

1. **Folding:** This is done as per buyer guidelines, with the goal of maintaining garment structure and minimizing wrinkles. Standard folding techniques vary:
   - Flat folding (e.g., for T-shirts, pants)
   - Rolling (e.g., for knits or wrinkle-prone garments)
   - Hanger packaging (e.g., for suits or dresses)
2. **Insert Placement:** Collars may be supported with cardboard inserts. Tissue papers may be used to protect delicate surfaces. Some buyers require the use of fragrance or anti-microbial sheets inside garments.
3. **Accessory Attachment:** This includes tagging brand labels, price tags, size stickers, or security tags. These should be applied according to buyer placement specifications.
4. **Polybags:** Garments are placed inside individual polybags. These must be:
   - Clear and dust-free
   - Printed with barcodes, style codes, size, or wash care instructions
   - Sealed tightly to prevent dust or moisture entry

   Polybags can be of different types—biodegradable, recycled, or conventional plastic—depending on sustainability requirements set by buyers or internal company policies.

Once garments are bagged, they are packed into cartons or boxes, and this step follows a structured layout:

- **Garment Orientation:** Depending on the type, garments are arranged flat, interlocked, or layered to avoid crushing.

- **Labelling:** Carton labels must contain accurate information like buyer name, PO number, style, colour, size assortment, quantity, and destination.
- **Weight Checks:** Each carton must be weighed to ensure compliance with logistics requirements and to avoid overloading.
- **Silica Gel and Desiccants:** These are inserted to control moisture levels and avoid mildew, especially for garments shipped overseas.
- **Protective Packaging:** Shrink wrap or corner protectors may be used for long-distance or international shipments to maintain box integrity.

From a quality assurance perspective, packaging also includes several checkpoints:

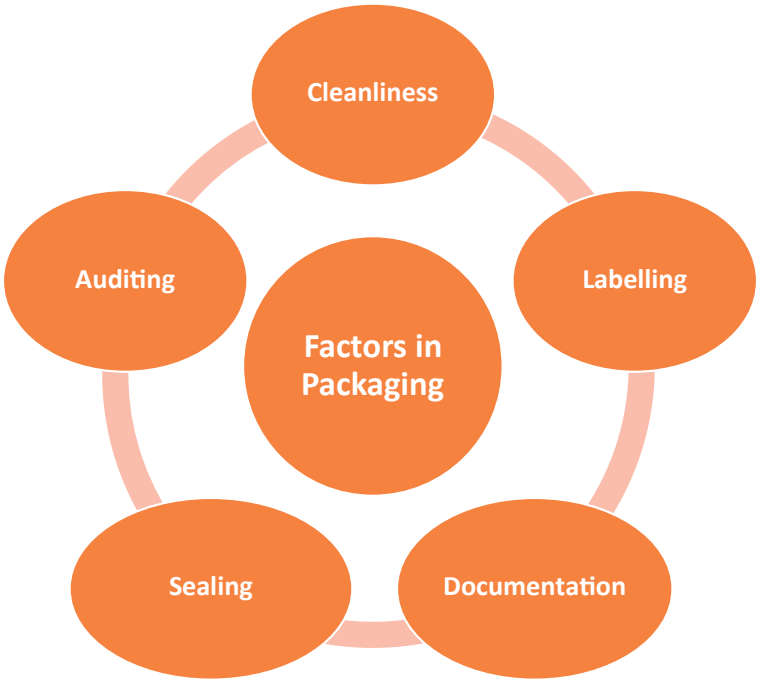


Fig. 7.1.2: Packaging Checkpoints

Sustainability in packaging is becoming a growing concern. Many global buyers now request:

- **Minimal packaging to reduce waste**
- **Recyclable and biodegradable materials**
- **Reduced plastic usage**
- **Packaging made from post-consumer recycled (PCR) content**

Fig. 7.1.3: Sustainable Packaging requirements

Companies must adapt their packaging policies to meet environmental compliance, which not only fulfils buyer mandates but also aligns with responsible business practices.

Lastly, packaging plays a vital role in the first impression of the garment when it reaches the buyer or retail store. Any mishandling or poor packaging could damage the garment or diminish its market appeal. Hence, packaging is both a quality control measure and a branding tool.

7.1.3 Preparation of Control Charts for Quality Monitoring

In any garment production unit, ensuring consistent product quality is vital. One of the most effective tools for this purpose is the control chart. Control charts, originally developed as part of statistical process control (SPC), are used to track the stability of processes over time. In the context of garment production, control charts serve as visual records that monitor defects, process efficiency, and corrective actions at various stages of finishing, including ironing, trimming, and packaging.

Purpose of Control Charts in Finishing

The key objective of using control charts in the finishing department is to:

- Track trends in defects over time.
- Identify recurring issues in finishing operations.
- Evaluate operator and machine performance.
- Maintain process stability and ensure garments meet buyer specifications.
- Support decision-making for process improvement and defect prevention.

Setting Up Control Charts

Before charting begins, the QC team defines quality standards based on:

- Garment specifications.
- Buyer tolerance levels.
- Acceptable quality limits (AQLs).
- Historical data from previous batches.

Each control chart includes critical components such as:

- Upper Control Limit (UCL) and Lower Control Limit (LCL).
- A centre line, which reflects the average defect level or measurement.
- Time intervals (hourly, per shift, per day).
- Sample size (e.g., 10 garments per hour).
- Categories of defects being tracked (e.g., shine marks, thread uncut, packaging errors).

Control Charts Usage

Throughout the day, QC inspectors record observations on the control chart. If the defect level stays within the UCL and LCL, the process is considered in control. However, if any point crosses these limits or if a non-random pattern emerges, it signals a need for immediate attention.

Example in Ironing Process

Imagine a finishing line where operators are ironing shirts. The QC team tracks defects like press marks, unpressed seams, and shine lines. If a control chart shows a sudden rise in shine marks, it may be due to incorrect ironing temperature, dirty iron surfaces, or insufficient operator training. Once this issue is identified, the QC supervisor investigates, makes adjustments, and notes the corrective action on the chart.

Benefits of Control Charts are provided in the list below:

- Early identification of quality issues before garments are packed.
- Reduction in rework time and waste.
- Better coordination between QC, production, and finishing teams.
- Data-driven process improvement and training needs analysis.
- Enhances buyer confidence through documented quality assurance

Control Chart Maintenance

- Charts must be updated hourly or as per protocol.
- QC staff should sign and date entries.
- Charts must be stored and reviewed weekly to identify long-term trends.
- Any corrective actions taken should be documented with time stamps and responsible personnel.

Integration with Digital Tools

Modern garment units may use **digital control chart software** or ERP systems that allow:

- Real-time data entry through tablets.
- Instant alerts for process deviations.
- Automated trend analysis and defect categorization.
- Integration with production dashboards.

Control charts are not just documents—they are living tools that enable finishing teams to deliver consistent, high-quality garments while maintaining transparency and accountability.

7.1.4 Finishing Processes: Trimming Threads and Cleaning

Once garments are assembled and inspected, they undergo finishing—a set of operations that improve presentation, comfort, and market readiness. Two fundamental finishing tasks include thread trimming and cleaning. Though they may seem minor, these processes significantly influence garment aesthetics and buyer satisfaction.

Thread Trimming

Loose threads, untrimmed yarns, and hanging fibres are among the most common visual defects noticed during buyer inspections. Even a well-constructed garment may be rejected if threads are visible at seam ends, hems, or label areas.

Fig. 7.1.4: Thread Trimming

Importance of Thread Trimming are as follows:

- Thread trimming ensures a neat and professional garment appearance, enhancing visual appeal and meeting buyer presentation standards.
- It prevents loose threads from causing seam unravelling or snagging, thereby improving the garment's durability and overall quality.

Trimming Process

Trimming is carried out either manually or using automatic thread trimming machines.

- **Manual Trimming:** Operators use scissors or snips to cut threads carefully. This method requires attention to detail and is preferred for delicate fabrics or complex garments.
- **Automated Trimming:** Machines with suction-based trimmers or pneumatic systems are used on high-volume lines. They ensure consistent trimming quality and save time.

Operators are trained to inspect the following areas thoroughly:

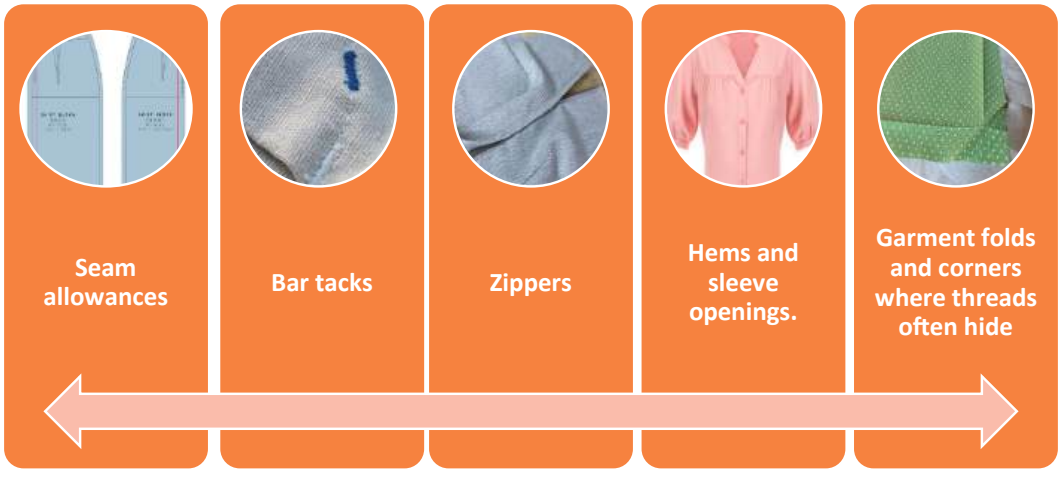


Fig. 7.1.5: Criteria for Operators during Quality Inspection

Precautions

- Scissors and trimmers must be regularly sharpened.
- Fabric damage must be avoided while cutting threads.
- QC performs random checks to validate trimming accuracy.

Cleaning of Garments

After trimming, garments are cleaned to remove dust, chalk marks, lint, oil stains, or any residues left from stitching or handling.

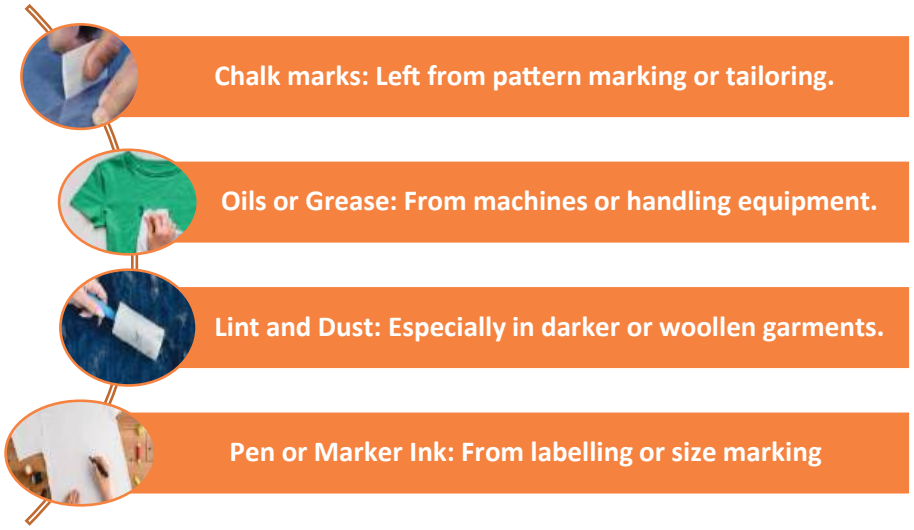


Fig. 7.1.6: Types of Contaminants

Cleaning Tools and Equipment

Cleaning Tools and Equipment play a vital role in ensuring garments are free from dust, stains, and loose fibres before packing and shipment. These tools not only enhance the visual appeal of the product but also help meet buyer quality expectations. From simple lint rollers for surface cleaning to specialized steam guns and spot cleaners for stain removal, each tool serves a specific purpose in maintaining garment cleanliness and presentation. Proper use of these tools ensures that garments reach customers in perfect condition.

Tool/Equipment	Purpose
Lint Rollers 	For surface-level fibre removal
Air Blowers 	To remove dust from folds and seams

Tool/Equipment	Purpose
Spot Cleaners 	Chemical-based stain removers for oil or ink
Steam Guns 	Useful for freshening garments and lifting light stains
Brushes and Clothes Wipers 	For more detailed cleaning tasks

Table 7.1.1: Cleaning Tools and Equipment

Cleaning Procedures for finished garments includes the following list:

- Conducted under bright, natural or LED lights for maximum visibility.
- Performed on designated cleaning tables separate from stitching lines.
- Operators inspect every garment surface, especially cuffs, collars, plackets, and seams.
- Any cleaned garment is re-inspected before packaging to confirm cleanliness.

Precautions that needs to be undertaken during the garment cleaning involves the following:

- Proper ventilation is necessary when using chemical cleaners.
- Separate tools for light and dark garments to prevent cross-contamination.
- Operators should wear gloves and masks while using sprays or solvents.

A methodical strategy to preserving the cleanliness and quality of clothing is part of QC oversight. In order to guarantee that all necessary chores are continuously completed, supervisors are in charge of keeping an extensive cleaning checklist. In order to facilitate performance assessments and evaluate the efficacy of the cleaning procedure, the quality control team records the types of defects both before and after cleaning. Control charts, which are intended to assess recurring problems and pinpoint areas in need of improvement, also track cleaning efficiency. This methodical supervision guarantees that hygienic standards are maintained and that persistent issues are quickly resolved.

7.1.5 Final Quality Check After Cleaning and Ironing

The final quality check is a crucial process in garment manufacturing, serving as the last inspection point before products are packaged and shipped to buyers. At this stage, any defect that goes unnoticed can lead to customer dissatisfaction, returns, and potential loss of future business. Therefore, this check must be carried out meticulously and by experienced quality inspectors.

This inspection is comprehensive and involves checking various elements of the garment's presentation, construction, measurements, and finishing. The following components are reviewed in detail:

- **Visual Inspection of Garment Surface:** The inspector carefully examines each garment under adequate lighting conditions to detect surface imperfections. These include visible stains, dirt, marks left during production, uncut threads, or ironing mishaps such as shine marks or creases. Any residual chalk marks from patternmaking or tailoring stages must also be removed.
- **Measurement Verification:** The garment's dimensions are measured against the approved size chart. Parameters such as chest, waist, sleeve length, inseam, garment length, and shoulder width are checked using measuring tapes or specialized measuring templates. Garments that are even slightly off-spec may affect fit and are thus flagged for correction or rejection, depending on deviation severity.
- **Stitching Quality Check:** Each seam, hem, and edge is examined for proper stitch formation, even spacing, and strength. The inspector ensures there are no skipped stitches, loose threads, or seam puckering. Particular attention is given to stress areas such as armholes, crotch seams, and side seams, where poor stitching could lead to tearing.
- **Component Placement and Attachment Check:** Garments often include trims, labels, buttons, zippers, embroidery, and decorative elements. The inspector verifies that all such elements are present, firmly attached, and aligned properly according to the approved sample. Any missing or misaligned component can affect the garment's utility and aesthetic.
- **Fabric Appearance and Finishing:** Inspectors look for uniformity in colour, weave, texture, and overall garment drape. Colour shading must be consistent across panels and between garments in the same lot. Inconsistent dyeing or fabric flaws such as snags, holes, or piling are recorded and analysed.
- **Label and Tag Review:** Correct labelling is not only a buyer requirement but also a regulatory one. Inspectors verify that all care labels, fibre content labels, size tags, and brand labels are accurate and securely attached. Any error in labelling may result in product recalls or legal issues in certain markets.

Garments that pass the final inspection are moved to the packaging section. If minor, mendable defects are found, the garments are sent for rework. Major faults or recurring issues are documented and escalated for root cause analysis. This final inspection process functions as a filter to ensure that only garments meeting both buyer and organizational standards are shipped.

Documentation is also an integral part of this step. Each inspected batch is recorded with details of defects found, rework conducted, acceptance rate, and inspector comments. These records support quality assurance, traceability, and compliance requirements.

7.1.6 Handling Mendable Defects During Inspection

Not all defects discovered during the final inspection necessitate rejection or wastage of garments. Many defects are categorized as mendable or repairable, meaning they can be fixed through appropriate corrective action without compromising the structural integrity, aesthetics, or functionality of the garment.

Effective handling of mendable defects involves several key steps:

- **Defect Identification and Categorization:** Inspectors must be trained to recognize which defects are minor and can be repaired. Common mendable defects include:
  - Loose or hanging threads
  - Minor seam opening
  - Small stains or chalk marks
  - Slight pressing issues (e.g., fold lines or missed areas)
  - Uneven button placement
  - Missing buttons or trims
  - Slight measurement variation within allowable tolerance
- **Routing for Rework:** Once identified, these garments are routed to the designated rework area. This area is usually equipped with basic stitching machines, pressing tools, cleaning supplies, and necessary accessories. Garments are tagged with defect details to guide the rework operator.
- **Corrective Action and Re-inspection:** Skilled rework operators address the defect as per defined standard operating procedures (SOPs). After the correction is made—be it a stitch fix, pressing touch-up, or cleaning—the garment undergoes a second inspection to ensure the issue is fully resolved and that the repair hasn't caused any damage or new defects.
- **Rework Documentation and Monitoring:** Every rework case must be logged, with data on the nature of the defect, time taken for rework, and operator name. This allows the quality team to identify frequent issues, analyse trends, and implement preventive actions to reduce rework rates over time. For instance, if thread trimming defects are repeatedly seen, trimming SOPs or staff training may need to be revisited.
- **Acceptable Rework Limits:** Though rework is a cost-effective method of salvaging garments, it should be controlled. Excessive rework can signal poor upstream quality processes and may weaken the garment. For example, repeated stitching or pressing can distort the fabric or leave shine marks. Most factories have limits on the number of reworks allowed per garment or per batch, beyond which the product is rejected.
- **Importance of Skilled Workforce:** The effectiveness of defect handling depends on the skill of the inspection and rework staff. Poorly executed repairs can result in more damage than the original defect. Hence, regular training, upskilling, and supervision are crucial. Workers must be familiar with fabric characteristics, stitch types, and acceptable quality limits.

- **Feedback Loop to Production Team:** An important part of handling mendable defects is using the information to prevent their recurrence. If garments repeatedly return with the same issue—like loose buttons or inaccurate sizing—the issue may stem from a flaw in the production line. Quality teams use this insight to brief the production team, adjust machine settings, or retrain operators.

Some specific examples of mendable defects and solutions include:

1. **Thread pulls:** Removed or corrected by trimming and brushing.
2. **Missing button:** Re-attached using the correct button and placement.
3. **Stain:** Removed with a spot cleaner, solvent, or through steaming.
4. **Slight seam opening:** Restitched with matching thread, ensuring seam strength.
5. **Creasing:** Removed by re-pressing with proper settings.

By effectively handling mendable defects, factories minimize wastage, maintain buyer satisfaction, and improve their overall production efficiency. This practice also aligns with sustainable production goals by reducing unnecessary discards and optimizing material usage.

7.1.7 Rejecting Garments That Fail Quality Standards

Rejection of garments is a necessary and integral part of the quality assurance process in apparel manufacturing. Despite multiple checks at various stages—cutting, stitching, finishing, and final inspection—some garments may still not meet the required standards due to critical or irreparable defects. These garments must be identified and rejected systematically to uphold brand value, customer trust, and contractual obligations with buyers.

Criteria for Rejection

Garments are typically rejected based on one or more of the following grounds:

1. **Fabric Damage:** This includes holes, snags, tears, burns, or permanent stains that cannot be removed through cleaning or repaired without compromising the aesthetics or strength of the garment. Fabric defects are often irreparable, especially when they occur on visible areas like the front panel or sleeve.
2. **Irremovable Stains:** Oil marks, ink stains, or colour bleeding that persist even after spot treatment are valid grounds for rejection. Such flaws can ruin the appearance of a garment and affect buyer satisfaction.
3. **Size Deviation:** A garment that significantly deviates from the approved size specifications—either too large, too tight, or disproportionate in structure—can be uncomfortable for the wearer and lead to returns or brand damage.
4. **Colour Shading and Dyeing Issues:** Uneven colour patches, shading across different parts of the same garment, or inconsistent dyeing can ruin the overall look. If the shading is significant or in a highly visible area, the garment must be rejected.
5. **Stitching Defects:** These may include skipped stitches, loose seams, broken threads, or tension imbalance that affects the garment's structural strength. If such issues cannot be corrected through rework or would lead to a compromised finish, rejection is necessary.

6. **Trimming or Embellishment Issues:** Incorrect or misaligned attachment of trims like lace, zippers, buttons, or embellishments such as sequins or embroidery also warrant rejection. If not fixable, they impact design integrity.

Rejection Procedure

1. **Segregation:** Garments that fail final quality checks are immediately segregated from the approved stock and moved to a designated "rejection" area.
2. **Tagging and Identification:** Each rejected garment is tagged with a rejection label noting the nature of the defect, date, batch number, inspector's name, and stage of detection.
3. **Documentation:** Rejection details are recorded in a standardized rejection register or software system. Information includes SKU/Style ID, reason for rejection, production date, and associated production unit or line.
4. **Root Cause Analysis (RCA):** Frequent or repeated rejection patterns are analysed to identify systemic issues such as machine problems, operator errors, raw material quality, or ineffective supervision.
5. **Disposal of Rejected Items:** Rejected garments are either:
   - Scrapped (destroyed so they don't enter the market),
   - Recycled into other usable materials or rags,
   - Kept as training samples for demonstrating quality failures,
   - Returned to the vendor (if the defect is attributable to supplied material).
6. **Reporting and Review:** Rejection summaries are periodically reviewed by quality heads and production managers to initiate corrective and preventive action plans (CAPA).

Importance of Rejection

Rejection is not merely about removing defective garments—it is a safeguard against customer dissatisfaction, product recalls, and brand reputation loss. While reducing rejection rates is ideal, compromising on quality to achieve this can be far more damaging in the long run. A structured rejection process ensures accountability, transparency, and continuous quality improvement.

7.1.8 Recording and Documenting Finishing Observations

Proper documentation during and after garment finishing is critical for maintaining high quality standards and ensuring traceability, consistency, and accountability throughout the production lifecycle. Documentation serves not only as a reference but also as a tool for quality audits, buyer communication, and internal process improvement.

Purpose of Finishing Documentation

1. **Traceability:** Accurate records allow production history tracking, helping identify which line, batch, or team was responsible for a specific garment.
2. **Compliance and Audits:** Brands and buyers often conduct internal or third-party audits. Well-maintained documentation provides proof of adherence to quality and safety standards.
3. **Performance Monitoring:** By recording metrics like rework rates or rejection causes, production teams can identify performance bottlenecks and address them proactively.
4. **Root Cause Analysis:** Defect trends or recurring issues can be traced back to their origin using detailed records, aiding problem resolution and process optimization.
5. **Training Reference:** Documentation from past errors or successes serves as a useful training tool for on boarding new QC personnel or line workers.

Key Records Maintained

1. **Control Charts**
   - These visualize process data across time. Control charts track variables like defect rates, rework frequency, or machine performance.
   - Helps identify abnormal trends and signal when intervention is needed.
2. **Rework Logs**
   - Logs mention garments that underwent correction, the type of defect, rework performed, date, and responsible personnel.
   - Overuse of rework indicates deeper quality issues that need resolution.
3. **Rejection Reports**
   - Capture reasons for garment rejection, defect categories, quantity, inspector details, and corrective actions recommended.
   - Useful for monthly or weekly quality performance reviews.
4. **Final Inspection Checklists**
   - Inspectors fill out a checklist for each garment or sample to confirm conformity to various parameters: appearance, measurements, stitching, labels, trims, etc.
   - These checklists ensure no step is missed and provide accountability.
5. **Packaging Records**
   - Once garments pass the final QC check, details of packaging are recorded—style code, size set, quantity per box, packaging type, and carton number.
   - Aids in shipment tracking and resolving post-dispatch disputes.
6. **Defect Tagging Slips**
   - Physical tags attached to garments during finishing to denote the defect type, rework needed, or rejection decision.
   - Enhances clarity and communication between QC and finishing teams.
7. **Audit Trail Records**
   - Periodic internal audits or buyer-side inspections are documented to track factory readiness and adherence to SOPs.
   - Includes inspector comments, photos, and compliance scores.

Documentation Best Practices

- **Consistency:** Use standardized forms and digital templates across all departments.
- **Accuracy:** Ensure real-time recording of defects, inspections, or changes to avoid gaps in information.
- **Legibility:** For manual entries, handwriting must be clear and universally understood.
- **Integrity:** Records must be tamper-proof and protected from unauthorized access.
- **Backup and Retrieval:** Use cloud or ERP-based systems where feasible to allow fast access and historical comparison.

Digital vs Manual Documentation

- **Digital Systems (e.g., ERP, QC software):**
  - Enable real-time data entry, analytics, dashboard tracking, and quicker audits.
  - Ideal for medium to large factories with high volumes.

- **Manual Logbooks:**
  - More common in small-scale units or in regions where digital literacy is low.
  - Require strict discipline and regular supervision to ensure completeness.

Importance of Documentation in Quality Culture

Documentation forms the backbone of a well-functioning quality system. It not only helps identify defects but also guides decisions on rework, rejection, and even supplier accountability. By cultivating a documentation-focused mind-set among workers, supervisors, and managers, organizations can build a culture of transparency, precision, and continuous improvement.

Finishing and quality control are the final and most decisive stages in garment production. This unit emphasizes the importance of a structured process that includes ironing, packaging, quality inspection, control chart preparation, rework handling, and rejection procedures. By systematically addressing each stage with trained personnel and clear documentation, manufacturers can ensure that only flawless garments reach the buyers—building brand trust and minimizing cost due to returns or penalties. Mastery of these finishing and quality control techniques is fundamental for quality assurance executives, floor supervisors, and anyone involved in apparel production.

Summary

- Garment finishing includes trimming, ironing, cleaning, and packaging.
- Quality control in finishing helps identify and reject defective garments.
- Control charts and records are maintained to track defects and compliance.
- Finishing staff must check for stains, thread leftovers, and repairable issues.
- Trimming and cleaning processes must ensure a polished final product.
- Final inspection helps ensure garments meet buyer specifications before dispatch.
- Documentation during finishing ensures traceability and accountability.

Exercise

Multiple-choice Question:

1. Which defect is mendable?
   a. Large tear
   b. Loose thread
   c. Burn hole
   d. Missing sleeve

2. When is the finishing control chart updated?
   a. Daily
   b. After ironing and cleaning
   c. Weekly
   d. Before stitching

3. Packaging must ensure:
   a. Visual appeal
   b. Moisture protection
   c. Branding only
   d. Retail barcode

4. What is documented in finishing?
   a. Marketing plan
   b. Trim cost
   c. Observations
   d. Export lead time

5. Which tool is used in finishing?
   a. Screen printer
   b. Steam iron
   c. Measuring tape
   d. Clamp meter

Descriptive Questions:

1. What is a finishing observation sheet?
2. Mention one mendable defect.
3. List two packaging essentials.
4. Why is final pressing important?
5. Define control chart in finishing.

Notes

Scan the QR codes or click on the link to watch the related videos

https://youtu.be/nuVHz3lpUlw?si=BX9CxTAceGSaUfmJ

Shirt's finishing iron press process in garments industry.

Skill India
कौशल भारत-कुशल भारत

सत्यमेव जयते
GOVERNMENT OF INDIA
MINISTRY OF SKILL DEVELOPMENT
& ENTREPRENEURSHIP

N·S·D·C
RE IMAGINE FUTURE

APPAREL MADE-UPS HOME FURNISHING
SECTOR SKILL COUNCIL

8. Coordinate with Different Departments

Unit 8.1 - Communication and Process Improvement in Production

AMH/N1404

Key Learning Outcomes

By the end of this module, the participants will be able to:

1. Explain the process of handing over the work to superior.
2. Explain the importance of team work.
3. Follow the work instructions given by the seniors.
4. Identify the methods to increase the efficiency in production.
5. Explain the reporting process to superior about process-flow, improvement in the product.
6. Identify defects received from previous process.
7. Select the process to communicate to reporting superior about employee management, i.e. shortages or performance related, work hazards and rework on feedback provided by superior on product, process and people.

UNIT 8.1: Communication and Process Improvement in Production

Unit Objectives

By the end of this unit, the participants will be able to:

1. Explain the process involved in handing over work to superiors.
2. Discuss the importance of teamwork in a production environment.
3. Describe how to follow the work instructions provided by senior personnel.
4. Outline the methods used to increase efficiency in the production process.
5. Explain the reporting process to superiors regarding process flow and product improvements.
6. Identify defects identified in the previous stages of the production process.
7. Select the appropriate communication process to report issues related to employee management, including shortages, performance concerns, work hazards, and rework feedback provided by superiors on product, process, and people.

8.1.1 Handover Process to Superiors

In the apparel production industry, where operations are often continuous and involve multiple teams working in shifts, the handover process to superiors or the incoming team becomes critical. It ensures that production remains consistent, errors are minimized, and work continues seamlessly without time loss or confusion.

A structured handover acts as a bridge between outgoing and incoming team members or supervisors, facilitating clarity and continuity. Without an effective handover, misunderstandings and delays may occur, impacting production timelines, quality, and resource utilization.

Key Components of an Effective Handover

An ideal handover includes the following elements:

- **Summary of Completed Tasks:** A brief but clear record of the work completed during the shift, including number of pieces stitched, checked, reworked, or packed.
- **Pending Work or Unresolved Issues:** Mention of any activities that were left incomplete, machinery breakdowns, pending quality checks, or garments held back for rework.
- **Defect Reports and Observations:** If certain defects were repeatedly observed during the shift, or particular operations faced issues (e.g., stitching puckering or loose threads), they must be documented.
- **Production Target Status:** Whether the team met, exceeded, or fell short of the planned production target should be conveyed to the next supervisor.
- **Team Feedback or Instructions:** If there were any specific instructions given by higher management or any unusual observations about raw materials or machines, they should be included in the handover note.

Tools for Handover

The handover process can be verbal, written, or digital—ideally, a combination. Some tools used for this process include:

- **Shift Summary Sheets:** Pre-structured templates to capture key production, quality, and maintenance data.
- **Digital Logs:** ERP systems or factory apps where real-time production metrics and notes can be entered and accessed by all stakeholders.
- **Whiteboards or Display Screens:** For quick updates on ongoing shift tasks, alerts, and priority items.

Documented handovers ensure accountability and traceability, making it easier to investigate issues, audit processes, or identify training needs later.

Benefits of a Structured Handover Process

- **Minimizes Downtime:** The incoming team starts with a clear understanding of what needs to be done.
- **Reduces Communication Errors:** Written or logged handovers provide clarity and reduce dependency on memory.
- **Supports Quality Control:** Any known defects or risks are highlighted early, allowing better focus.
- **Promotes Professionalism and Responsibility:** Employees take ownership of their roles and understand the value of maintaining flow.

Best Practices for Handover

- Perform handovers at the end of every shift without fail.
- Use structured templates or checklists to avoid missing important points.
- Maintain a respectful tone in documentation—avoid blame and focus on factual information.
- Encourage two-way communication. The outgoing and incoming teams should interact briefly during overlap to clarify doubts.

8.1.2 Importance of Teamwork in Production

In garment production, a single finished piece goes through many hands—cutting, stitching, checking, ironing, packaging, and more. Each process is dependent on the previous one being completed correctly and on time. This intricate dependency means that teamwork is not just helpful; it is essential.

Without effective teamwork, production lines would become inefficient, deadlines would be missed, and product quality would decline. Whether it's in the sewing line, finishing department, or quality control, coordinated team efforts ensure speed, accuracy, and consistency.

Characteristics of Effective Teamwork

- **Communication:** Team members must be encouraged to share updates, ask questions, and provide timely feedback.
- **Trust:** A strong team trusts that everyone will do their job responsibly, reducing the need for micromanagement.

- **Supportive Attitude:** When workloads increase or issues arise, team members should be willing to help each other out.
- **Clear Roles and Goals:** Every worker must know their responsibility and understand how it contributes to the larger production goal.

Benefits of Teamwork in Production are as follows:

- **Faster Output:** A synchronized team can complete tasks faster by dividing work smartly.
- **Better Quality:** Mistakes can be spotted early by peers, and corrections made before garments move forward in the line.
- **Improved Morale:** Workers feel valued when they are part of a well-functioning team and are more likely to stay motivated.
- **Problem Solving:** Teams that collaborate are better at brainstorming solutions to technical or operational challenges.

To build a team-oriented environment, factories and supervisors can:

- **Conduct Team Briefings:** Daily stand-up meetings help align team members on goals, shifts, or challenges.
- **Encourage Peer Learning:** Senior operators can mentor junior ones, especially when new machines or techniques are introduced.
- **Celebrate Team Success:** When targets are achieved or quality milestones are hit, celebrate as a team to build unity.
- **Provide Cross-Training:** Allowing workers to learn other roles increases flexibility during staff shortages and fosters empathy for others' work.

Teamwork Challenges and Solutions

1. **Language Barriers:** In multi-lingual teams, visuals, gestures, or basic common words can aid communication.
2. **Conflicting Personalities:** Supervisors should mediate conflicts early to prevent disruptions.
3. **Uneven Work Distribution:** Leaders must ensure all team members are contributing equally and receiving fair recognition.

The Role of Supervisors in Team Development

Team leaders and line supervisors are crucial in shaping a team's efficiency. Their role includes:

1. Monitoring team dynamics and intervening when needed
2. Ensuring fair workload distribution
3. Creating a respectful and safe work environment
4. Recognizing and rewarding collaboration and cooperation

By building strong team relationships, leaders not only improve productivity but also reduce absenteeism and turnover.

Example: Consider a stitching line where one operator delays due to confusion over a new design. Without teamwork, the next operator waits idly, and the line slows. But in a supportive team, another operator steps in to help or the quality checker clarifies the issue, allowing continuity. Such responsiveness only comes from teamwork.

8.1.3 Following Work Instructions from Superiors

In garment production, work instructions provided by superiors such as line supervisors, quality control managers, or floor in-charges are critical for ensuring consistency, efficiency, and adherence to quality standards. These instructions serve as a roadmap for operators and workers on the production line, detailing how specific tasks should be executed and what standards must be maintained. Ignoring or misinterpreting instructions can lead to costly errors, delays in production, and potential non-compliance with buyer specifications.

Work instructions typically cover various aspects of the production process, including:

- Machine operation protocols (e.g., machine speed, needle type, thread tension)
- Specific stitching methods required for different garment parts
- Handling and checking of raw materials, trims, and finished components
- Procedures for in-line and end-line quality inspections
- Guidelines for marking, bundling, and routing garments

These instructions are developed based on production planning, customer requirements, and quality benchmarks. They are often communicated at the start of the shift, during line meetings, or through printed Standard Operating Procedures (SOPs) posted at workstations.

Following instructions has several key benefits:

1. **Minimizing Mistakes and Defects:** When operators follow clear instructions, the chance of errors such as incorrect stitching patterns, fabric puckering, or misaligned seams significantly reduces. Consistent adherence ensures that each garment meets quality expectations.
2. **Standardizing Production Practices:** Uniformity is essential in garment manufacturing, especially in large-volume orders. By following the same instructions, operators ensure that every unit produced matches the approved sample, thereby maintaining consistency across batches.
3. **Ensuring Timely Completion:** Production schedules are tight, and reworks can cause costly delays. When everyone on the line adheres to the planned sequence of operations and quality checks, the process flows smoothly without interruptions.
4. **Maintaining Compliance with Buyer Requirements:** International buyers often specify exact construction techniques, seam allowances, and finishing procedures. Adhering to work instructions ensures these requirements are fulfilled, reducing the risk of shipment rejections or penalties.
5. **Enhancing Workplace Discipline and Accountability:** Workers who habitually follow instructions set a professional example. This fosters a culture of discipline and builds trust with supervisors and peers. It also enables easier performance evaluation and feedback.

Operators are also encouraged to communicate proactively with their superiors when they face any difficulty in understanding instructions. Seeking clarification, rather than assuming or ignoring, prevents misunderstandings. For example, if a seamstress is unsure about the placement of a brand label, she

should consult the supervisor or refer to the approved sample, rather than guess and risk a whole batch being faulty.

Work instructions can be both verbal and written. While verbal directions are quick and immediate, written or visual aids like instruction cards, digital tablets, or posters provide more clarity and can be referred to multiple times. Factories are increasingly adopting digital tools such as real-time dashboards or workflow management software to disseminate instructions more effectively.

Furthermore, supervisors often perform random checks to ensure that instructions are being followed. If deviations are found, corrective actions such as retraining or one-on-one guidance are provided. In some factories, workers are asked to sign acknowledgment sheets to confirm that they have received and understood the day's work instructions.

In conclusion, following instructions from superiors is not just about obedience—it is about being part of a streamlined, quality-focused system. Operators who respect instructions contribute to the factory's overall productivity, reduce the burden on quality inspectors, and ultimately help in delivering high-quality garments that meet buyer expectations.

8.1.4 Methods to Increase Production Efficiency

Improving production efficiency is vital for any garment manufacturing unit. Higher efficiency leads to increased output, reduced costs, improved product quality, and enhanced competitiveness in the market. It reflects how well resources such as time, labour, machines, and materials are utilized to produce garments with minimal waste and maximum output.

There are several proven methods to increase production efficiency in apparel manufacturing:

1. **Line Balancing:** Line balancing involves distributing workload evenly among all operators in a production line. When tasks are unevenly assigned, some operators may become overloaded while others are idle. This creates bottlenecks and reduces output. Through time-motion studies and line analysis, managers can identify and redistribute operations to ensure that each workstation completes its task within a standard cycle time. Balancing minimizes idle time and helps maintain a steady production rhythm.
2. **Workstation Optimization:** An organized workstation improves both speed and safety. Keeping tools, materials, and finished components within easy reach reduces unnecessary movement and fatigue. Ergonomically designed tables and chairs, proper lighting, and ventilation also contribute to operator comfort and faster execution of tasks.
3. **Skill Training and Multi-Skilling:** Operators with strong technical skills can complete tasks more quickly and with fewer errors. Regular training sessions help upgrade operator skills in stitching, fabric handling, and machine maintenance. Multi-skilled operators can be rotated across various operations, ensuring flexibility during absenteeism or sudden demand changes. This adaptability significantly boosts production continuity and efficiency.
4. **Defect Prevention and Root Cause Analysis:** Frequent defects slow down production due to reworks and inspections. Implementing systems like "first-time-right" encourages operators to aim for defect-free output. When defects do occur, analysing their root causes—such as improper thread tension or wrong stitch type—helps in taking permanent corrective action rather than temporary fixes. Visual aids like "do and don't" boards at the workplace serve as reminders of quality expectations.
5. **Use of Control Charts and Monitoring Tools:** Control charts help track key performance metrics such as defect rates, output per hour, and operator downtime. These charts provide visual feedback to workers and supervisors, making it easier to identify trends and anomalies. Digital tools like ERP systems and real-time dashboards provide instant data that facilitates faster decision-making and action.

6. **Standard Minute Value (SMV) and Incentive Systems:** By calculating the Standard Minute Value for each task, factories can set realistic output targets. Linking operator incentives to SMV-based performance encourages faster and more focused work. However, care must be taken that quality is not compromised in pursuit of quantity.
7. **Lean Manufacturing Practices:** Adopting lean methods such as 5S (Sort, Set in order, Shine, Standardize, Sustain), Kaizen (continuous improvement), and Just-in-Time (JIT) can drastically improve efficiency. These practices reduce waste, streamline operations, and create a culture of responsibility and ownership among workers. For instance, Kaizen encourages even the smallest suggestions from floor staff to improve daily tasks, leading to gradual yet impactful efficiency gains.
8. **Preventive Maintenance of Machines:** Breakdowns halt production and disrupt delivery timelines. A schedule for preventive maintenance—checking oil levels, replacing worn-out parts, and calibrating machines—ensures continuous operation. Operators should be trained to handle basic maintenance tasks and report faults immediately.
9. **Time and Motion Study:** By analysing the time taken for each movement in the operation, managers can identify unnecessary steps that can be eliminated. Even saving a few seconds per garment can result in significant gains when scaled over thousands of pieces.
10. **Effective Communication and Supervision:** Supervisors must be clear, supportive, and available. Immediate guidance, feedback, and decision-making prevent delays. Also, having team leaders or coordinators who act as links between the floor and management ensures that instructions and concerns flow smoothly.
11. **Use of Automation and Advanced Machinery:** Where budget permits, semi-automated or automated machines can speed up repetitive tasks with greater precision. For example, automated buttonhole machines, laser cutting, and automatic label attaching machines reduce manual errors and improve speed.
12. **Minimizing Downtime and Idle Time:** Monitoring break times, shift changes, and machine setup durations can highlight areas where time is lost. Planning shift transitions carefully and having spare machines or backup operators can reduce downtime.
13. **Quality at Source:** Encouraging operators to self-check their work before passing it on helps catch mistakes early and reduces the burden on quality control teams. This fosters a mind-set of responsibility and minimizes rework rates.

8.1.5 Reporting Process to Superiors

In the apparel manufacturing industry, the process of reporting to superiors plays a vital role in sustaining operational transparency, improving quality, and ensuring the timely resolution of issues. Reporting involves structured communication—whether oral, written, or digital—between employees at different levels of the production hierarchy. It enables supervisors and managers to make informed decisions based on real-time data and situational feedback.

Purpose and Importance of Reporting:

- Facilitates real-time problem-solving and preventive measures.
- Enhances the decision-making capacity of supervisors.
- Promotes transparency and trust across teams.
- Helps track productivity, quality performance, and target achievement.
- Identifies training needs, safety concerns, and process bottlenecks.

Types of Reports in a Garment Factory:

1. **Daily Production Reports:** These include shift-wise output, number of garments completed, number of defective pieces, machine downtime, and absenteeism.

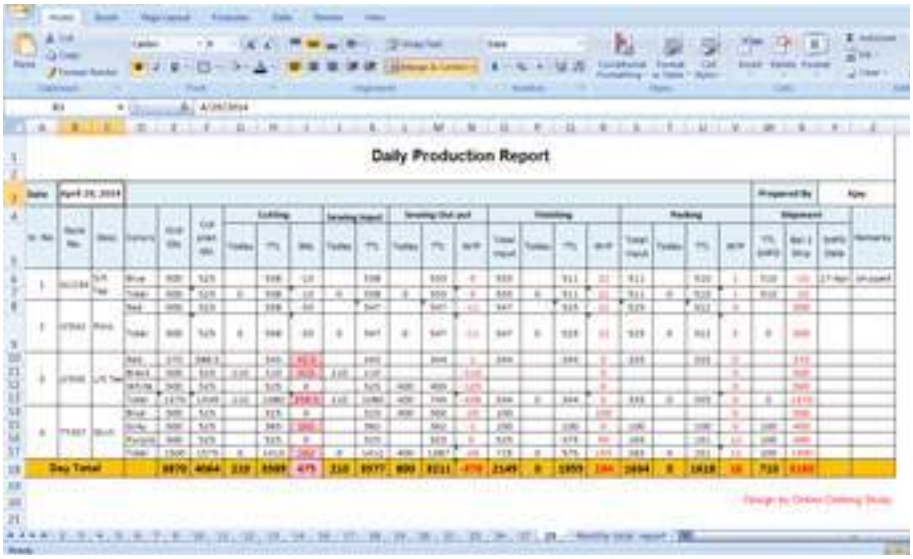


Fig. 8.1.1: Daily Production Reports

2. **Quality Reports:** Highlight specific defects, rejection rates, causes of quality failure, and results from audits or inspections.

Fig. 8.1.2: Quality Reports

3. **Line Efficiency Reports:** Share efficiency calculations such as SAM (Standard Allowed Minutes), total time consumed, actual output, and bottlenecks.

Icon	Code	Code Description	Time (Seconds)	
		SEW TWO PARTS TOGETHER	Machine	Manual
	MG2T	Match and Get 2 Parts Together		1.95
	FOOT	Put Part(s) to Machine Foot		1.30
	MS1A	Sew to hold	0.90	
+	AM2P	Align and Match 2 Parts		1.52
	S9LA	Sew 9cm, Low Guidance and Stop > 1cm	1.35	
+	AM2P	Align and Match 2 Parts		1.52
	S9LA	Sew 9cm, Low Guidance and Stop > 1cm	1.35	
	TCUT	Cut Thread		1.65
	APSH			

Fig. 8.1.3: SAM

4. **Maintenance Reports:** Log of machine breakdowns, servicing schedules, spare parts usage, and unresolved technical issues.

Fig. 8.1.4: Maintenance Reports

5. **Improvement Reports:** Include suggestions from operators or team leaders to improve workflow, safety, quality, or efficiency.
6. **Incident Reports:** Filed when there are injuries, safety violations, disputes, or compliance issues.

Fig. 8.1.5: Incident Reports

Essential Elements of a Good Report:

- **Concise and Factual:** Stick to facts. Avoid opinions unless specifically requested.
- **Time-stamped:** Mention the date, time, and shift to help in tracking recurring issues.
- **Data-driven:** Support with metrics, images (if needed), and source logs.
- **Clear Format:** Use tables, bullet points, and headings for clarity.
- **Channel-Appropriate:** Submit via prescribed channels—registers, digital systems (ERP), WhatsApp, or dashboards.

Communication Etiquette While Reporting:

- Maintain a respectful tone while addressing concerns.
- Avoid blame; instead focus on solutions and collaborative effort.
- Report at appropriate times, especially for non-urgent matters.
- Ensure information confidentiality when required.

Digital Tools in Reporting:

Modern garment units often implement software systems like T&A tracking apps, quality dashboards, production ERPs, and issue escalation portals. These tools reduce manual errors, facilitate real-time updates, and promote cross-functional visibility.

Challenges in Reporting and Their Solutions:

- **Fear of Reporting Issues:** Foster a non-punitive culture.
- **Lack of Standard Formats:** Implement and train on standard templates.
- **Delayed Reporting:** Assign fixed times and define escalation paths.
- **Language Barriers:** Use local language or pictorial symbols for ease.

Timely, honest, and accurate reporting is the backbone of operational excellence. It creates a feedback loop essential for continuous improvement, ethical compliance, and meeting buyer standards.

8.1.6 Identifying Defects in Previous Production Stages

In garment manufacturing, maintaining quality is not only the job of the finishing department but a shared responsibility across all stages. Identifying defects in earlier processes is crucial because unnoticed errors tend to escalate and become harder to fix later.

Why Early Detection Matters:

- Reduces rework time and cost.
- Minimizes resource wastage and material loss.
- Ensures that the final product meets client specifications.
- Increases customer satisfaction and retention.

Common Stages and Their Defects:

1. **Cutting Stage Defects:**
   - Wrong pattern size or misalignment
   - Fabric fraying at edges
   - Incorrect panel placement
2. **Stitching Stage Defects:**
   - Skipped stitches, broken threads
   - Uneven tension or incorrect seam allowance
   - Misattached collars, cuffs, or panels
3. **Printing/Embroidery Stage Defects:**

- Smudged prints or off-centre placement
- Thread entanglement in embroidery
- Color bleeding

4. **Washing Stage Defects:**
   - Shrinkage beyond tolerance
   - Color fading or uneven wash
   - Chemical residue
5. **Finishing Stage Defects:**
   - Improper ironing or pressing
   - Excess thread not trimmed
   - Stains or dirt during handling

Techniques for Identifying Defects:

- **Visual Inspection:** Regular checks during and after each stage.
- **Touch & Feel:** Useful for detecting fabric inconsistencies or hidden defects.
- **Light Table Inspection:** Used to examine defects like pinholes or spots.
- **Measuring Tools:** Ensuring sizes, seam allowances, and stitch counts.
- **Control Charts:** To monitor process consistency and highlight deviation.

Defect Documentation:

- Use **Defect Registers, Inspection Sheets, or Digital QC Apps.**
- Document date, department, type of defect, person responsible, and corrective action taken.

Feedback Loop to Previous Departments:

- Once defects are found, the respective department (cutting, stitching, etc.) must be informed.
- Root Cause Analysis (RCA) helps identify systemic issues.
- Corrective and Preventive Actions (CAPA) are to be taken based on analysis.

Training and Awareness:

- Train workers to recognize quality standards.
- Display common defects and their visuals at workstations.
- Encourage open communication for defect reporting without fear.

Benefits of Identifying Defects Early:

- Smoother flow to next stages.
- Lower production costs.
- Faster production turnaround.
- Compliance with buyer quality audits.

8.1.7 Communication for Employee and Process Issues

Smooth and respectful communication is a vital component of a productive and ethical workplace. In garment factories, where hundreds of workers operate under tight timelines, structured communication practices are necessary to resolve employee grievances and operational challenges.

Types of Employee and Process Issues:

1. **Attendance or Manpower Shortage:**
   - Absenteeism or lack of skilled labor affecting output.
2. **Training Needs:**
   - Workers unfamiliar with new machines or quality procedures.
3. **Interpersonal Conflict:**
   - Misunderstandings or disputes between workers affecting morale.

4. **Health and Safety Concerns:**
   - Unsafe machines, poor lighting, ventilation, or injury risks.
5. **Feedback from Buyers or Auditors:**
   - Quality, compliance, or ethical audit remarks requiring urgent attention.

Channels of Communication:

- **Verbal:** Through supervisors during shift meetings or huddles.
- **Written:** Notice boards, registers, suggestion books.
- **Digital:** WhatsApp groups, HRMS systems, issue tracking tools.
- **Meetings:** Daily production meetings, safety talks, or review boards.

Best Practices in Communication:

- Be clear and specific—avoid vague language.
- Choose the right time and person to escalate the issue.
- Listen actively to feedback and encourage two-way dialogue.
- Keep communication respectful and professional at all times.

Structured Communication Systems:

- **Daily Shift Meetings:** For production planning and updates.
- **Issue Escalation Matrix:** Clear process to report urgent matters.
- **Suggestion Box System:** For anonymous employee suggestions or complaints.
- **Internal Communication Apps:** For documenting updates and assigning responsibilities.

Importance of Timely Communication:

- Helps prevent production downtime.
- Addresses employee dissatisfaction before it escalates.
- Promotes proactive issue resolution.
- Builds a transparent and respectful work culture.

Encouraging Open Communication:

- Train supervisors in soft skills and conflict resolution.
- Include communication KPIs in performance appraisals.
- Recognize employees who contribute through constructive feedback.

Proper communication helps in building a safe, productive, and accountable work culture. It enables quick resolution of issues and encourages employees to take ownership of both product quality and team welfare.

Communication and process improvement are not just buzzwords—they are integral to the smooth operation of any garment production line. From handing over responsibilities, working as a team, and following instructions, to identifying defects and communicating effectively with superiors, each step contributes to better efficiency and output. When every team member understands their role in the larger process and communicates openly, it becomes easier to meet quality standards, optimize workflows, and ensure timely delivery. This unit empowers production and quality control workers to become active contributors to a more efficient and harmonious workplace.

Summary

- Workers should understand their role and responsibility limits in reporting.
- Adherence to customer-specific codes of conduct is critical in exports.
- Environmental sustainability includes waste minimization and energy saving.
- Machine efficiency helps reduce power consumption and downtime.
- Resource use should be optimized without compromising garment quality.

Exercise

Multiple-choice Question:

1. Which is an ethical sourcing practice?
   a. Lowest cost supplier
   b. Fair labour wages
   c. Hidden pricing
   d. Under-age workforce

2. Waste minimization includes:
   a. Buying more
   b. Efficient material use
   c. Faster delivery
   d. Hiring more workers

3. Who can employees report non-compliance to?
   a. Random co-worker
   b. Authorized supervisor
   c. Competitor
   d. Security guard

4. Which is an environmental compliance action?
   a. Fast fashion
   b. Burning waste
   c. Wastewater treatment
   d. Redesigning logo

5. Transparent communication means:
   a. Open pricing
   b. Free sampling
   c. Fast delivery
   d. Verbal contracts

Descriptive Questions:

1. Define ethical sourcing.
2. What is meant by sustainability in garments?
3. Mention a method of waste control.
4. What are labour law basics?
5. Who sets environmental standards?

Notes

Scan the QR codes or click on the link to watch the related videos

https://youtu.be/prhP3L_Zcq4?si=pujpxAvYVvYqNnzl

The Importance and Advantages of Teamwork

Skill India
कौशल भारत-कुशल भारत

सत्यमेव जयते
GOVERNMENT OF INDIA
MINISTRY OF SKILL DEVELOPMENT
& ENTREPRENEURSHIP

N·S·D·C
RE IMAGINE FUTURE

9. Promote and Sustain Safety, Health, and security in the Workplace while Fostering Gender and Persons with Disabilities (PwD) Sensitization

APPAREL MADE-UPS HOME FURNISHING
SECTOR SKILL COUNCIL

Unit 9.1 - Workplace Health, Safety, and Compliance

Unit 9.2 - Risk Management and Emergency Preparedness

Unit 9.3 - Workplace Inclusion, Awareness, and Best Practices

AMH/N0620

Key Learning Outcomes

By the end of this module, the participants will be able to:

1. Follow health and safety practices applicable at the workplace, including compliance with gender and PwD-related guidelines.
2. Identify and use appropriate personal protective equipment (PPE) such as nose masks and lock guards.
3. Recognise and interpret health and safety signage to ensure workplace safety.
4. Identify workplace hazards, including physical injuries, electric shock, and fire risks, and take corrective actions where possible.
5. Demonstrate basic first aid, emergency response, and fire-fighting procedures, including participation in mock drills.
6. Safely handle and maintain stitching tools and equipment, including identifying and correcting machine malfunctions.
7. Maintain hygiene, sound health, and good workplace habits to support overall well-being.
8. Follow organizational procedures for safely handling machines and compliance with stitching-related safety requirements.
9. Participate in workplace training and sensitization programs on gender equality, PwD awareness, and safety measures.

UNIT 9.1: Workplace Health, Safety, and Compliance

Unit Objectives

By the end of this unit, the participants will be able to:

1. Explain workplace health and safety practices, including compliance with safety, gender, and PwD-related instructions.
2. Identify health and safety signage and compliance requirements related to stitching.
3. Discuss hazards of sewing machine operations, such as physical injuries and electric shocks.
4. Identify and correct (if possible) malfunctions in sewing machines and other equipment.
5. Discuss the importance of personal protective equipment (PPE) like nose masks and lock guards.

9.1.1 Workplace Health and Safety Practices

Creating a safe, inclusive, and respectful working environment is not just a legal necessity but also essential for long-term productivity. The sampling coordinator is responsible for promoting and implementing workplace health and safety standards within the sampling section, as well as ensuring compliance with rules regarding gender equality and the inclusion of Persons with Disabilities (PwDs).

The generic workplace safety and healthy practices are as follows:

- Ensure proper ventilation and lighting to maintain a comfortable and hazard-free environment in the sampling and preparation areas.
- Maintain cleanliness and hygiene by organizing regular cleaning schedules and ensuring that waste from sampling activities is disposed of properly.
- Keep aisles and emergency exits clear to prevent accidents and enable quick evacuation if needed.
- Ensure sampling equipment, machines, and tools are well-maintained and fitted with safety guards to reduce the risk of injury during operations.
- Provide first-aid kits and ensure the sampling coordinator and selected team members are trained in basic first aid.

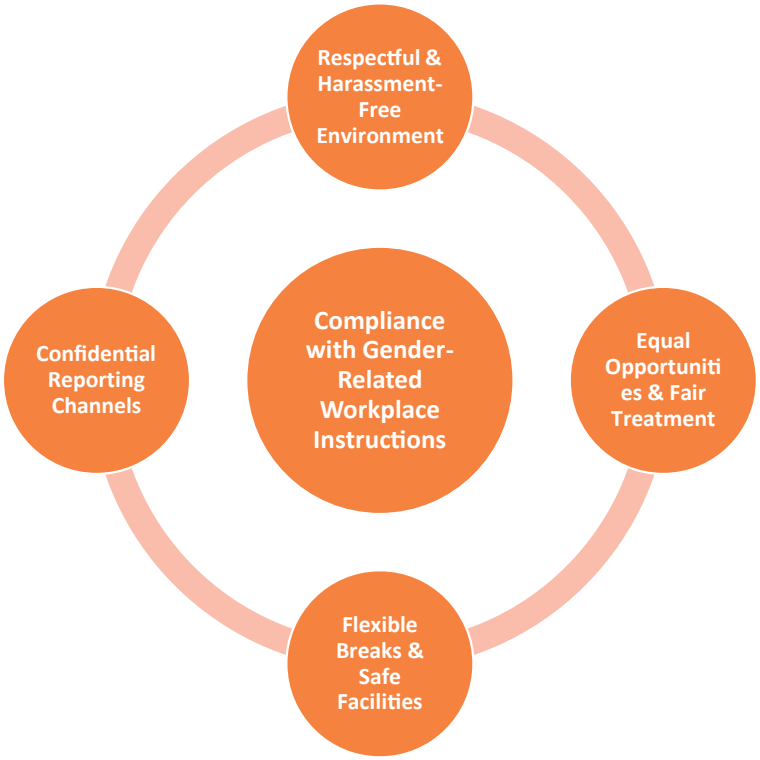


Fig. 9.1.1: Compliance with Gender-Related Workplace Instructions

- Conduct periodic safety drills and training sessions on fire safety and emergency protocols relevant to sampling operations.

The steps for complying with the gender-related workplace instructions by the sampling coordinator in the apparel industry for sampling operations are as follows:

- Promote a respectful and harassment-free environment where all genders are treated equally.
- Ensure equal work opportunities and fair treatment for male, female, and other gender-identifying workers regarding tasks, breaks, and work conditions.
- Support flexible break schedules and safe facilities, especially for female workers, including access to clean restrooms and sanitary provisions.
- Encourage reporting gender-related issues through open-door policies or designated complaint channels while ensuring confidentiality.

Practice	Description
Assign appropriate tasks	Allocate work based on each PwD worker's physical ability to ensure safety and productivity in sampling activities.
Ensure access-friendly infrastructure	Provide features like ramps, wide aisles, ergonomic seating, and accessible restrooms.
Offer special training or modified work instructions	Adapt training methods and instructions to match the needs of workers with different abilities.
Foster an inclusive work culture	Conduct team sensitization programs and prevent any form of discrimination or isolation.

Table 9.1.1: Inclusion and Support for Persons with Disabilities (PwDs)

Avoiding discrimination or isolation of PwD workers by sensitizing the team can help foster an inclusive work culture. Accommodating learning or physical abilities where necessary also helps provide special training or modified work instructions.

A safe and inclusive workplace contributes to better productivity, lower absenteeism, and improved morale. By promoting health and safety standards and respecting gender and PwD-related instructions, the sampling coordinator ensures that the sampling area remains a space where every worker can perform at their best with dignity and confidence.

Health and safety signage

Health and safety signage is vital to maintaining a safe stitching environment. It helps prevent accidents, inform workers of potential hazards, and reinforce compliance with workplace safety rules. Clear visual communication is essential in the stitching section, where operators work with high-speed machines and sharp tools.

Category	Type / Requirement	Description
Safety Signage 	Machine Safety Signs	Indicate using machine guards, caution around moving parts, and safe handling instructions.
	PPE Signs	Remind workers to wear finger guards, masks, hairnets, or safety glasses as required.
	Fire and Emergency Signs	Indicate fire extinguisher locations, emergency exits, assembly points, and alarm instructions.

Category	Type / Requirement	Description
	Ergonomic & Posture Signs	Promote proper sitting posture, foot placement, and back support during stitching operations.
	Prohibited Actions Signs	Prohibit unsafe behaviours like eating near machines, mobile phone use, or leaving machines running.
Compliance Requirements 	Machine Guarding Compliance	Machines must have safety covers and guards, especially around needles, belts, and trimmers.
	Noise and Lighting Standards	Ensure proper lighting to reduce eye strain and manage noise levels with hearing protection.
	Electrical Safety	Machines should be earthed, and wiring should be enclosed to prevent electrical hazards.
	First Aid & Emergency Readiness	First aid kits should be accessible; workers must know emergency protocols.
	Operator Training & SOP Adherence	Workers should be trained in safe machine use and follow standard operating procedures.
	Safety Audits & Inspections	Regular inspections must be conducted to ensure safety compliance is met and documented.

Table 9.1.2: Common Types of Safety Signage and Compliance Requirements Related to Stitching

9.1.2 Hazards Associated with Sewing Machine Operations

Sewing machine operations involve several mechanical and electrical components that, if not handled properly, can lead to workplace injuries. Understanding these risks is essential for maintaining a safe and productive environment.

Type of Hazard	Description
Needle Injuries 	Accidental punctures or cuts can occur if fingers come too close to the needle.
Finger Entrapment 	Moving parts like needle bars and thread trimmers can trap or pinch fingers.
Scissor/Blade Cuts 	Workers may get cuts while using manual or automatic fabric cutters.
Eye Injuries 	If no protection is used, broken needles or flying debris can cause eye injuries.
Repetitive Strain Injuries (RSIs) 	Continuous use of hands and arms without proper posture can cause muscle strain.

Type of Hazard	Description
Back and Neck Pain 	Poor seating or posture over long hours can lead to ergonomic injuries.

Table 9.1.3: Physical Injuries

Preventive Measures for Ensuring Safety from Hazards and Risks in Sampling Operations are as follows:

- Always ensure sampling machines, cutting tools, and pressing equipment are fitted with safety guards and accessories before use.
- Wear PPE such as safety glasses, finger guards, protective gloves, and appropriate footwear during fabric cutting, trimming, or pressing activities.
- Ensure all sampling equipment is regularly maintained and inspected for electrical faults, loose parts, or sharp edges to prevent accidents.
- Train sampling team members on safe operating procedures for machines, cutting tools, and pressing equipment, including emergency shutdown protocols.
- Use ergonomic furniture and encourage proper posture during long hours of pattern cutting, stitching, or sample finishing to avoid strain-related injuries.

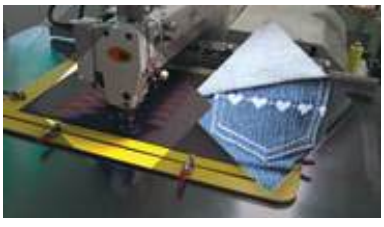
Type of Hazard	Description
Electric Shock	It may occur if machines are not adequately grounded or wires are exposed.
Short Circuits	Faulty wiring or improper maintenance can cause short circuits and fire risks.
Overheating of Motors	Continuous operation without proper ventilation can lead to overheating, posing fire or shock hazards.
Improper Plug Use	Using non-standard plugs or overloading sockets can lead to sparks or electric failure.

Table 9.1.4: Electrical Hazards

While necessary for apparel manufacture, sewing machine activities carry inherent risks such as bodily injury and electrical hazards. Workplace accidents can be considerably avoided by knowing these hazards and applying proper safety practices such as employing machine guards, wearing personal protective equipment, guaranteeing regular maintenance, and fostering ergonomic work habits. A proactive approach to safety protects workers and boosts productivity and morale on the factory floor.

Malfunctions in sewing machines and other equipment

Sampling machines and related equipment are the foundation of the sampling process in garment manufacturing. However, frequent use during sample development and lack of proper maintenance can lead to various malfunctions that disrupt workflow, delay sample delivery timelines, compromise quality, and impact client satisfaction.

Malfunction	Description	Impact
Thread Breakage 	Incorrect threading, poor tension settings, and inferior thread quality	Interrupt stitching leads to a poor finish.
Skipped Stitches 	Results from needle damage, incorrect needle size, or timing issues	Weak seams and rejected garments.
Needle Breakage 	It happens due to sewing over complex objects, fabric pulling, or bent needles.	Production delays and injury risk
Fabric Puckering 	Due to wrong tension, feed issues, or unsuitable thread/ fabric combination	It affects garment appearance and quality
Machine Jamming 	Caused by lint build-up, tangled threads, or mechanical issues.	Halts production and requires intervention.

Malfunction	Description	Impact
Noisy Operation 	Results from lack of lubrication or loose components	Indicates wear or mechanical faults

Table 9.1.5: Common Sewing Machine Malfunctions

Thread breakage, skipped stitches, needle breakage, and fabric puckering are common concerns with sewing machines used in apparel production. Inadequate threading, wrong tension, damaged needles, or improper fabric-thread combinations frequently cause these issues. Mechanical flaws, a lack of maintenance, or lint build-up can all cause problems such as machine jamming, uneven stitching, and noisy operations. Such difficulties can cause manufacturing delays, worse garment quality, and an increase in the requirement for rework or repairs.

Equipment	Possible Malfunctions	Impact
Cutting Machines	Blade dullness, misalignment, or motor failure.	Inaccurate cuts, fabric wastage
Ironing/Pressing	Uneven heat, steam leakage, or thermostat failure	Improper finishing or fabric damage.
Trimmers & Snippers	Blade dullness or alignment issues	Slows down the trimming and finishing process
Power Supply Units	Fluctuations or outages affecting machine performance	Frequent stoppages, risk of damage

Table 9.1.6: Other Equipment Malfunctions

Thread breakage, skipped stitches, needle breakage, and fabric puckering are common concerns with sewing machines used in sampling. These issues often arise due to inadequate threading, incorrect tension settings, damaged or inappropriate needles, or mismatched fabric-thread combinations during prototype construction. Mechanical faults, insufficient maintenance, or lint and dust build-up can also result in problems such as machine jamming, uneven stitching, and noisy operation. Such issues can delay sample completion, reduce the quality of prototypes, and increase the need for rework or alterations before client presentation.

In addition to sewing machines, other sampling tools—such as fabric cutters, pressing equipment, and embroidery machines—can also malfunction. For example, fabric cutting machines may suffer from blade dullness or misalignment, pressing units can face uneven heating or steam leakage, and embroidery machines may experience thread tension or design alignment errors. These malfunctions can negatively affect the accuracy, finish, and overall presentation of the sample.

Regular maintenance, timely repairs, proper handling of sampling equipment, and thorough operator training are essential to prevent or quickly resolve such malfunctions. The Sampling Coordinator should implement scheduled equipment inspections, ensure operators follow correct usage procedures, and arrange for immediate repair when faults are detected. A well-maintained sampling setup ensures high-quality prototypes, minimizes downtime, and enables the sampling team to deliver accurate, well-finished garments to buyers within the agreed timelines.

9.1.3 Importance of Personal Protective Equipment (PPE)

Personal Protective Equipment (PPE) plays a vital role in ensuring the safety and well-being of workers in sewing and apparel production environments. While sewing may seem like a low-risk activity, the use of sharp tools, high-speed machinery, and prolonged repetitive motions make it essential to protect workers from immediate and long-term injuries.

The importance of PPE in Sampling Operations is listed below:

1. **Prevents Physical Injuries:** PPE such as finger guards and metal thimbles help prevent needle punctures, cuts, and abrasions that can occur during machine operation or manual handling.
2. **Protects Eyes and Face:** Safety glasses shield the eyes from broken needles or flying debris, especially in high-speed machine environments.
3. **Reduces Exposure to Dust and Fibres:** Face masks help protect against inhalation of fine textile dust and loose fibres, which can lead to respiratory irritation or long-term breathing issues.
4. **Promotes Hygiene and Cleanliness:** Hairnets and gloves prevent contamination of fabrics and finished garments, especially in export or hygienic product categories.
5. **Prevents Repetitive Strain Injuries (RSIs):** Wearing wrist supports or using ergonomically designed gear reduces the strain on joints and muscles from repetitive motions.
6. **Improves Focus and Confidence:** Workers feel safer and more confident when adequately equipped, leading to better focus and productivity.
7. **Ensures Legal and Safety Compliance:** Using PPE is often part of compliance with factory safety audits, government regulations, and international labour standards.

Examples of Common PPE in the Apparel Industry

Fig. 9.1.2: Examples of Common PPE

PPE is a simple yet highly effective measure to protect sewing machine operators and other workers in apparel production. It reduces workplace accidents, supports health, ensures compliance with safety standards, and enhances overall productivity. Promoting the consistent and correct use of PPE is a key responsibility of supervisors and workers in maintaining a safe and efficient work environment.

UNIT 9.2: Risk Management and Emergency Preparedness

Unit Objectives

By the end of this unit, the participants will be able to:

1. Analyse the workplace and work processes for potential risks and threats (e.g., injuries, fire hazards).
2. Discuss mock drills, evacuation procedures, and emergency response training, including fire-fighting and first aid.
3. Discuss basic first aid and undertake safety-related training programs.
4. Discuss the importance of maintaining hygiene, a healthy lifestyle, and good habits at work.

9.2.1 Workplace and Work Processes for Potential Risks and Threats

In the sampling process of garment manufacturing, various workplace settings and operational activities—such as cutting, stitching, pressing, and finishing prototypes—can pose safety risks, health hazards, and productivity threats if not managed properly. Identifying and mitigating these risks is essential for ensuring the safety of the sampling team, maintaining the quality of prototypes, and meeting strict buyer timelines.

Risk/Threat	Description	Impact
Ergonomic Strain 	Long hours of sitting, repetitive motions, awkward postures, and poor workstation design	It can cause musculoskeletal disorders and chronic back, shoulder, or wrist pain.
Electrical Hazards 	Improperly grounded machines, exposed wires, or poorly maintained electrical systems	It may lead to electric shocks, equipment damage, and fire incidents.

Risk/Threat	Description	Impact
Fire Risks 	Fabric dust accumulation, flammable materials, or faulty wiring	Increases the likelihood of fire outbreaks, worsened by lack of extinguishers or blocked exits
Machine-Related Injuries 	Unprotected moving parts of sewing/cutting machines, absence of machine guards	It can result in cuts, needle punctures, finger injuries, or entanglement.
Slips, Trips, and Falls 	Wet floors, loose threads, scattered tools, poor lighting, or unsecured mats and cables	Cause physical injuries, disrupt work, and create unsafe working conditions.
Poor Ventilation 	Lack of airflow, presence of dust and chemical fumes from adhesives or fabrics	It leads to respiratory issues, discomfort, and reduced concentration and productivity.

Table 9.2.1: Common Workplace Risks and Threats

For a Sampling Coordinator, this means regularly assessing sampling workstations for potential hazards such as improper machine guarding, faulty electrical connections, poor lighting, or obstructed work areas. Early detection of these risks helps prevent accidents, ensures smooth operations, and maintains the consistency needed for high-quality sample development.

9.2.2 Mock drills, Evacuation Processes and Emergency Response Training

In the sampling section, the Sampling Coordinator, safety personnel, and team members must work together to establish clear safety protocols, deliver targeted training for handling specialized sampling equipment, and maintain strict housekeeping practices to reduce hazards. This includes ensuring tools are stored properly, walkways are clear, and work surfaces are kept clean to avoid disruptions in the sampling workflow.

Given the fast-paced and high-pressure nature of sample development, preparedness for emergencies is critical. Regular safety training sessions and mock drills help ensure that the sampling team can respond promptly and effectively to incidents such as fire, equipment malfunction, or operator injury. A Sampling Coordinator plays a key role in organising these drills, guiding the team during evacuations, and ensuring that emergency procedures are well understood and practiced.

By maintaining a proactive approach to safety, the Sampling Coordinator helps create a secure, efficient, and compliant sampling environment by protecting both the workforce and the quality of the garments being presented to buyers.

Mock Drills

- **Purpose:** The main goal of mock drills is to simulate potential emergencies such as fire, earthquake, or chemical spills to test the preparedness and response of all employees.
- **Activities Involved:** Alarms are sounded to initiate the emergency simulation and alert everyone to begin evacuation. Evacuation is practised in real-time to assess how quickly and efficiently workers can exit the facility. Specific team members participate in role-play as first responders or part of the emergency management team to practice their designated duties.
- **Benefits:** Regular mock drills help build employee confidence in managing real emergencies calmly and effectively. These drills highlight gaps or weaknesses in the existing emergency procedures and help improve them. They also promote quick thinking and better worker coordination, especially under pressure.

Fig. 9.2.1: Mock Drills at Workplace

- **Case Study:** A quarterly fire drill was conducted during working hours in a mid-sized garment factory in Tirupur. The production floor had around 120 operators at that time.
- **Execution:** The fire alarm was triggered, and all employees were instructed to evacuate. Supervisors guided each line to the nearest exit. Within 3 minutes, the entire team had reached the designated assembly point.
- **Outcome:** The drill revealed that one emergency exit was partially blocked by fabric rolls, which was addressed immediately. Also, one new operator was unfamiliar with the evacuation route, prompting a refresher orientation for all recent hires.
- **Impact:** After this drill, the company implemented a rule to brief all new employees on emergency routes and added more visible floor markings. Confidence and readiness improved significantly among the staff.

Evacuation Processes

Fig. 9.2.2: Apparel Factory work culture

- **Evacuation Plan:** Emergency exits should be marked, well-lit, and free of obstructions to allow a safe and quick exit. Evacuation maps must be displayed prominently on the production floor to guide employees during emergencies. Designated assembly points must be located outside the building where all employees can gather safely after evacuation.
- **Key Practices:** Elevators should never be used during a fire evacuation under any circumstances. Workers must be trained to move calmly, avoid panic, and follow instructions during evacuation. Special attention must be given to assisting persons with disabilities or those injured to ensure their safety during the evacuation.
- **Case Study:** During a regular shift in a Noida-based apparel unit, a short circuit led to a minor fire near the storage room. Though the fire was quickly contained, evacuation was initiated as a precaution.
- **Outcome:** The evacuation process ran smoothly. It was noted that better signage near the warehouse section could speed up response time. The company added extra visual signs the next day.
- **Impact:** This real-life situation validated the importance of evacuation drills and highlighted the effective role of supervisors in maintaining calm and order during emergencies.

Emergency Response Training

Fig. 9.2.3: Training for an emergency at an Apparel business

- **Fire-Fighting:** Workers should receive basic training in using fire extinguishers and understanding the different types (A, B, C) based on the source of the fire. They must learn to quickly identify the fire source and type before taking action. It is also essential to know when attempting to extinguish the fire is safe and when evacuation is safer.
- **First Aid:** Employees should be trained in treating common minor injuries like cuts, burns, and machine-related incidents that may occur during production. They must also be capable of providing immediate care for situations involving fainting, shock, or strain-related discomfort. CPR training should be provided for severe medical emergencies where immediate life-saving action is needed before professional help arrives.
- **Specialized Team Involvement:** Every shift should have a designated emergency response team. This team must include at least one person trained in first aid and one trained in basic fire safety to ensure preparedness across all areas and shifts.
- **Case Study:** At a sewing unit in Bengaluru, a worker accidentally suffered a deep needle puncture while stitching heavy fabric. Bleeding was significant, and the worker panicked.
- **Execution:** A trained first aid responder from the emergency response team immediately applied pressure to stop the bleeding, cleaned the wound, and bandaged it.

- **Outcome:** The injury was quickly managed, and the operator returned to work after a few days. Because of the swift and calm handling, other workers felt reassured and confident in the team's emergency readiness.
- **Impact:** Post-incident, the company conducted a refresher first-aid workshop for all supervisors and ensured that every shift had at least two trained responders.

9.2.3 Basic First Aid and Safety-Related Training Programs

Maintaining the health and safety of the sampling team is critical in the fast-paced environment of garment sample development. Sampling operators and tailors work closely with high-speed sewing machines, precision cutting tools, pressing equipment, and occasionally specialised machinery for prototype creation. They are also frequently engaged in repetitive, detail-oriented tasks, which can cause physical strain. These conditions make the sampling section susceptible to minor injuries, ergonomic issues, and operational emergencies.

Basic First Aid Training Programs

1. **Wound Care and Bleeding Control:** Workers are trained to handle needle pricks, cuts, and minor lacerations by learning to clean wounds, apply antiseptics, and use bandages safely.
2. **Burn Treatment:** Operators are taught how to respond to burns from ironing/pressing equipment, including applying cold compresses and sterile dressings and recognizing when medical attention is needed.
3. **Handling Fainting or Heat Stress:** Training includes how to recognise signs of dizziness or fainting, provide proper positioning, ensure fresh air access, and administer fluids if needed.
4. **Fractures and Sprains:** Employees learn how to immobilize an injured limb using makeshift splints and how to avoid worsening the injury while waiting for medical professionals.
5. **CPR and Emergency Response:** Supervisors and selected staff receive basic Cardiopulmonary Resuscitation (CPR) training for cardiac emergencies, including using an AED (if available).

Safety-Related Training Programs

1. **Fire Safety and Extinguisher Use:** Training includes identifying different types of fires and fire extinguishers (A, B, C types) and practising operating extinguishers safely and effectively.
2. **Electrical Safety Awareness:** Focuses on recognizing and reporting faulty wiring, safe plug usage, grounding of machines, and the risks of overloading sockets.
3. **Machine Handling Safety:** Workers are trained on using sewing machines safely, including turning off equipment during jams, using guards, and avoiding loose clothing or jewellery near moving parts.
4. **Ergonomics and Safe Posture:** Teaches correct sitting posture, workstation arrangement, and scheduled stretch breaks to prevent musculoskeletal strain and long-term injuries.
5. **Hazard Identification and Reporting:** Staff are encouraged to report hazards like wet floors, blocked exits, or broken equipment. They're trained to raise safety concerns to the supervisor or safety officer.

Basic first aid and safety training programs are essential for the sampling team. Such programs equip workers with the knowledge and skills to respond quickly and appropriately to incidents such as needle punctures, minor cuts, burns from pressing equipment, or electrical faults. They also prepare team members to handle more serious emergencies until professional help arrives.

The importance of maintaining hygiene, good work habits and a healthy lifestyle with the Sampling Coordinator are as follows:

- **Setting the Right Example:** By maintaining personal hygiene, wearing clean uniforms, and following safety practices, the supervisor sets a strong example for the team, encouraging them to follow suit.
- **Ensuring Workplace Cleanliness:** The supervisor plays a critical role in enforcing hygiene protocols—such as keeping sewing areas clean, ensuring proper waste disposal, and promoting sanitization of tools and equipment. A hygienic workplace reduces the risk of infections, improves air quality, and boosts worker morale.
- Punctuality, task planning, proper documentation, and regular machine checks are all habits that enhance productivity. The supervisor ensures these habits are followed and mentors' workers who need improvement, fostering an efficient and disciplined work environment.
- **Monitoring Operator Health and Wellbeing:** The supervisor observes team members for signs of fatigue, stress, or illness. Encouraging short stretch breaks, adequate hydration, and rest during lunch helps maintain operator health and concentration.
- **Creating Awareness about Healthy Lifestyles:** By organizing or encouraging participation in health-related workshops (e.g., yoga, nutrition talks, mental wellness), supervisors help workers understand the long-term benefits of a healthy lifestyle. A healthier team means fewer absences and higher productivity.
- **Minimizing Health-Related Absenteeism:** When hygiene and wellness are prioritized, the number of illness-related absences decreases. It helps in maintaining production flow and avoiding sudden shortages in human resources.

UNIT 9.3: Workplace Inclusion, Awareness, and Best Practices

Unit Objectives

By the end of this unit, the participants will be able to:

1. Discuss the significance of training programs for gender and PwD awareness.
2. List of usage and maintain tools and equipment safely, such as scissors and thread cutters.
3. Discuss how to ensure a safe and inclusive work environment for all employees.

9.3.1 Significance of Training Programs for Gender and PwD Awareness

In the diverse and dynamic apparel business, Sampling Coordinators play an essential role in managing sample development timelines, ensuring quality, and fostering a fair, inclusive, and respectful work environment. As sampling teams become more diverse in gender and ability, the Sampling Coordinator must be well-versed in gender sensitivity and the inclusion of Persons with Disabilities (PwDs). Training programs in these areas are crucial for building a positive work culture where all team members feel valued, respected, and empowered to contribute productively. These programs also enable the Sampling Coordinator to build more cohesive, collaborative teams while ensuring compliance with legal and organisational requirements.

1. **Promotes an Inclusive Work Culture:** Training equips the Sampling Coordinator with the awareness and skills to treat all team members—regardless of gender or ability—with respect, fostering an environment that values equality, dignity, and inclusion.
2. **Improves Communication and Team Dynamics:** Through proper training, the Sampling Coordinator learns how to communicate effectively with diverse team members, avoiding stereotypes, addressing concerns empathetically, and encouraging cooperation without bias.
3. **Supports Fair Work Allocation:** Awareness training ensures that sampling tasks—such as cutting, stitching, pressing, and finishing—are assigned based on skills and capabilities, not gender or physical ability. The Sampling Coordinator can make informed decisions on workload distribution and necessary accommodations.
4. **Encourages Timely Interventions and Support:** A trained Sampling Coordinator can identify when a PwD team member requires assistive tools or when a female worker faces discomfort or harassment. Prompt intervention builds trust and prevents issues from escalating.
5. **Strengthens Legal and Policy Compliance:** The Sampling Coordinator must understand workplace regulations related to gender equality and PwD inclusion, ensuring adherence to laws such as the Rights of Persons with Disabilities Act and the Sexual Harassment of Women at Workplace Act.
6. **Boosts Morale and Productivity:** When team members feel respected and supported, they are more motivated and engaged. This directly enhances sample quality, reduces absenteeism, and improves retention rates.
7. **Reduces Workplace Conflicts:** Awareness programs enable the Sampling Coordinator to address unconscious bias, reduce discriminatory behaviour, and resolve conflicts constructively through respectful dialogue and mediation.

Training programs focused on gender and PwD awareness are not merely compliance requirements—they are essential tools for creating a supportive, high-performing sampling department. By fostering equality, understanding, and respect, the Sampling Coordinator contributes to higher morale, reduced conflicts, and improved productivity, ultimately helping the apparel business deliver quality samples on time while maintaining an inclusive workplace culture.

9.3.2 Usage and Maintenance of Tools and Equipment Safely

Proper use and maintenance of hand tools such as scissors, rotary cutters, and thread snips are essential in ensuring safety and efficiency in the **sampling department.** These tools, though small, play a critical role in cutting, trimming, and finishing prototype garments, and mishandling them can lead to injuries, sample defects, or equipment damage.

Guideline	Description
Use the Right Tool for the Task	Use sharp scissors for fabric thread cutters for threads; avoid misuse.
Maintain Proper Grip and Control	Hold tools firmly to avoid slipping and maintain accuracy.
Cut Away from the Body	Always cut away from your body to prevent injury.
Pass Tools Safely	Hand over tools handle-first to reduce risk.
Avoid Distractions	Stay focused while using sharp tools to avoid accidents.

Table 9.3.1: Safe Usage Guidelines

Proper use and maintenance of hand tools such as scissors and thread cutters are essential in ensuring safety and efficiency in the sampling process. In sample development, these tools, though small, play a critical role in precise fabric cutting, trimming, and finishing, which directly impacts the quality of prototype garments. Mishandling them can lead to operator injuries, damaged fabrics, inaccurate cuts, or compromised sample quality. The Sampling Coordinator must ensure that all team members are trained in safe tool handling, proper maintenance routines, and correct usage techniques to achieve high-quality results while preventing workplace accidents.

Practice	Description
Regular Cleaning	Clean daily to remove lint, thread, or dust that may dull blades.
Sharpening Blades	Sharpen or replace blades periodically to maintain cutting efficiency.
Proper Storage	Store in holders/pouches to prevent damage and accidents.
Inspect for Damage	Check for loose or broken parts and report immediately.
Lubrication (if needed)	Apply oil at the joint of the scissors to ensure smooth cutting action.

Table 9.3.2: Maintenance Practices

Periodically sharpen dull blades or replace worn-out cutters to ensure clean, precise cuts that maintain fabric integrity and reduce effort during sample preparation. Regularly check tools for any damage, such as loose screws, cracked handles, or worn blades. Faulty tools should be reported and replaced immediately to prevent accidents. All tools should be stored in safe, designated spaces such as tool holders or pouches to prevent accidental injuries and maintain their condition for future use.

9.3.3 Ensuring a Safe and Inclusive Work Environment for all Employees

Creating a safe and inclusive workplace is a legal obligation and essential for sustaining productivity, employee morale, and long-term organizational success. In the context of the apparel industry, where diversity and physical safety are key concerns, the production supervisor plays a vital role in shaping and maintaining such an environment.

Area of Responsibility	Role of the Production Supervisor
Enforcing Health and Safety Standards	The supervisor ensures all workers follow safety practices like PPE, machine guarding, and ergonomic posture.
Promoting Gender Inclusivity	Supervisors ensure fair opportunities and respectful treatment for all genders in work assignments and conditions.
Supporting Persons with Disabilities (PwDs)	They assign appropriate tasks to PwD employees and ensure accessibility through collaboration with HR or facilities.
Encouraging Open Communication and Feedback	The supervisor fosters a culture of trust by promoting open-door policies and confidential reporting of concerns.
Preventing Harassment and Discrimination	They intervene in cases of discrimination or bullying and report issues to appropriate committees or authorities.
Leading by Example	The supervisor models respectful, inclusive behaviour that sets a standard for the rest of the team to follow.
Training and Sensitization	Supervisors participate in and promote training on gender, disability, and anti-discrimination awareness.

Table. 9.3.3: Importance of creating a safe and inclusive workplace

A safe and inclusive work environment is essential for ensuring smooth workflow, team satisfaction, and harmonious collaboration in the sampling section. The Sampling Coordinator is responsible for enforcing health and safety protocols, promoting equal opportunities, supporting Persons with Disabilities (PwDs), and encouraging respectful communication. By actively preventing harassment and discrimination, setting the right example, and fostering ongoing awareness programs, the Sampling Coordinator helps create a culture where every team member feels valued, protected, and empowered to contribute effectively. An inclusive and safe workplace is not only a legal and ethical requirement but also a foundation for the long-term success of both the sampling process and the overall apparel business.

Summary

- A QC Executive plays a crucial role in ensuring workplace safety in the quality control section through proper lighting, ventilation, clear signage, ergonomic workstation arrangements, regular maintenance of inspection and testing equipment, and emergency preparedness, while also upholding gender equality and the inclusion of Persons with Disabilities (PwDs).
- Common QC-related hazards include needle injuries during garment checking, cuts from trimming tools, electrical shocks from testing or pressing equipment, and repetitive strain injuries from prolonged garment handling or visual inspection. Preventive measures include using machine guards, wearing PPE such as safety gloves, safety glasses, and masks, maintaining ergonomic workstations, and providing regular training in safe handling and inspection procedures.
- Malfunctions in inspection or testing equipment can cause delays in shipment clearance and compromise product quality. Regular equipment maintenance, operator training on proper usage, and consistent use of PPE are essential to maintain safety, inspection accuracy, and productivity in the QC process.
- The QC process involves risks like ergonomic strain from long hours of garment checking, electrical hazards from small testing equipment, and injuries from pressing or trimming tools. The QC Executive must ensure that these risks are identified and minimised through workplace adjustments and safety protocols.
- A QC Executive is also responsible for promoting hygiene, safe work habits, and healthy lifestyles among the QC team. This includes maintaining a clean and organised inspection area, ensuring proper waste disposal of rejected trims or threads, and encouraging regular stretch breaks to prevent fatigue.
- QC Executives in the apparel industry must be trained in gender sensitivity and disability inclusion to ensure fairness, prevent discrimination, and maintain an environment where all team members are treated with dignity and respect.
- Safe use and proper maintenance of QC tools such as fabric inspection machines, measurement tapes, trimmers, and pressing equipment are essential in the QC section to avoid accidents and ensure the delivery of high-quality, defect-free garments.

Exercise

Multiple-choice Question:

1. What is one primary reason for providing ergonomic furniture in a sewing floor environment?
   a. To increase electricity usage
   b. To reduce production costs
   c. To prevent repetitive strain injuries and improve posture
   d. To increase the speed of sewing machines

2. Which of the following is a standard electrical hazard in sewing machine operations?
   a. Fabric puckering
   b. Improper plug use
   c. Needle misalignment
   d. Thread breakage

3. Which of the following is NOT typically a risk in a sewing production environment?
   a. Ergonomic strain
   b. Electrical hazards
   c. Radiation exposure
   d. Fire risks

4. What is the key responsibility of the production supervisor during an evacuation?
   a. Operating fire extinguishers across the floor
   b. Guiding and accounting for team members at the assembly point
   c. Turning off all machines during evacuation
   d. Removing all fabric rolls from storage

5. What is the correct way to hand over scissors or cutters to another person on the production floor?
   a. Pass them with blades pointing out
   b. Throw them on the table for the other person
   c. Pass them handle-first
   d. Hold both ends together while handing over

Descriptive Questions:

1. Describe the role of the production supervisor in promoting gender equality and inclusion of Persons with Disabilities (PwDs) in the sewing production environment. Include key practices.
2. Explain the significance of Personal Protective Equipment (PPE) in apparel manufacturing. Mention at least four types of PPE and their specific purposes.
3. Describe the purpose and benefits of conducting mock drills in a garment manufacturing facility. Include one case study-based learning.
4. How does a production supervisor influence workplace hygiene, operator health, and good work habits in a sewing line?
5. Explain how a production supervisor contributes to building an inclusive and safe work environment in a garment manufacturing unit.

Notes

Scan the QR codes or click on the link to watch the related videos

https://youtu.be/6hvLLe5OqGY?si=rCbohmUgMK7---fa

Sewing Machine Safety Training Area 01

Skill India
कौशल भारत-कुशल भारत

सत्यमेव जयते
GOVERNMENT OF INDIA
MINISTRY OF SKILL DEVELOPMENT
& ENTREPRENEURSHIP

N·S·D·C
RE IMAGINE FUTURE

10. Adhere to Industry, Regulatory, and Organizational Standards and Embrace Environmentally Sustainable Practices Sensitization

APPAREL MADE-UPS HOME FURNISHING
SECTOR SKILL COUNCIL

Unit 10.1 - Ethical Practices, Compliance, and Governance

Unit 10.2 - Organizational Procedures, Reporting, and Responsibilities

AMH/N0621

Key Learning Outcomes

By the end of this module, the participants will be able to:

1. Follow ethical, value-based governance and organizational policies, ensuring compliance with the apparel industry's legal, regulatory, and ethical requirements.
2. Adhere to customer and country-specific regulations, along with mandated work process requirements.
3. Maintain punctuality, attendance, and personal responsibility while following reporting procedures for deviations.
4. Monitor the workplace for risks, threats, and potential hazards, reporting them to supervisors as necessary.
5. Minimize wastage by effectively using resources, conserving energy, and properly handling and storing waste materials.
6. Follow organizational procedures for safe machine handling, including proper shutdown when not in use and correct storage of hazardous substances.
7. Use personal protective equipment (PPE) per protocol to ensure workplace safety.
8. Participate in first aid, CPR, and emergency response training, reporting health and safety concerns.
9. Support supervisors and team members in enforcing organizational policies and ensuring quality, safety, and environmental standards compliance.
10. Seek clarifications on policies and procedures from supervisors and authorized personnel while ensuring documentation and compliance with reporting protocols.

UNIT 10.1: Ethical Practices, Compliance, and Governance

Unit Objectives

By the end of this unit, the participants will be able to:

1. Explain the importance of ethical, legal, and regulatory compliance in the apparel industry, including customer and country-specific requirements.
2. List organizational policies, procedures, and reporting protocols to ensure compliance with legislation and ethical standards.
3. Discuss clarifications from supervisors or authorised personnel on policies, procedures, and responsibilities.
4. Discuss sustainability guidelines, including responsible waste disposal and equipment handling to reduce environmental impact.

10.1.1 Importance of an Ethical and Value-Based Approach to Governance

An ethical and value-based style of governance ensures that an organization conducts itself with integrity, fairness, and accountability. It facilitates the establishment of a strong foundation for trust, efficiency, and long-term success. Ethical governance ensures adherence to legal and moral requirements while creating a culture of responsibility and transparency.

Fig. 10.1.1: Importance of an ethical and value-based approach to governance

- **Guarantees Accountability and Integrity:** Moral governance mandates that organizations act with integrity and accountability so that leaders and workers maintain ethical conduct in all business practices. With a focus on accountability, people own their actions, minimizing unethical practices like fraud, discrimination, or abuse of organizational resources. Such a culture enhances trust within the organization and with outsiders.
- **Encourages Transparency and Fairness:** Ethical leadership encourages transparency in the decision-making process, where policies, financial dealings, and business practices are made known to everyone concerned. Transparency eliminates corruption, favouritism, and covert motivations, which lead to employees, customers, and business partners trusting the business organization. Fair treatment of employees, such as equal opportunities for advancement and reward, also leads to a motivated and committed employee base.
- **Minimizes Legal and Financial Risks:** Organizations that practice ethics and governance guidelines have fewer chances of encountering legal issues, lawsuits, or fines. Complying with labour laws, environmental policies, and corporate governance rules helps ensure businesses run within the confines of the law, not risking penalties that will jeopardize their financial well-being and image. Ethical compliance also saves the organization from damage to its reputation due to unethical activities.

- **Fosters Ethical Leadership:** Ethical governance standards expect leaders to be role models, exhibiting honesty, fairness, and accountability. If leaders emphasize ethics, employees are apt to follow suit, developing a culture of respect and ethical decision-making. Ethical leadership resolves disputes fairly, maintains open communication, and encourages collaboration and teamwork within the organization.
- **Supports Corporate Social Responsibility (CSR):** A value-based governance approach extends beyond internal policies and emphasizes an organization's responsibility toward society and the environment. Ethical companies engage in sustainable business practices, fair labour policies, and community development programs, which enhance their public image and contribute positively to society. Engaging in CSR initiatives also improves brand reputation, making the organization more appealing to socially conscious customers and investors.

Benefits to Self and the Organization

Adopting an ethical and value-based governance approach enhances the organization's reputation and provides individuals with career security and professional growth.

Builds Trust and Credibility	•Employees, customers, and stakeholders have confidence in an organization that consistently follows ethical practices, leading to stronger business relationships.
Increases Employee Morality and Retention	•A ethical and just working atmosphere makes employees satisfied with their work and enhances morality, bringing in less turnover.
Promotes Organizational Stability and Growth	•Ethical companies are more likely to attract investors, customers, and talented workers, which ultimately results in long-term growth and stability.
Enhances Decision-Making and Problem-Solving	•Ethical governance fosters reflective decision-making, ensuring decisions made are consistent with both business objectives and moral obligations.
Creates a Positive Work Culture	•Employees are more motivated and engaged in an environment where ethical behaviour is rewarded, fostering collaboration and overall workplace harmony.

Fig. 10.1.2: Benefits to self and the organization

10.1.2 Procedures to Follow When Legal, Regulatory, and Ethical Requirements Are Not Met

Non-compliance with legal, regulatory, and ethical standards in the fashion business may result in serious repercussions such as legal actions, loss of reputation, and loss of business deals. Organizations should have explicit procedures to deal with non-compliance and ensure proper remedial action is taken.

1. **Internal Investigation and Assessment:** The initial step is to conduct a proper internal investigation to establish non-compliance. It entails checking records, auditing, and taking statements from employees or stakeholders to ascertain the cause of the problem.
2. **Immediate Corrective Steps:** Immediately upon detection of non-compliance, corrective action is required to eliminate unethical or unlawful practices. The steps taken might involve shutdown of production, attending to risky work conditions, phasing out unsafe substances in the product, or adjusting payments against wages so they are made under labour regulations.

3. **Reporting to Regulators or Government Authorities:** Where a legal or regulatory violation has happened, the firm should report this to the responsible government authorities, e.g., OSHA for workplace safety infringements, ILO for violations of labour legislation, or agencies for protecting the environment. Prompt reporting can help avoid penalties and show that the firm is interested in compliance.
4. **Employee Training and Awareness Initiatives:** Non-compliance usually arises due to ignorance or lack of care. Organizing training programs on labour laws, ethical procurement, and workplace safety ensures that employees and management are aware of their roles and adhere to proper procedures in the future.
5. **Adopting Stricter Compliance Mechanisms:** To avoid repeat offences, corporations must adopt more stringent compliance monitoring systems, including third-party audits, frequent inspections, and grievance reporting. It facilitates early detection of malpractices and ensures continuous compliance with legal and ethical requirements.
6. **Disciplinary Action Against Delinquent Parties:** If responsible parties or personnel are proven guilty of wilful non-compliance, disciplinary actions should be executed. Disciplinary actions can extend from warning and suspension to discharge or prosecution at law, according to the violation's seriousness.
7. **Revising Policies and Enhancing Governance:** Corporations must modify internal policies to comply with the law, regulatory requirements, and ethical principles. Enhancing the governance structures by appointing compliance officers, designing ethics committees, and formulating whistle-blower policies supports a culture of accountability.
8. **Restoring Reputation and Regaining Consumer Trust:** In case of non-compliance that results in a public scandal, firms must make amends to restore their reputation by being open to taking remedial steps. Public announcements, CSR activities, and better ethical behaviour assist in building the confidence of stakeholders, customers, and regulatory authorities again.

10.1.3 Organizational Policies and Procedures Within Self-Authority and Reporting Deviations

Apparel industry organizations have policies and procedures implemented to provide compliance with regulatory needs, ethical conduct, and quality measures. Workers at different ranks possess increasing levels of authority to enforce these policies. They are required to report any variations to the proper authorities to comply and maintain operational integrity.

Policies and Procedures Within Self-Authority

- **Compliance with Health and Safety:** Workers are held accountable for adhering to workplace safety procedures, using protective gear, and ensuring a safe working environment. They can instantly report hazards and implement corrective measures, like halting machinery during an emergency.
- **Quality Inspection and Control:** Production workers and inspectors must ensure that clothes conform to established quality levels, looking for defects, mis-stitching, and fabric irregularities. Quality variations should be addressed before the product is taken to the next level.
- **Ethical and Just Labour Practice:** Workers should conduct themselves according to moral standards, obey fair labour practices, and ensure no discrimination, harassment, or exploitation. Supervisors can deal with minor disputes and forward major complaints to HR.
- **Environmental Compliance and Waste Management:** Employees must adhere to the waste disposal policy, recycle resources where possible, and reduce the environmental impact. Failure to adhere to sustainability policy, such as excessive wastage of fabrics, should be recognized and communicated.

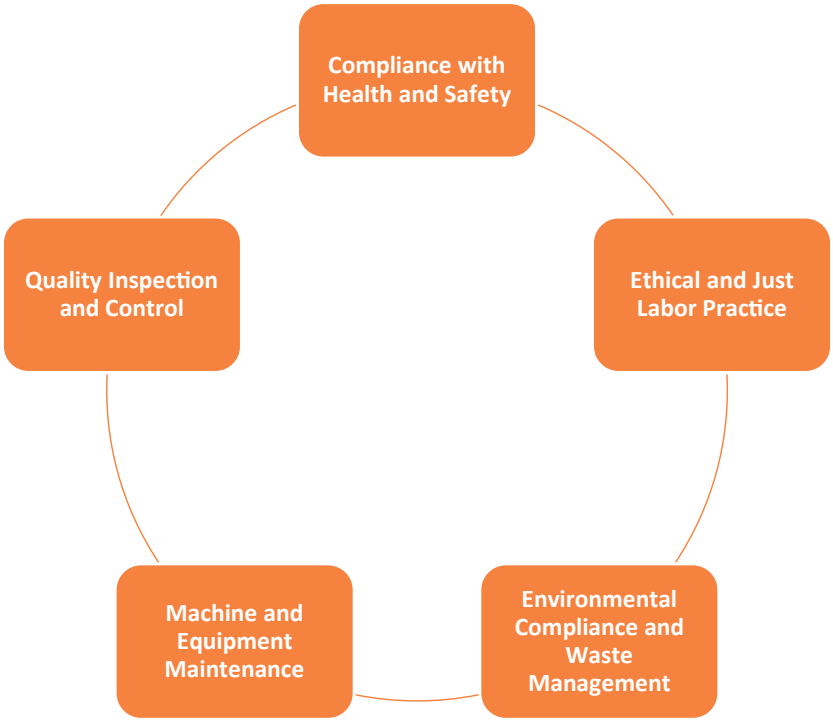


Fig. 10.1.3: Policies and procedures within self-authority

- **Machine and Equipment Maintenance:** Operators must conduct routine equipment checks, ensure proper calibration, and report faults immediately. They have the authority to halt operations for safety or maintenance concerns.

Reporting Deviations from Regulatory Requirements

Incident Reporting to Supervisors	Documentation of Non-Compliance	Escalation to Management or Compliance Teams	Corrective and Preventive Actions (CAPA)
•Any deviations from safety protocols, labour laws, or environmental policies must be reported to immediate supervisors or compliance officers for investigation and corrective action.	•Workers are required to document discrepancies, including defective products, unsafe work environments, or ethical infractions, and forward reports to the quality or compliance department.	•Employees should escalate an unresolved reported issue to senior management, regulatory authorities, or internal audit teams for further action.	•Organizations should take corrective measures, like retraining staff, reworking procedures, or updating policies, to ensure future instances of non-compliance are avoided.

Fig. 10.1.4: Reporting deviations from regulatory requirements

10.1.4 Implementation of Sustainable Consumption Practices in Daily Work

Sustainable consumption in the clothing industry entails reducing the wastage of resources, maximizing efficiency, and embracing environmentally friendly practices in daily work. Employees are responsible for minimising environmental degradation through informed decisions in material consumption, energy usage, and waste reduction.

1. **Maximizing Fabric and Material Utilization:** Effective marker planning and accurate cutting practice enable optimal fabric utilisation with minimal waste. Workers must adopt best practices in pattern placement to minimize the leftover fabric remnants and assist in sustainable production.
2. **Energy and Water Savings:** Operating the machines efficiently by switching them off during idling times, running them at optimal speed levels, and maintaining them according to schedules conserves energy. The staff operating dyeing and finishing processes is supposed to adopt water-saving methods, such as reusing treated water, where possible, and reducing excess water consumption.
3. **Reduction of Chemical and Hazardous Waste:** Employees should properly manage dyes, adhesives, and other chemicals by adhering to safe practices and utilizing only the amounts needed. Secure storage, disposal, and recycling of hazardous waste guarantee adherence to environmental regulations and minimize pollution.
4. **Encouraging Recycling and Upcycling Programs:** Workers can also help ensure sustainability by separating fabric scraps for recycling, upcycling excess materials into accessories or smaller items, and contributing to upcycling initiatives. Reducing environmental footprint is also achieved by promoting the reuse of packaging materials.
5. **Adhering to Eco-Friendly Workplace Practices:** Simple actions like reducing paper usage, switching to digital documentation, using reusable containers, and avoiding single-use plastics help make daily operations more sustainable. Employees can also encourage sustainable habits among colleagues by promoting green workplace initiatives.
6. **Supporting Ethical Sourcing and Sustainable Materials:** Choosing organic, recycled, or biodegradable fabrics aligns with sustainable consumption goals. Procurement or material handling employees should ensure that suppliers adhere to eco-friendly production processes and ethical labour practices.
7. **Maintaining Equipment for Longevity and Efficiency:** Machine and tool servicing regularly guarantees they function optimally, minimizing unnecessary resource use. Properly maintained equipment lasts longer, diminishing the demand for constant replacement and lowering environmental waste.

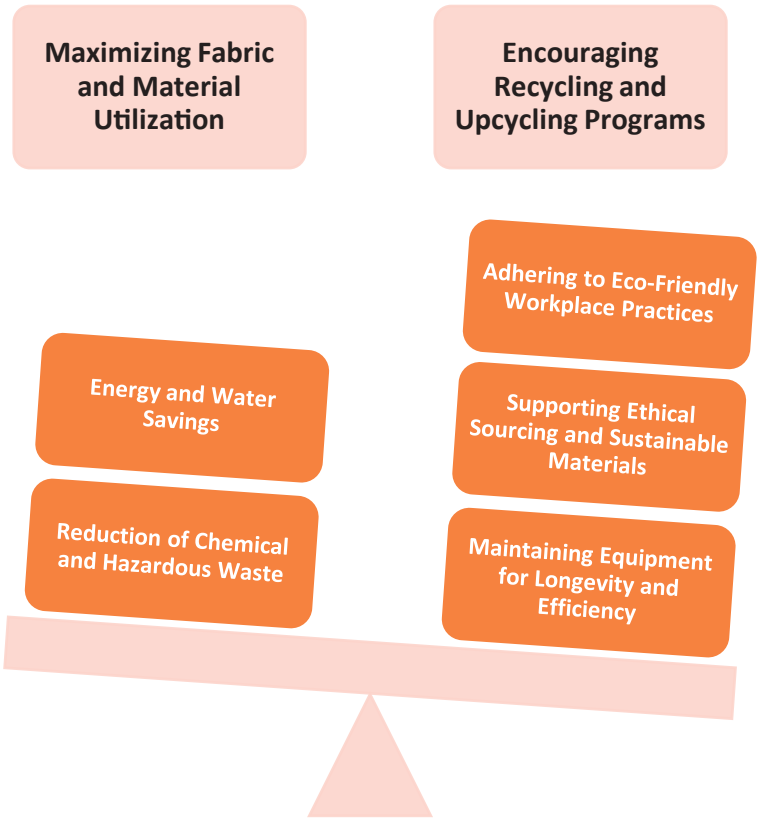


Fig. 10.1.5: Implementation of sustainable consumption practices in daily work

UNIT 10.2: Organizational Procedures, Reporting, and Responsibilities

Unit Objectives

By the end of this unit, the participants will be able to:

1. Discuss punctuality, attendance, and accountability following workplace policies.
2. Discuss reporting procedures for deviations, risks, and regulatory compliance issues.
3. Analyse team coordination, enforce organizational guidelines and maintain accurate documentation.

10.2.1 Importance of Personal Responsibility in Workplace Performance

Punctuality, consistent attendance, and a good sense of personal responsibility are necessary to maintain workplace efficiency, professionalism, and teamwork. It leads to a productive work culture, assists in achieving organizational objectives, and promotes a culture of dependability and discipline.

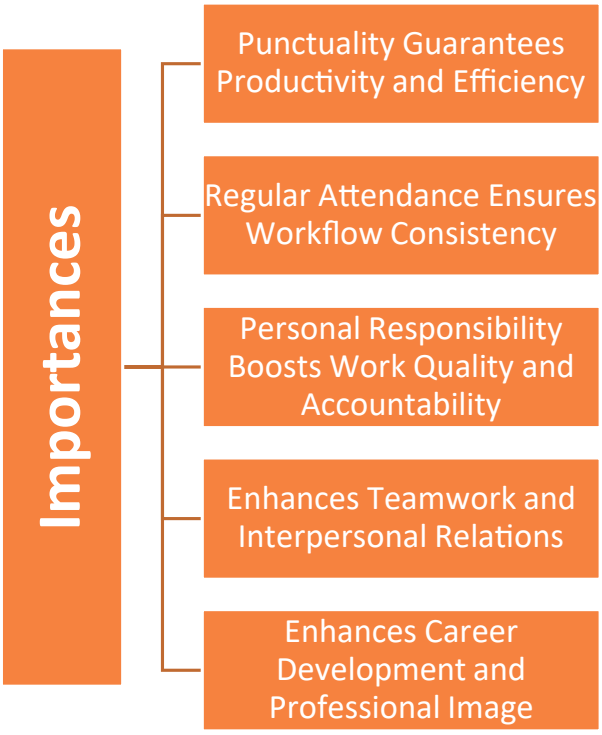


Fig. 10.2.1: Importance of personal responsibility in workplace performance

1. **Punctuality Guarantees Productivity and Efficiency:** Being on time enables workers to begin their work as planned, avoiding breakdowns in workflow. It guarantees the fulfilment of production lines, meetings, and deadlines without any postponements. Constant punctuality also exhibits professionalism and responsibility, affirming an employee's dependability.

2. **Regular Attendance Ensures Workflow Consistency:** Recurrent absenteeism can negatively influence team performance and lead to production or service delivery delays. Regular work attendance ensures consistency in operations, lessening the workload for other colleagues who may have to take up responsibility for absent workers. Attendance is also responsible for satisfying client expectations and project deadlines.
3. **Personal Responsibility Boosts Work Quality and Accountability:** Being held accountable for responsibilities guarantees that staff members finish the work with focus and precision. Personal responsibility teaches a proactive work ethic, wherein people look for solutions to difficulties instead of laying blame. It also shows trustworthiness, gaining the trust of supervisors and others in the organization.
4. **Enhances Teamwork and Interpersonal Relations:** When workers are present and on time, team collaboration increases as tasks are finished in synchronization with others. Reliable workers ensure a conducive work environment where everyone respects each other and offers assistance when needed. It also reduces conflict generated by late submissions or failed promises.
5. **Enhances Career Development and Professional Image:** Workers who are always punctual, present, and responsible are likely to receive recognition, promotions, and opportunities for career advancement. Employers appreciate committed and accountable workers, and they are the best candidates for leadership positions and long-term employment.

10.2.2 Reporting Procedures for Deviations, Risks and Regulatory Compliance Issues

Reporting hazardous incidents and unsafe machinery in the garment industry is essential to ensure workplace safety and accident prevention. Workers should be trained to identify possible hazards and report them to the concerned staff to initiate corrective promptly.

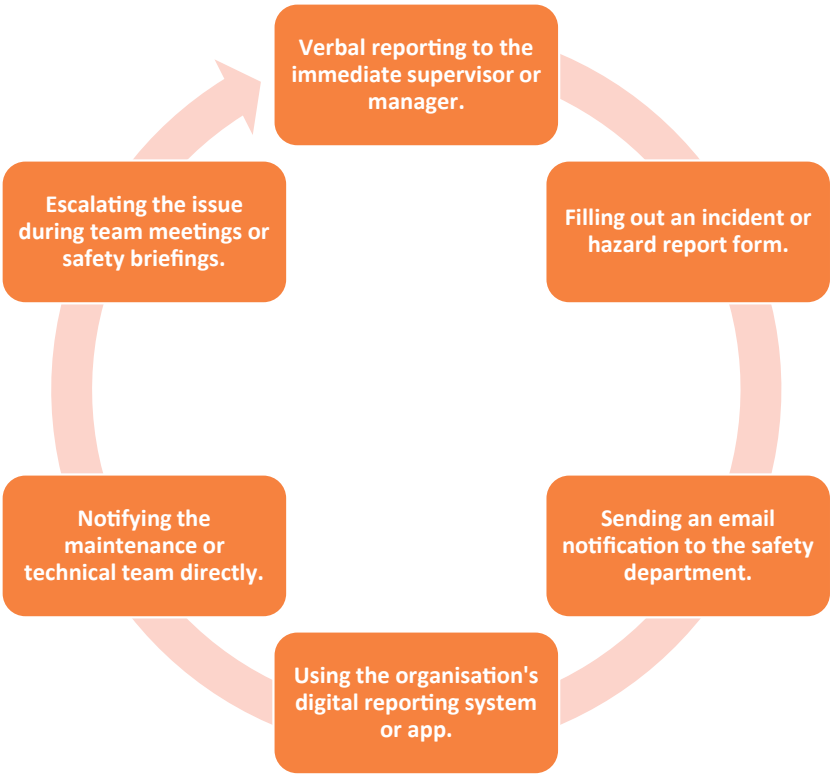


Fig. 10.2.2: Way to report unsafe equipment and other dangerous occurrences to concerned personnel

1. **Identifying Unsafe Equipment:** Unsafe equipment includes malfunctioning sewing machines, overheating motors, dull cutting blades, exposed wiring, and faulty safety guards. Workers should regularly inspect their tools and machines for wear and tear, unusual noises, or operational delays that indicate a potential hazard.
2. **Identification of Hazardous Incidents:** Typical hazardous incidents encompass electrical short circuits, machine malfunction, fire risk due to the accumulation of fabric dust, chemical spills, and cuts from sharp tools. Staff members should always be vigilant towards these hazards and immediately act to report them.
3. **Procedures for Reporting Hazardous Conditions:** Employees should report unsafe equipment to their direct supervisor or the maintenance department. There should be an official reporting procedure through which workers can report matters in maintenance registers or electronic tracking systems to resolve them in time.
4. **Emergency Response to Hazardous Situations:** If a severe danger is present, for example, electrical fire, gas leak, or equipment breakdown, employees must initiate emergency procedures, leave the site if needed, and report to the safety officer or the concerned authority for instant action.
5. **Offering Clear and Correct Descriptions:** When a problem is reported, employees should state the nature of the problem, its location, and its visible symptoms of failure. Providing information such as unusual sounds, unusual machine speed, or overheating allows technicians to diagnose and correct problems more effectively.
6. **Preventing Accidents Through Proactive Measures:** Employees should not attempt to operate or repair unsafe equipment unless trained. Lockout/tagout (LOTO) procedures should be followed to ensure machines are deactivated before maintenance. Safety barriers, warning signs, and PPE should be used to prevent further risks.
7. **Encouraging a Safety-First Culture:** Organizations should create an environment where workers feel comfortable reporting safety concerns without fear of consequences. Regular training sessions, safety drills, and reward programs for proactive reporting help reinforce the importance of workplace safety.

10.2.3 Support to Supervisors and Team Members in Enforcing Organizational Considerations

In any organisation, the effectiveness of operations relies heavily on seamless collaboration between supervisors and team members. Supervisors play a critical role in setting expectations, providing guidance, and ensuring adherence to organisational policies. However, their effectiveness is greatly enhanced when team members actively support and align with these efforts. By fostering a cooperative environment, teams can collectively uphold standards, improve efficiency, and contribute to achieving broader organisational goals.

Supporting supervisors goes beyond mere compliance—it involves proactive participation in enforcing company policies, promoting a positive work culture, and ensuring consistency in operations. Whether it is adhering to safety protocols, maintaining quality standards, or streamlining communication, the collective effort of both supervisors and team members creates a structured and well-functioning workplace. Through mutual support, organisations can drive productivity, strengthen accountability, and cultivate a more disciplined and goal-oriented work environment.

Support Area	Description
Assisting in Policy Implementation	Employees help supervisors by understanding and following workplace attendance, safety, and quality control policies. Reinforcing these rules among colleagues ensures consistent compliance.
Encouraging Teamwork and Collaboration	Supporting colleagues in completing tasks, sharing knowledge, and fostering a cooperative attitude help improve overall efficiency and reduce work-related conflicts.
Ensuring Workplace Safety and Compliance	Employees should follow safety protocols, properly use personal protective equipment (PPE), and report hazards to supervisors immediately. Active participation in safety drills ensures readiness in case of emergencies.
Providing Constructive Feedback and Reporting Issues	Employees should communicate any inefficiencies, production delays, or workplace concerns to supervisors. Regular feedback and early reporting of issues help prevent more extensive operational disruptions.
Supporting Training and Development Efforts	Assisting in training new hires, sharing skills with colleagues, and actively participating in workshops enhances team capability and ensures workforce readiness for future challenges.
Maintaining Equipment and Workstations	Ensuring machines, tools, and workstations are clean, well-maintained, and functioning reduces downtime and helps supervisors maintain a smooth production flow.
Adapting to Changes and Implementing Improvements	Employees should remain flexible to organizational changes, such as new production techniques, technology, or workflow adjustments, and help colleagues adapt efficiently.
Reinforcing Ethical Workplace Behaviour	Employees should uphold company values by promoting professionalism, honesty, and respect among team members, ensuring a positive and ethical work environment.

Table 10.2.1: Methods of Enforcing Organizational Considerations

Meeting Organizational Standards, Greening Solutions, Policies, and Regulations

Carrying out work functions in an apparel manufacturing environment requires adherence to organizational standards, sustainable (greening) solutions, company policies, and industry regulations. It ensures quality production, environmental responsibility, and legal compliance while maintaining workplace efficiency.

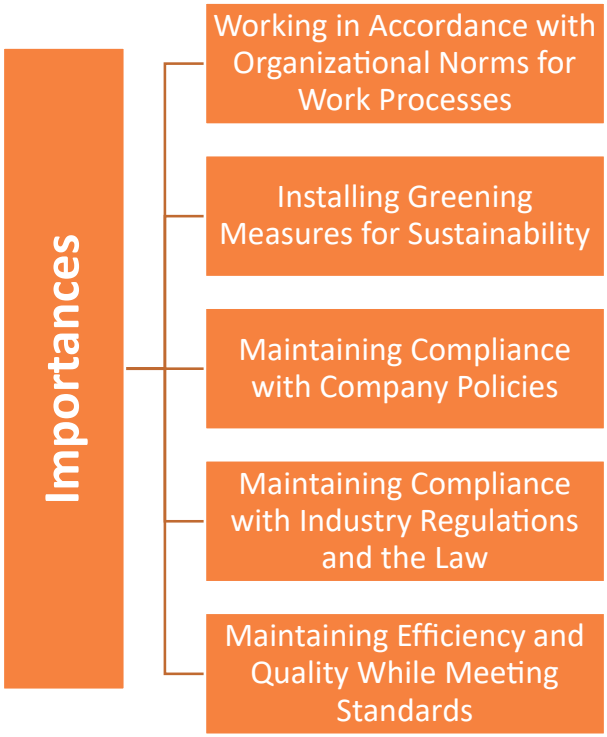


Fig. 10.2.3: Importance of meeting organizational standards

1. **Working following Organizational Norms for Work Processes:** Workers must follow organizational standards for quality control, production effectiveness, and workplace behaviour. The standards ensure that all processes, ranging from cutting materials to final inspection, meet set standards of accuracy and uniformity. Standard operating procedures (SOPs) delineate sequential processes to uphold consistency and minimize errors in production.
2. **Installing Greening Measures for Sustainability:** The fashion industry creates a lot of waste, so sustainable methods are crucial. Material waste is reduced through optimized fabric markers, recycled textile cuttings, and energy-saving machinery. Water and chemical management during dyeing and finishing also help minimise environmental footprint. Workers contribute to sustainability by adopting green practices like waste segregation and low consumption of non-renewable resources.
3. **Maintaining Compliance with Company Policies:** Company policies on employee attendance, workplace ethics, handling machines, and safety protocols must be followed by work functions. Workers must practice safety procedures, employ personal protective gear (PPE), and maintain workplace discipline. Ethical sourcing, fair compensation, and non-discrimination policies guarantee a fair and responsible work environment.
4. **Maintaining Compliance with Industry Regulations and the Law:** Fashion businesses must adhere to national and global laws, including labour legislation, occupational health and safety (OHS) codes, and environmental regulations. Compliance with industry certifications such as ISO 14001 (environmental management) or SA8000 (social accountability) enables businesses to conduct their operations ethically. Workers must be informed about these laws and report any infringements to provide a legally compliant workplace.
5. **Maintaining Efficiency and Quality While Meeting Standards:** Work functions must balance efficiency with compliance. Employees should focus on completing tasks within given timelines while ensuring quality consistency. Regular inspections, training programs, and performance evaluations help adhere to organizational and regulatory requirements.

Improving and Supporting Organizational Performance and Environmentally Friendly Processes

Workers are vital in building organizational performance and driving sustainable practices in the apparel sector. Engaging directly in efficiency gains and adopting eco-friendly processes help drive long-term business performance and a lower environmental impact.

- **Enhancing Productivity Through Process Optimization:** Employees can contribute to organizational performance by identifying inefficiencies in production workflows and suggesting improvements. Streamlining fabric cutting, reducing machine downtime, and implementing lean manufacturing techniques help increase output without compromising quality.
- **Consistency and Lower Defects in Garments:** Quality standards ensured in garments lead to lesser rework and waste of materials. Employees should perform proper stitching, inspect raw materials, and inform defects early during production to ensure uniformity and not lose much on production.
- **Building Team Work and Skills:** Collaboration is key to productivity. Employees must actively participate in knowledge-sharing sessions, help train new employees, and participate in skill development programs. Cross-functional collaboration assists in solving production issues and enhances overall efficiency.
- **Embracing Environmentally Friendly Production Practices:** Employees can contribute towards sustainability by minimizing fabric wastage, recycling shreds, and adopting environmentally-friendly dyeing and finishing techniques. Energy-efficient machine usage, reduced water usage, and the safe elimination of chemical residues help create less polluting processes.
- **Treating in compliance with Sustainable Use of Materials and Waste Minimization:** Workers can assist in maximizing fabric use through effective marker planning and cutting methods. Promoting organic, recycled, or biodegradable materials in manufacturing also supports sustainability objectives—waste reduction strategies like upcycling fabric remnants further increase environmental stewardship.
- **Encouraging Team Collaboration and Skill Development:** Teamwork is essential for productivity. Employees should actively participate in knowledge-sharing sessions, train new hires, and engage in skill development programs. Cross-functional teamwork helps resolve production challenges and improves overall efficiency.
- **Adopting Environmentally Friendly Production Practices:** Workers can support sustainability by minimizing fabric waste, recycling scraps, and following eco-friendly dyeing and finishing methods. Using energy-efficient machinery, reducing water consumption, and properly disposing of chemical waste contribute to greener production processes.
- **Following Sustainable Material Usage and Waste Reduction:** Employees can help optimize fabric utilization through proper marker planning and cutting techniques. Encouraging organic, recycled, or biodegradable materials in production aligns with sustainability goals. Waste reduction practices such as upcycling fabric scraps further enhance environmental responsibility.
- **Complying with Environmental Regulations and Safety Standards:** Organizations must meet regulatory requirements for pollution control, waste disposal, and sustainable sourcing. Employees can support compliance by following environmental policies, participating in sustainability training programs, and reporting ecological hazards.
- **Promoting a Culture of Continuous Improvement:** Encouraging feedback, innovation, and proactive problem-solving leads to ongoing organizational improvements. Employees should suggest process modifications, contribute ideas for cost savings, and remain adaptable to new sustainability initiatives.

Summary

- Ethical and Value-Based Governance promotes integrity, fairness, and accountability in business operations, fostering transparency, trust, and legal compliance while minimizing risks and promoting CSR.
- Non-compliance procedures include internal investigation, immediate corrective action, reporting to authorities, training programs, stricter monitoring, and disciplinary measures to restore compliance and trust.
- Self-authority in policies and procedures allows employees and supervisors to act on health, safety, quality, environmental standards, ethical labour practices and mandates reporting deviations to higher authorities.
- Sustainable Consumption Practices involve maximizing resource use, conserving energy and water, safely handling chemicals, encouraging recycling, and supporting eco-friendly workplace habits and ethical sourcing.
- Organizational and Individual Responsibility is emphasized in ensuring long-term sustainability, legal compliance, and ethical behaviour across all levels of the apparel production chain.
- In the garment industry, identifying and promptly reporting malfunctioning machines, hazardous incidents, and unsafe working conditions are critical to prevent accidents.
- Workers play a vital role in supporting organizational standards by enforcing policies, ensuring safety, promoting ethical behaviour, and adopting sustainable practices such as waste reduction, efficient energy use, and compliance with environmental regulations.

Exercise

Multiple-choice Question:

1. Which of the following is an organisation's primary benefit of ethical and value-based governance?
   a. Higher garment prices
   b. Increased favouritism
   c. Enhanced transparency and accountability
   d. Reduced product variety

2. When a company detects non-compliance with legal or ethical standards, what is the first step?
   a. Take disciplinary action
   b. Immediately notify customers
   c. Conduct an internal investigation and assessment
   d. Fire the responsible employee

3. Which daily practice contributes to sustainable consumption in the apparel industry?
   a. Increasing use of paper documentation
   b. Ignoring water usage in dyeing
   c. Using energy-efficient machines and switching them off during idle times
   d. Buying non-recyclable materials in bulk

4. What is the correct initial action when identifying a malfunctioning piece of equipment?
   a. Try to repair it yourself
   b. Ignore it if it still works
   c. Please report it to your supervisor or maintenance team
   d. Wait for the next scheduled inspection

5. Which of the following actions supports sustainability in apparel manufacturing?
   a. Using more water for dyeing
   b. Ignoring fabric scraps
   c. Reusing treated water and upcycling fabric waste
   d. Running machines unnecessarily

Descriptive Questions:

1. Describe the importance of ethical leadership and how it influences employee behaviour.
2. Explain the procedures a company should follow when it fails to meet legal or regulatory standards in the fashion industry.
3. What key sustainable consumption practices can employees adopt in their daily work to support environmental goals in apparel manufacturing?
4. Explain the procedures employees should follow when reporting unsafe machinery or hazardous situations in the garment industry.
5. How can employees support organizational goals by collaborating with supervisors and adopting environmentally friendly production practices?

Notes

Scan the QR codes or click on the link to watch the related videos

https://youtu.be/ltW7KVYJ1go?si=FGeEFciHkzBjO_5A

Business Ethics, Nature of Business ethics

Skill India
कौशल भारत-कुशल भारत

सत्यमेव जयते
GOVERNMENT OF INDIA
MINISTRY OF SKILL DEVELOPMENT
& ENTREPRENEURSHIP

N·S·D·C
RE>IMAGINE FUTURE

APPAREL MADE-UPS HOME FURNISHING
SECTOR SKILL COUNCIL

11. Employability Skills

DGT/VSQ/N0102

Employability Skills is available at the following location

https://www.skillindiadigital.gov.in/content/list

Employability Skills

Skill India
कौशल भारत-कुशल भारत

सत्यमेव जयते
GOVERNMENT OF INDIA
MINISTRY OF SKILL DEVELOPMENT
& ENTREPRENEURSHIP

N·S·D·C
RE IMAGINE FUTURE

APPAREL MADE-UPS HOME FURNISHING
SECTOR SKILL COUNCIL

12. Annexure

Module No.	Unit No.	Topic Name	Page No	Link for QR Code (s)	QR code (s)
Module 1: QC Executive Stitched Items (Bridge Module)	Unit 1.1: Apparel Industry Overview and QC Executive Role	1.1.1 Overview of the Apparel Industry and Key Market Forces	17	https://youtu.be/-ddisteV3tOo-?si=uFDW4QKnItoOKknY	Textile Sector in India
		1.1.2 Apparel Production Process	17	https://youtu.be/-QaS4sI0n5Qg-?si=_BndodY0hCorANp6	Garments Full Production Process
		1.1.3 Role, Duties, and Core Functions of a QC Executive – Stitched Items	17	https://youtu.be/-zX9KoZ7tz6Y-?si=oKKdSHPsGu9jMfP4	QUALITY ASSURANCE IN APPAREL MANUFACTURING
Module 2: Identify the Quality of Raw Material	Unit 2.1: Garment Production Essentials	2.1.2 Methods to Handle and Correct Defects in Garment Production	56	https://youtu.be/-WTlFD2MQdbM-?si=z5_uYqjL568WR3Kb	Types of Defects in Fabric Quality Assurance in Garment Production
		2.1.3 Tools and Equipment for Garment Construction	56	https://youtu.be/-GOKJAlQzhoc-?si=orEJTalDz-bZsOj9	Tools used in Garment Construction

Module No.	Unit No.	Topic Name	Page No	Link for QR Code (s)	QR code (s)
		2.1.4 Types of Garment Patterns and Their Application	56	https://youtu.be/-ub_WXoT6boA-?si=D9xV0chO_9nW8lYh	Pattern Making class
Module 3: Identify and assess the quality of raw material (AMH/N1401)	Unit 3.1: Quality Control and Documentation in Production	3.1.3 Monitoring and Ensuring Quality During Production	83	https://youtu.be/-PrLjrCnXDDs-?si=K1ieJRmJOV1a9gc7	QUALITY CHECKPOINTS IN GARMENT PRODUCTION
		3.1.4 Inspection of Raw Materials for Defects	83	https://youtu.be/-022ejRl4i5c-?si=ZTcMOuKnMFtg6huE	Inspection Procedure for raw materials
		3.1.6 Inspecting Pattern and Template Accuracy	83	https://youtu.be/-_yXkoDkvtMw-?si=-rMQ9phALj0Wlccj	Inspection Process in Garment Industry
Module 4: Identify and assess the quality in sewing room" (AMH/N1402)	Unit 4.1: Garment Stitching and Quality Control	4.1.1 The Garment Stitching Process: Step by Step	94	https://youtu.be/-ruvgwm9R25I-?si=3kI0kLrPOXTWUfW7	How Ready Made Shirts are Made

Module No.	Unit No.	Topic Name	Page No	Link for QR Code (s)	QR code (s)
		4.1.2 Types of Stitching Defects in Garment Construction	94	https://youtu.be/-2cS8c2Y2MC8-?si=qvmg4WqXlwhbxbxk	MOST COMMON DEFECTS IN GARMENTS
Module 5: Correction of stitching defects (AMH/ N1402)	Unit 5.1: Maintaining Quality in Stitching and Monitoring	5.1.7 Final Inspection of Stitched Garments	111	https://youtu.be/-o4Y_xuZht4o-?si=o2UBM6R6SOgOv5HL	Garment Inspection – Stitching, Measurements, and Finishing
Module 6: Identify and Assess the Quality After Finishing of Garment (AMH/ N1403)	Unit 6.1: Quality Control in Production Stages	6.1.5 Key Finishing Stages: Thread Cutting, Cleaning, Ironing, Packaging	131	https://youtu.be/-2sc_m8eU5rM-?si=QOGmrYqWsF10dwWn	Thread Trimming Machine | Thread Trimmer
Module 7: Inspect the finished garment (AMH/ N1403)	Unit 7.1: Finishing and Quality Control in Garment Production	7.1.1 Ironing Garments for Proper Finishing	151	https://youtu.be/-nuVHz3lpUlw-?si=BX9CxTAceGSaUfmJ	Shirt's finishing iron press process in garments industry.
Module 8: Coordinate with different departments (AMH/ N1404)	Unit 8.1: Communication and Process Improvement in Production	8.1.2 Importance of Teamwork in Production	170	https://youtu.be/-prhP3L_Zcq4-?si=pujpxAvYVvYqNnzl	The Importance and Advantages of Teamwork

Module No.	Unit No.	Topic Name	Page No	Link for QR Code (s)	QR code (s)
Module 9: Promote and sustain safety, health, and security in the workplace while fostering Gender and Persons with Disabilities (PwD) Sensitization (AMH/ N0620)	Unit 9.1: Workplace Health, Safety, and Compliance	9.1.2 Hazards Associated with Sewing Machine Operations	192	https://youtu.be/-6hvLLe5OqGY-?si=rCbohmUgMK7---fa	Sewing Machine Safety Training Area 01
Module 10: Adhere to industry, regulatory, and organizational standards and embrace environmentally sustainable practices (AMH/ N0621)	Unit 10.1: Ethical Practices, Compliance, and Governance	10.1.1 Importance of an Ethical and Value-Based Approach to Governance	208	https://youtu.be/-ltW7KVYJ1go-?si=FGeEFciHkzBjO_5A	Business Ethics, Nature of Business ethics

Skill India
कौशल भारत-कुशल भारत

सत्यमेव जयते
GOVERNMENT OF INDIA
MINISTRY OF SKILL DEVELOPMENT
& ENTREPRENEURSHIP

N·S·D·C
RE IMAGINE FUTURE

APPAREL MADE-UPS HOME FURNISHING
SECTOR SKILL COUNCIL

Address: **Apparel Made-ups & Home Furnishing Sector Skill Council**
Flat No. A-312 to A-323, 3rd Floor, Somdatt Chamber-1,
Bhikaji Cama Place, Africa Avenue, New Delhi-110066

Email: info@sscamh.com

Web: www.sscamh.com