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APPAREL MADE-UPS HOME FURNISHING
SECTOR SKILL COUNCIL

Participant Handbook

Sector
Apparel

Sub-Sector
Apparel, Made-Ups & Home Furnishing

Occupation
Department Supervision

Reference ID: **AMH/Q0601, Version 4.0**
NSQF level: 5

Cutting Supervisor -(Fabric)

Published by

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

Shri Narendra Modi
Prime Minister of India

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for

SKILLING CONTENT: PARTICIPANT HANDBOOK

Complying to National Occupational Standards of

Job Role/ Qualification Pack: **'Cutting Supervisor-(Fabric)'** QP No. **'AMH/Q0601, NSQF Level 5'**

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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 "Cutting Supervisor – Fabric" training programme. This Participant Handbook (PHB) is designed to provide participants with comprehensive knowledge about the principles and practices of fabric cutting operations in the garment manufacturing process. It focuses on planning, supervising, and executing fabric cutting tasks with precision, ensuring quality control, minimizing fabric wastage, and maintaining workflow efficiency. The programme also emphasizes understanding patterns and markers, handling cutting equipment safely, managing a cutting team effectively, and coordinating with other departments to ensure timely and accurate execution of production schedules.

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/N0610: Plan and organize cutting process
2. AMH/N0611: Preparatory processes for cutting
3. AMH/N0612: Supervise cutting operations
4. AMH/N0613: Maintain health, safety and security in the cutting department with Gender and PwD Sensitization
5. AMH/N0619: Ensure workplace orderliness and efficiently operate tools and machinery.
6. AMH/N0621: Adhere to industry, regulatory, and organizational standards and embrace environmentally sustainable practices
7. DGT/VSQ/N0102: Employability Skills (60 Hours)

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1. Introduction and Orientation to Cutting Supervisor-(Fabric)

Unit 1.1 - Role and Scope of a Cutting Supervisor in the Apparel Industry

AMH/N0610

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 'Cutting Supervisor-(Fabric)' in the apparel industry.
3. Describe the apparel production process and the role that the 'Cutting Supervisor-(Fabric)' plays in the process.
4. Explain roles and responsibilities of a 'Cutting Supervisor-(Fabric)'.

UNIT 1.1: Role and Scope of a Cutting Supervisor in the Apparel Industry

Unit Objectives

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

1. Recall the key features of the apparel industry in India.
2. List the key statistics that define the size of the Indian apparel industry.
3. Explain the factors that drive the growth of the apparel industry in India.
4. Describe the sequence of steps involved in the apparel production process.
5. Outline the specific tasks and duties of a cutting supervisor.

1.1.1 Overview of the Apparel Industry in India

Ancient skills and cultural traditions make the Indian garment sector one of the most unique in the world. Apart from their distinct cultures and languages, the various Indian states also have a range of fashions. The variety of textiles used in Indian clothing is huge, ranging from the warm Pashmina wool to the exquisite embroidery of the Chikankari in the north, to the vibrant and colourful Bandhani in the west and the majestic Chanderi in the geographical centre, to the hand-woven Sambalpuri and block-printed Kalamkari in the south.

Apparel refers to clothing and garments that people wear for functional, cultural, and aesthetic purposes. It encompasses a wide variety of products, including casual wear, formal attire, ethnic wear, sportswear, and luxury fashion. Apparel is more than just a necessity; it reflects personal style, social identity, and cultural traditions.

The apparel industry is a vast and dynamic sector that involves the design, production, distribution, and marketing of clothing. The industry involves various stakeholders, including:

Fig. 1.1.1: Stakeholders of apparel industry

This industry is influenced by changing fashion trends, consumer preferences, technological advancements, and economic factors. The apparel industry involves a series of interconnected activities, including:

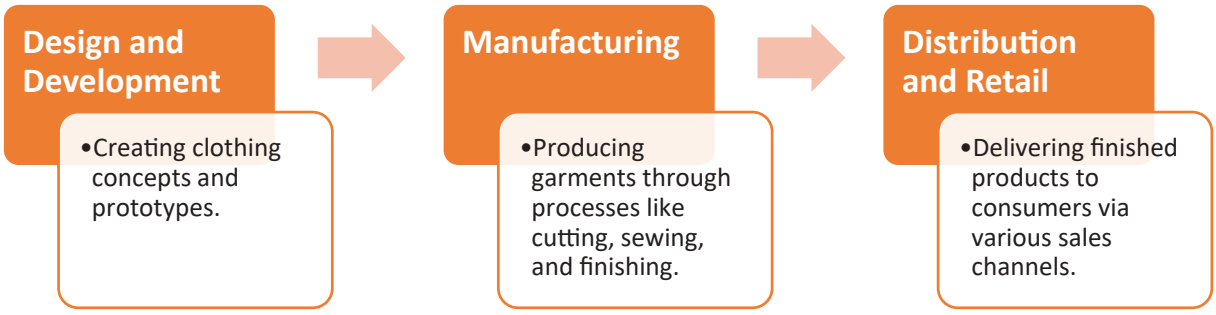


Fig. 1.1.2: Interconnected activities within the apparel industry

India's apparel industry is one of the largest in the world, playing a crucial role in the country's economy by contributing significantly to employment, exports, and GDP. With a rich textile heritage, a growing middle class, and an expanding retail market, India has positioned itself as a key global player in apparel manufacturing and fashion retailing.

The Indian apparel market, valued at five trillion US dollars according to a survey by Statista Research Service, is not only the largest in the world, but it is also one of the biggest exporters of clothing. The nation's apparel industry accommodates a broad spectrum of tastes, from western clothing to ethnic clothing. One of the top producers of cotton and jute in the world is India. India is the world's second-largest producer of silk and the source of 95% of the world's hand-woven cloth. A significant amount of the vastly diverse Indian textile and clothing business is composed of traditional handloom, handicraft, wool, and silk products as well as the organised textile industry. The primary hubs and manufacturing centres for the clothing industry are the states of Andhra Pradesh, Telangana, and Haryana. It is also the second largest employer after agriculture, providing direct employment to 45 million people and 100 million people in the allied sector according to IBEF (Indian Brand Equity Foundation). Andhra Pradesh, Telangana, Haryana, Jharkhand, and Gujarat are the top textile and clothing manufacturing states in India.

Key Segments of the Apparel Industry in India

Images	Segments	Features
	**Ready-to-Wear (RTW) Apparel**	The RTW segment is the largest and fastest-growing segment in the Indian apparel industry. It includes clothing for men, women, and children, such as casual wear, formal wear, and sportswear.
	**Ethnic Wear**	Ethnic wear is a significant segment in the Indian apparel industry, driven by the country's rich cultural heritage. This segment includes traditional clothing such as sarees, salwar kameez, lehengas, and kurtas.
	**Activewear**	The activewear segment is growing rapidly in India, driven by the increasing awareness of health and fitness. This segment includes clothing for yoga, running, gym wear, and other sports activities.

Images	Segments	Features
 	**Innerwear and Loungewear**	The innerwear and loungewear segment is also growing in India, driven by the increasing demand for comfortable and stylish clothing for daily wear.
	**Luxury and Premium Apparel**	The luxury and premium apparel segment is a niche but growing market in India, driven by the increasing disposable income of the affluent population.
	**Children's Wear**	The children's wear segment is a significant market in India, driven by the large population of children in the country.
	**Uniforms and Work-wear**	The uniforms and work-wear segment is a growing market in India, driven by the increasing demand for uniforms in industries such as healthcare, hospitality, and manufacturing.

Images	Segments	Features
	**Eco-Friendly and Sustainable Apparel**	The eco-friendly and sustainable apparel segment is a growing trend in India, driven by the increasing awareness of environmental sustainability and social responsibility such as Kala cotton, banana fiber, bamboo fiber, soybean fiber.

Table 1.1.1: Segments of the apparel industry

Challenges in the Apparel Industry

Some of the challenges identified as major barriers to Indian apparel export growth are the below –

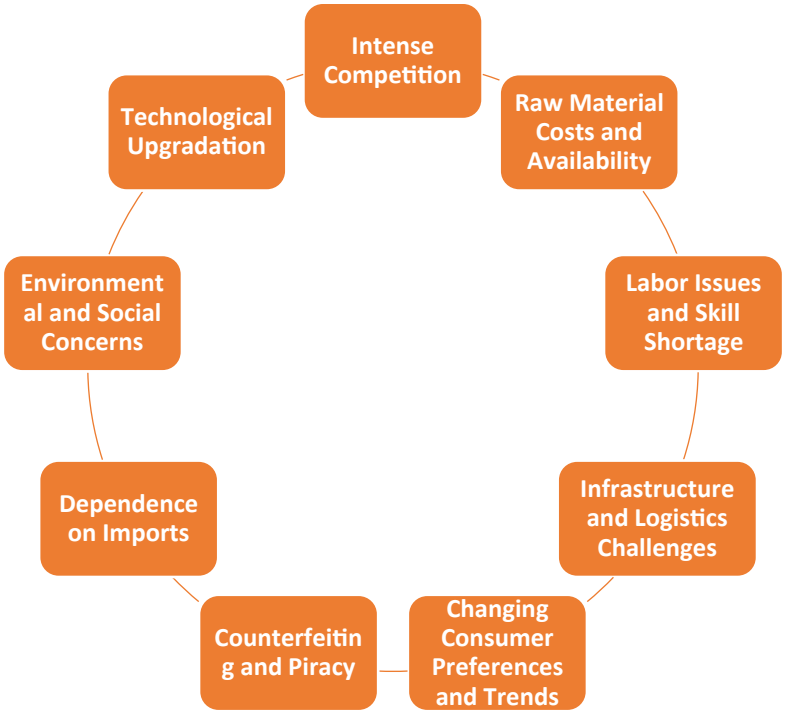


Fig. 1.1.3: Challenges in the apparel industry

1. **Infrastructure and Supply Chain Bottlenecks:** India's apparel industry relies on a fragmented supply chain, with textile production, dyeing, stitching, and finishing often scattered across multiple states. This lack of streamlined logistics leads to inefficiencies, delays, and higher costs. The transportation of raw materials from cotton-producing states like Gujarat to textile hubs such as Tiruppur and Ludhiana often faces logistical delays due to poor road networks and regulatory checkpoints.
2. **Intense Global Competition:** The Indian apparel industry competes with countries like China, Bangladesh, and Vietnam, which offer lower production costs and faster turnaround times due to advanced manufacturing techniques and government incentives. Bangladesh's low-cost garment manufacturing and preferential trade agreements with Western countries have made it a major exporter, often undercutting India's pricing in the global market.
3. **Rising Production Costs and Labour Issues:** Labour-intensive apparel manufacturing is becoming expensive due to increasing wages, labour shortages, and compliance with stricter worker

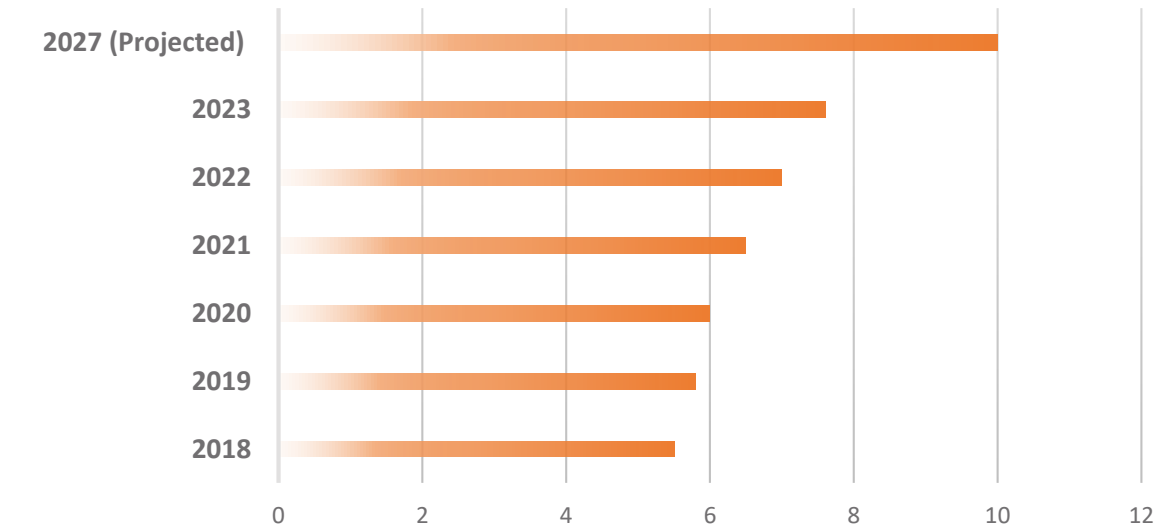
protection laws. Additionally, unorganised labour and a lack of formal training impact efficiency. Many garment factories in India have faced criticism for poor working conditions, low wages, and long working hours. This has led to labour unrest, strikes, and negative publicity, impacting the industry's reputation and competitiveness.

4. **Limited Adoption of Advanced Technology:** While leading brands and manufacturers have embraced automation, a significant portion of India's apparel sector, especially small and medium enterprises (SMEs), still relies on traditional methods. High capital investment requirements deter widespread adoption of AI, robotics, and blockchain technology. While large firms like Arvind Limited use automated fabric cutting and digital printing, many local textile mills still rely on manual looms and conventional dyeing processes, reducing efficiency.
5. **Environmental Concerns and Sustainability Issues:** Textile production is one of the most water- and energy-intensive industries. Pollution from dyeing units and excessive water usage for cotton farming pose severe environmental challenges, forcing brands to rethink sustainability strategies. The Noyyal River in Tamil Nadu, polluted by textile dyeing units in Tiruppur, has led to government crackdowns, forcing industries to adopt wastewater treatment plants, adding to operational costs.
6. **Changing Consumer Preferences and Fast Fashion Impact:** With the rise of fast fashion, Indian consumers are demanding trendy, affordable apparel at a rapid pace. This puts pressure on local brands to keep up while maintaining quality and ethical production. International brands like HandM and Zara have captured a significant market share in India by offering trendy collections every few weeks, challenging homegrown brands like FabIndia and Manyavar.
7. **Counterfeit Products and Brand Imitation:** The Indian market faces challenges with counterfeit goods and unauthorized replicas of branded apparel, affecting both high-end and budget segments. This reduces consumer trust and revenue for legitimate brands. Markets like Delhi's Palika Bazaar and Mumbai's Linking Road are flooded with fake versions of top brands like Nike, Adidas, and Levi's, harming both brand reputation and legal market sales.

1.1.2 Size of the Indian Apparel Industry

The Indian apparel industry has emerged as a significant sector in the country's economy, driven by a large and growing domestic market, as well as a substantial export potential. With a rich textile heritage and a strong manufacturing base, India has become a major player in the global apparel market. The industry has witnessed rapid growth over the past few years, driven by increasing demand from domestic and international markets, favourable government policies, and investments in technology and infrastructure.

According to a report made by Statista, as of the financial year 2023, the market size was estimated at ₹7.6 trillion. Projections indicate that by 2027, this figure could surpass ₹10 trillion, underscoring the sector's robust expansion.



	2018	2019	2020	2021	2022	2023	2027 (Projected)
Market Size (₹ Trillion)	5.5	5.8	6	6.5	7	7.6	10

Table 1.1.2: Market size of the Indian apparel industry (₹ Trillion)

Top Export Destinations

India exports textile and clothing items, including handlooms and handicrafts, to over 100 nations worldwide. The United States, Bangladesh, the United Kingdom, the United Arab Emirates, Germany, and other nations are among India's top export markets for textiles and clothing items. Approximately one-fourth of India's total exports are imported by the USA, making it the biggest importer of all according to the Ministry of Commerce and Industry.

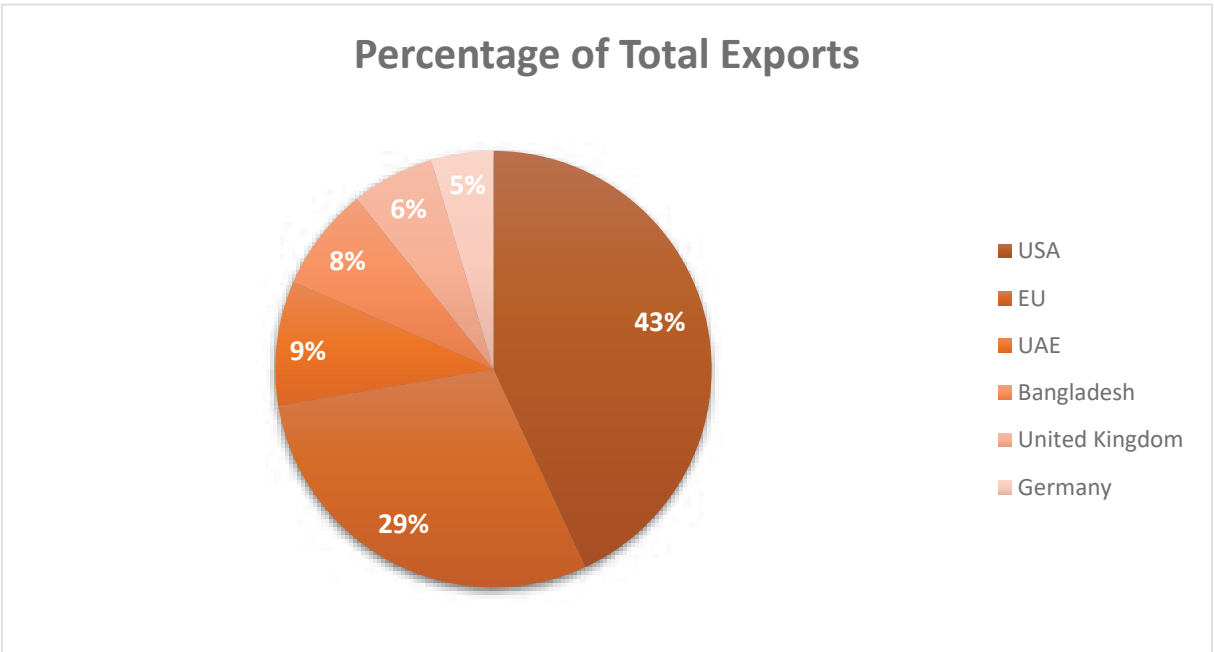


Fig. 1.1.4: Country-wise export share (2023-2024)

The Indian apparel market is diverse, catering to various demographics and preferences. Key segments include:

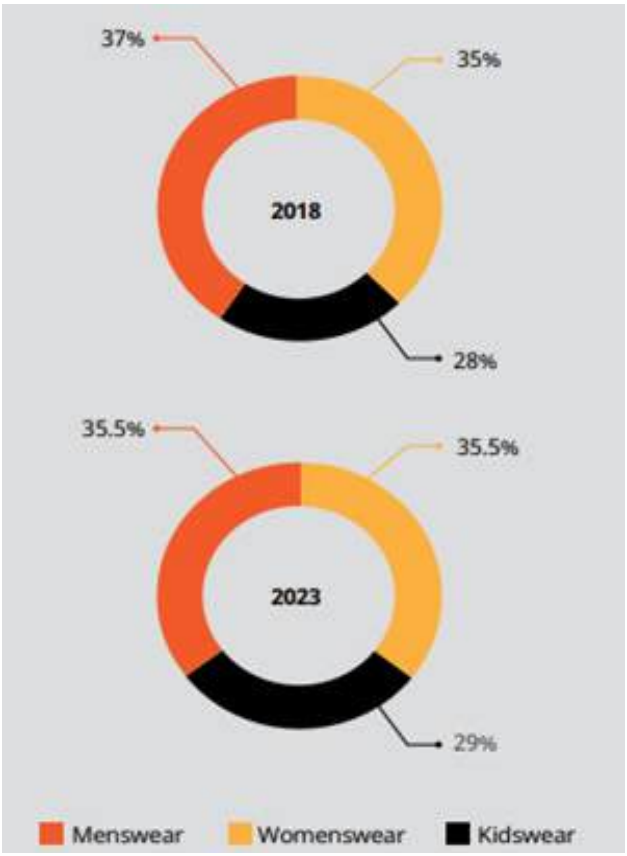


Fig. 1.1.5: Indian apparel market share by segment

Top 10 apparel exporters in India

Here is the list of the top 10 garment export companies in India:

Arvind Limited

Raymond Limited

Alok Industries Limited

Bombay Dyeing and Manufacturing Company Limited

Loyal Group

Sutlej Textiles

Shahi Exports

Page Industries

KPR Mills Welspun India

Fig. 1.1.6: Top 10 apparel export companies in India

1.1.3 Scope and Growth Drivers of the Apparel Industry in India

The apparel industry in India is a cornerstone of the country's economy, contributing significantly to GDP, employment, and exports. With rapid industrialisation, an expanding middle class, and evolving consumer preferences, the sector is poised for exponential growth. Below are the key growth drivers shaping the future of India's apparel industry:

1. **Rising Disposable Income and Changing Consumer Behaviour:** India's economic trajectory has been marked by steady GDP growth, leading to increased disposable incomes across urban and semi-urban areas. As per economic reports, per capita income in India has been rising, empowering consumers with greater purchasing power.

Fig. 1.1.7: Rising disposable income and changing consumer behaviour

2. **Urbanisation and Changing Lifestyles:** India is undergoing rapid urbanisation, with millions migrating to cities for better employment and lifestyle opportunities. As urban centres grow, the demand for formal, semi-formal, and occasion wear increases significantly.

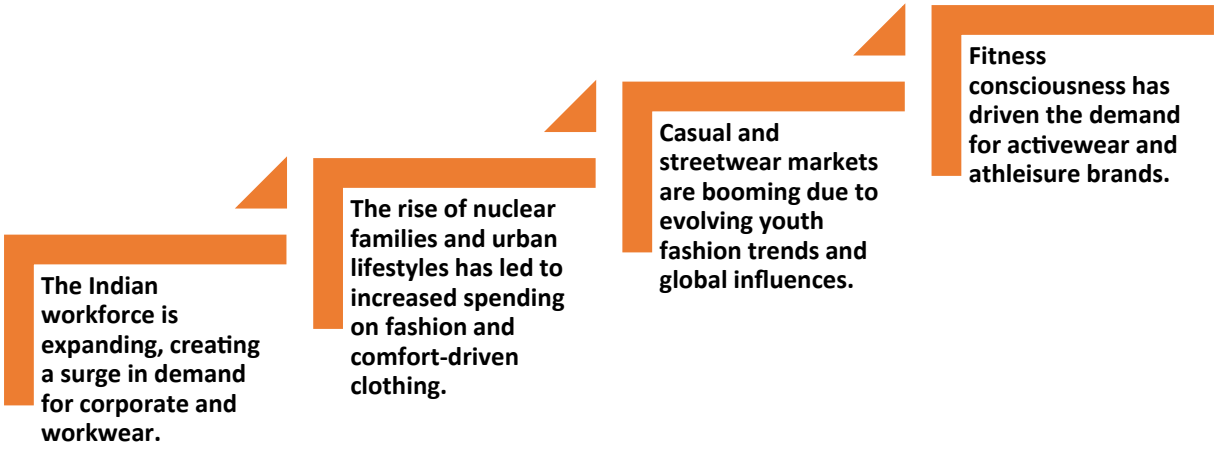


Fig. 1.1.8: Urbanisation and changing lifestyles in India

3. **E-Commerce and Digital Transformation:** India's e-commerce boom is one of the most significant drivers of the apparel industry's growth. With the proliferation of smartphones and affordable internet access, online shopping has become mainstream, even in smaller towns and rural areas.

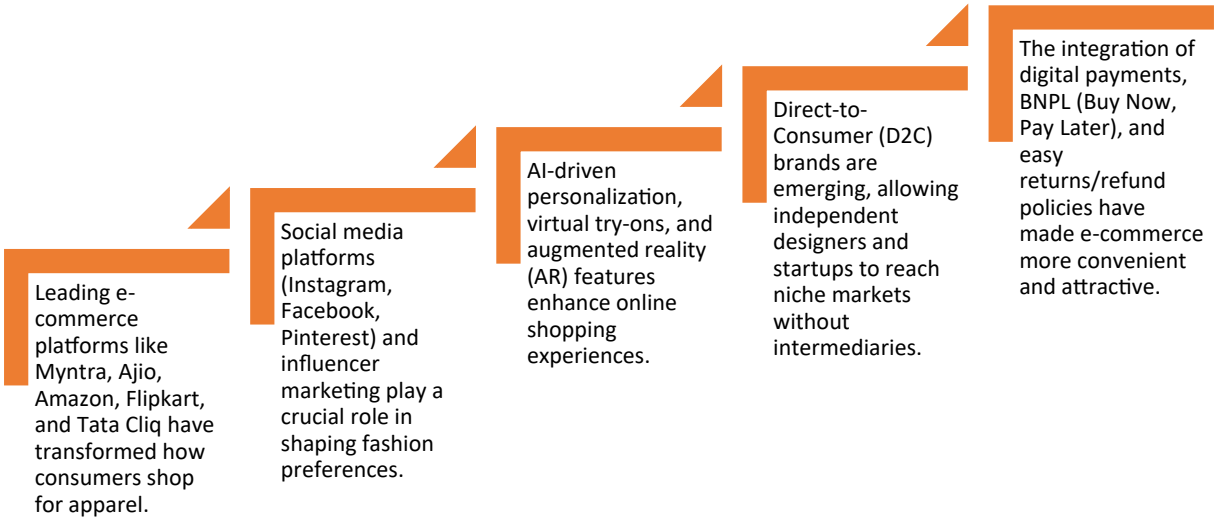


Fig. 1.1.9: E-Commerce and digital transformation

4. **Foreign Direct Investment (FDI) and Policy Support:** The Indian government has liberalised policies to attract Foreign Direct Investment (FDI) in the apparel sector, further boosting the industry's growth.

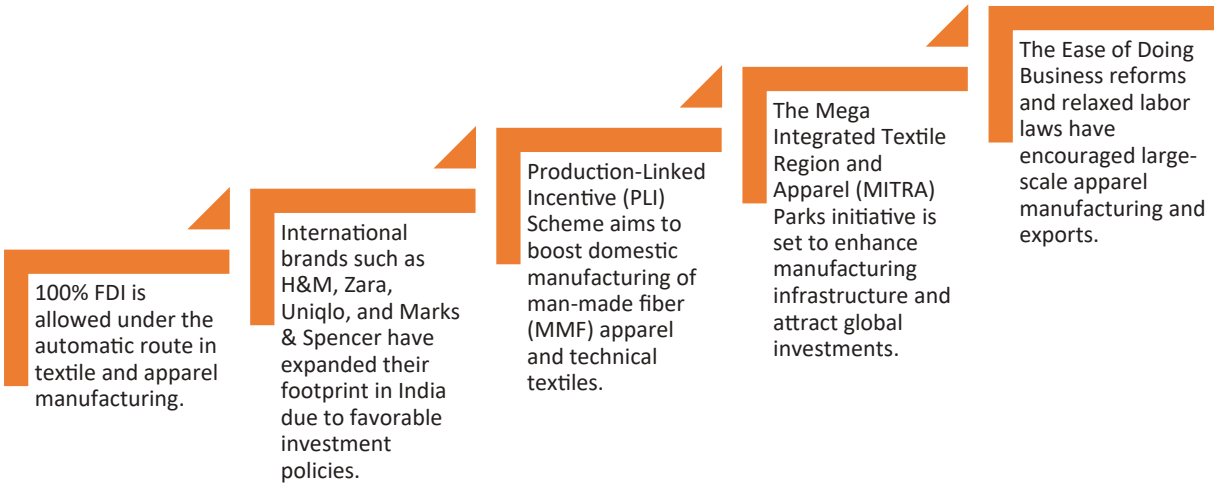


Fig. 1.1.10: Foreign Direct Investment (FDI) in the apparel sector

5. **Sustainability and Growing Conscious Fashion Trends:** Sustainability is no longer just an industry trend but a necessity, and Indian consumers are becoming more eco-conscious.

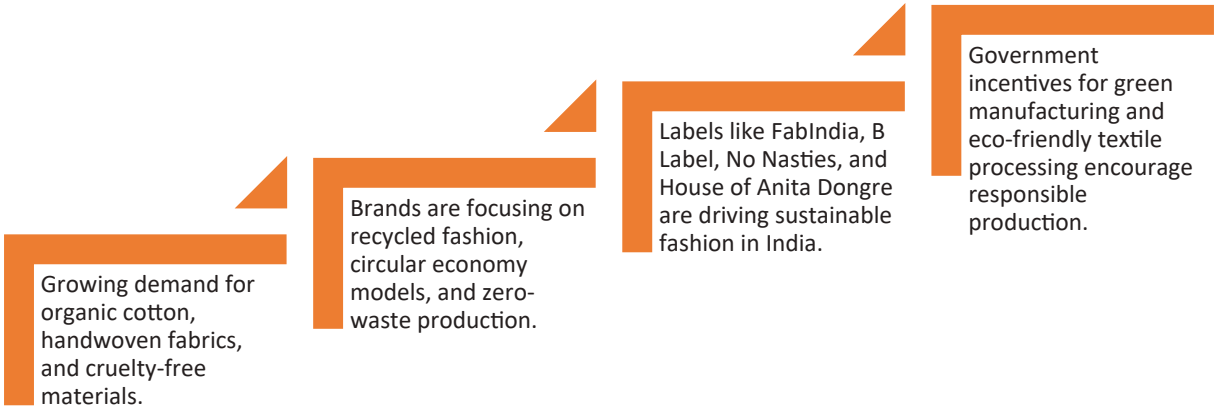


Fig. 1.1.11: Sustainability and growing conscious fashion trends

6. **Expansion of Organised Retail and Brand Penetration:** The shift from unorganised to organised retail is reshaping the apparel landscape:

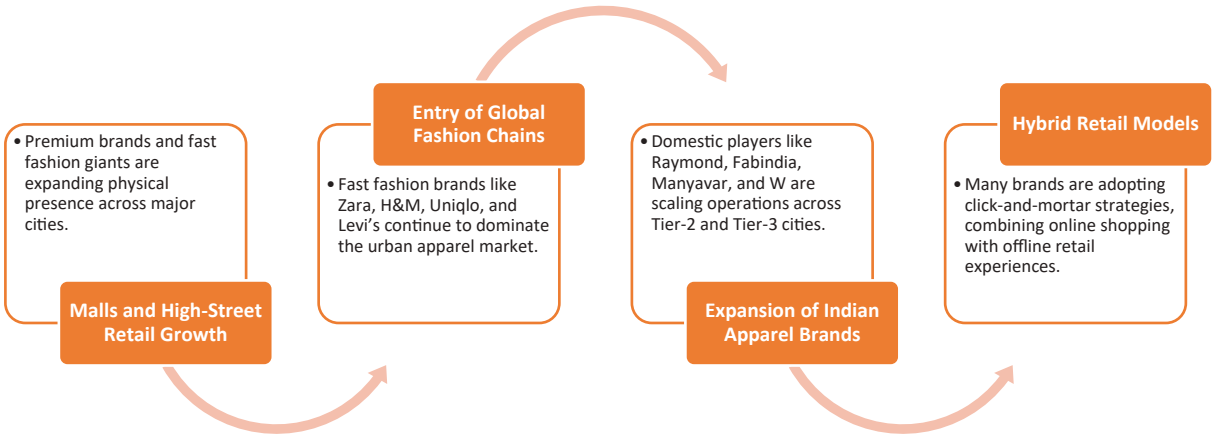


Fig. 1.1.12: Expansion of organised retail and brand penetration

7. **Global Recognition and Export Potential:** India has emerged as one of the world's leading exporters of textiles and apparel. The country's reputation for high-quality craftsmanship, traditional weaving techniques, and affordable manufacturing costs makes it a preferred destination for global sourcing.

Fig. 1.1.13: Export potential of India

1.1.4 Roles and Responsibilities of a Cutting Supervisor

Who is a Cutting Supervisor?

A Cutting Supervisor is a key professional in the apparel manufacturing industry responsible for overseeing and managing the fabric cutting process. This role is critical in ensuring that fabric is cut accurately, efficiently, and with minimal waste according to production specifications. The Cutting Supervisor plays a pivotal role in maintaining quality standards, meeting production deadlines, and optimising material usage.

Cutting supervisor has many roles and responsibilities in their job, some of them are following:

Fig. 1.1.14: Role of a cutting supervisor

1. **Overseeing Fabric Cutting Operations:** The cutting supervisor also sees to it that cutting is done with precision and consistency. This includes:
   - Checking manual and automated cutting activities to guarantee that pieces of fabric are aligned according to pattern specifications.

- Overseeing how layers of fabric are aligned, particularly for patterned, striped, or checkered pieces.
- Verifying that cutting machines and tools are properly configured in order to produce clean, precise cuts.
- Coordinating cutting room processes to prevent inaccuracies like misalignment, fraying, or wastage.

2. **Ensuring Precision and Accuracy:** Accuracy of fabric cutting to ensure proper fit and size of clothes. The supervisor makes sure:
   - Pattern matching and marker efficiency to ensure constant sizes.
   - Daily calibration of cutting machines for sharpness and accuracy.
   - Strict observance of tolerance and allowances while cutting to prevent inaccuracies leading to garment flaws.
   - Verification of fabric shrinkage and relaxation prior to cutting to avoid distortion in the finished garment.
3. **Reducing Fabric Wastage:** Fabric is the costliest raw material in clothing manufacture. A cutting supervisor has to:
   - Maximize marker efficiency to minimize fabric wastage.
   - Adopt best practices in fabric layering and spreading so as not to make unnecessary cuts and mistakes.
   - Track and regulate fabric leftovers, making sure they are recycled wherever possible.
   - Train employees on effective cutting methods to reduce errors and fabric wastage.
4. **Production Efficiency Maintenance:** A properly managed cutting room guarantees production smoothness. The cutting supervisor has to:
   - Plan and schedule cutting orders for production deadlines.
   - Coordinate with the pattern-making, sewing, and finishing departments to ensure efficiency.
   - Recognize and fix bottlenecks in the cutting process to avoid delays.
   - Have inventory control of fabrics, so there is no shortage or overuse.
5. **Managing Workforce and Safety:** Leading a team of cutters, spreaders, and assistants demands leadership. The cutting supervisor
   - Assigns duties and trains workers in safe and effective cutting methods.
   - Imposes safety measures to avoid accidents from sharp tools and machinery.
   - Inspects quality at every step to ensure high standards in cutting.

Skills and Expertise Required

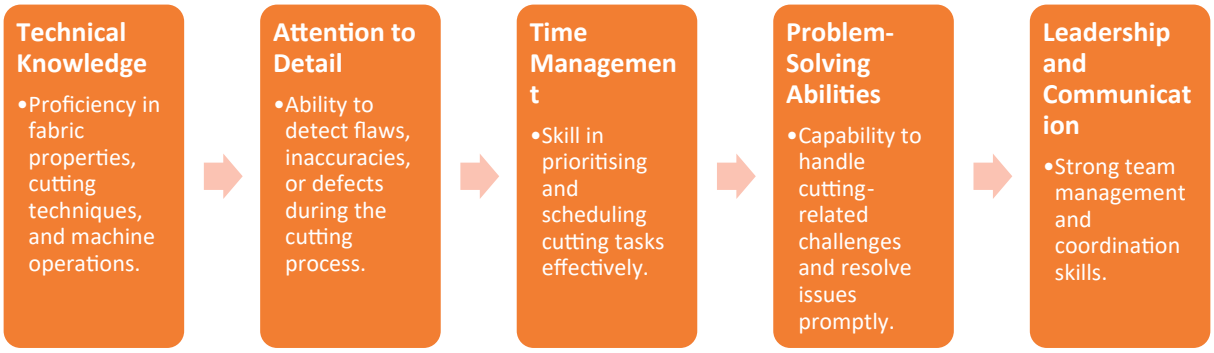


Fig. 1.1.15: Skills and expertise required of a cutting supervisor

Importance of a Cutting Supervisor in Apparel Production

The Cutting Supervisor plays a vital role in ensuring fabric efficiency, quality consistency, and production accuracy. By managing the cutting process effectively, they help:

Fig. 1.1.16: Importance of a cutting supervisor

1.1.5 Apparel Manufacturing Process & Function of the Cutting Supervisor

The apparel manufacturing process entails a number of stages, from raw material procurement to final garments. Every stage demands precision, synchronization, and quality control to achieve efficient production. The Cutting Supervisor (Fabric) is crucial for the cutting process, which has a direct effect on material efficiency, garment quality, and overall productivity.

- **Pattern Development & Design:** It all starts with sketching of garments by designers and pattern making in terms of development of patterns and size grading for production. The Cutting Supervisors make sure the patterns are being optimized for fabric efficiency and cut accuracy.

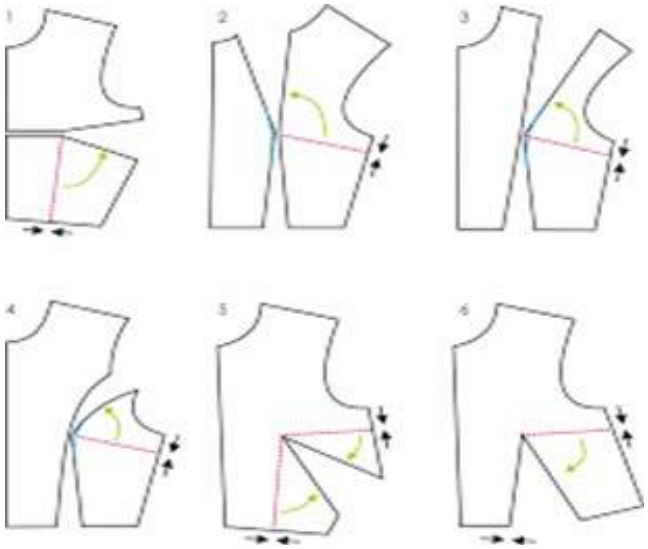


Fig. 1.1.17: Pattern development before cutting

- **Fabric Sourcing & Inspection:** Fabrics are sourced against specifications of texture, weight, and colour. Cutting Supervisors work together with the quality control group to inspect fabric for faults, shrinkage, and even colour distribution prior to cutting.
- **Fabric Spreading & Cutting:** Possibly the most sensitive phase where fabrics are spread in layers and cut to pattern. Cutting Supervisors supervise spreading, marker effectiveness, and accuracy in cutting with less fabric wastage.

Fig. 1.1.18: Fabric spreading and cutting

- **Sewing and Assembly:** Cut fabric pieces are taken to the sewing department, where they are sewn into finished garments. Cutting Supervisors ensure accuracy in cutting to avoid fitting problems and delays in the stitching process.

Fig. 1.1.19: Sewing and assembly process

- **Finishing & Quality Control:** Garments are pressed, trimmed, and subject to meticulous quality checks to identify defects. Cutting Supervisors help to monitor quality by double-checking that cutting mistakes do not pass on to subsequent stages.

Fig. 1.1.20: Pressing garments

- **Packing & Dispatch:** Finished garments are packed and shipped to retailers or customers. Cutting Supervisors ensure cut fabric quantities equal production requirements to avoid shortages or miscalculation.

Fig. 1.1.21: Packing garments

- **Coordination with Departments:** Cutting Supervisors serve as a bridge between pattern makers, quality control, sewing, and production departments for ensuring smooth work flow and effectiveness. Their activities ensure timely manufacturing, effective usage of fabric, and quality checks.
- **Workflow Optimization & Efficiency:** Through the implementation of automation aids such as CAD/CAM, maximizing fabric use, and best cutting practice staff training, Cutting Supervisors assist in enhancing speed of production and minimizing material cost.

Summary

- The apparel industry in India is a significant contributor to the economy, known for its vast workforce and export potential.
- It is one of the largest industries in the country, with key statistics highlighting its size, market value, and employment rates.
- Several factors drive its growth, including increasing consumer demand, technological advancements, and government initiatives.
- The apparel production process follows a systematic sequence, starting from design and fabric selection to cutting, stitching, finishing, and packaging.
- A cutting supervisor plays a crucial role in overseeing fabric cutting, ensuring accuracy, maintaining quality standards, and managing the cutting team.
- Their responsibilities also include coordinating with other departments, optimising fabric usage, and ensuring smooth workflow in the cutting section.

Exercise

Multiple-choice Question:

1. What is a key characteristic of the Indian apparel industry?
   a. It has a small workforce
   b. It is a major contributor to exports
   c. It does not require skilled labour
   d. It is declining in market value

2. Which of the following is a key factor driving the growth of the Indian apparel industry?
   a. Decreasing demand for clothing
   b. Lack of government support
   c. Technological advancements
   d. Limited workforce availability

3. What is the first step in the apparel production process?
   a. Stitching
   b. Fabric selection
   c. Cutting
   d. Packaging

4. What is one of the primary duties of a cutting supervisor?
   a. Selling finished garments
   b. Designing new clothing styles
   c. Overseeing fabric cutting
   d. Operating sewing machines

5. Why is optimising fabric usage important in apparel production?
   a. To increase fabric waste
   b. To reduce production costs
   c. To slow down production
   d. To make cutting more difficult

Descriptive Questions:

1. Describe the key features of the Indian apparel industry.
2. List and explain the main factors contributing to the growth of the apparel industry in India.
3. Outline the sequence of steps involved in the apparel production process.
4. What are the key responsibilities of a cutting supervisor in the apparel industry?
5. How does a cutting supervisor ensure accuracy and efficiency in fabric cutting?

Notes

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

https://youtu.be/p-yQPrH91nM?si=ejxG-IN9xfhH2UW1

Indian textile industry

https://youtu.be/dSn7iz-bFN8?si=Rtd7D9RFYMoWM0mC

Introduction to Apparel Industry

https://youtu.be/VKa_20K0YQM?si=kqYYxJ8YipnguLPp

Indian Textile Sector

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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. Organize the Process of Cutting

Unit 2.1 - Fabric, Garment Types, and Accessories

Unit 2.2 - Cutting Tools, Operations, and Production Planning

AMH/N0610

Key Learning Outcomes

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

1. Demonstrate pattern making and the specifications mentioned on it.
2. Identify markers, its efficiency and notations on it.
3. Select the cutting table /spreader as per the style and quantity.
4. Demonstrate the functioning of AutoCAD machine/other cutting equipment.
5. Identify the types of garments, made ups and home furnishing articles and their construction.
6. Identify operation and handling of cutting tools like electrical straight blade cutter, rotary cutter, side cutter etc.
7. Identify different types of woven (cotton, satin, silk, etc.), knit (Lycra, interlock, etc.), and upholstery (jacquard, polyester, blends, etc.) fabrics and their basic structure, construction and trade names.
8. Identify the various types of trims and accessories.
9. Analyse the production plan for cutting as per style /product category/class.
10. Check the quantity of the fabric as per the requirement.

UNIT 2.1: Fabric, Garment Types, and Accessories

Unit Objectives

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

1. Identify different types of garments, made-ups, and home furnishing articles along with their construction.
2. Identify various types of woven (cotton, satin, silk, etc.), knit (Lycra, interlock, etc.), and upholstery fabrics (jacquard, polyester, blends, etc.), including their structure, construction, and trade names.
3. Identify the various types of trims and accessories used in garment manufacturing.

2.1.1 Types of Garments, Made-Ups, and Home Furnishing

The textile universe is far removed from simple cloth and sewing. Apparel, made-ups, and home furnishing items are constantly changing, embracing tradition combined with state-of-the-art innovation. From self-grooming cloths to 3D-knitted fashion, the product construction of textiles is no longer merely about seam and stitches—about being able to adapt, function, and be sustainable.

This new way of thinking looks at how clothing is revolutionizing everyday life, going beyond traditional categories. It might be a space suit designed for zero-gravity conditions, a weighted blanket with intelligent sensors, or adaptive upholstery that changes with the seasons. Clothing today is interactive, high-tech, and highly individualized.

Fig. 2.1.1: A woman using a sewing machine to make garments

Let's look at how these terms—clothing, made-ups, and home furnishings—are being redefined through technology and artisanal skills.

1. **Garments and Their Construction:** Clothing are classified according to their function, form, and material. They are constructed differently according to the design, usability, and fabric involved.

Category	Examples	Construction Features
 **Men's Wear**	Comprises shirts, trousers, suits, jackets, and sports wear	Construction entails pattern making, fabric cutting, sewing, and finishing.

Category	Examples	Construction Features
 **Women's Wear**	Comprises dresses, skirts, blouses, and sarees.	Clothing construction usually includes pleats, darts, zippers, and ornamentation.
 **Children's Wear**	Comfort and ease of movement, such as rompers, T-shirts, shorts, and frocks.	The clothing features soft seams, long-lasting stitching, and elastic fit.
 **Ethnic Wear**	Kurtas, lehengas, and salwar suits are typical traditional clothing with embroidery, hand-stitched designs, and multi-layered construction.	Made with cotton, linen, or silk. Machine-sewn or hand-stitched. Structured with interlinings, heavy fabrics, and detailed embroidery.
 **Formal & Casual Wear**	Tailored suits, blazers, and smart casuals.	Blazers: Structured with interfacing. Casuals: Lightweight, with basic seams and edge finishes.
 **Innerwear & Lingerie**	Incorporates shapewear, bras, briefs, and thermals.	Multi-panelled with underwire or padded construction. Made of Cotton, spandex, modal, polyamide

Category	Examples	Construction Features
 **Sportswear & Active Wear**	Includes compression clothing with an aim toward flexibility and aeration, utilising elasticized, water-purging textiles.	Leggings: Overlock stitching for flexibility. Sportswear: Use of stretch fabrics with moisture-wicking finishes.

Table 2.1.1: Garments construction

2. **Made-Ups and How They Are Constructed:** Made-ups are products manufactured from textile which is not garments but fabricated by textile for designated purposes.

Category	Examples	Construction Features
 **Bed Linens**	Cotton, polyester, or blended fabrics used for sheets, pillowcases, duvet covers with firm, seamless stitching.	Involves hemming and overlocking to prevent fraying and quilting involves layered stitching.
 **Table Linens**	Tablecloths, runners, napkins with decorative stitches, lace trims, and long-lasting seams.	Involves straight seams with folded hems and often decorated with embroidery or lace
 **Curtains & Drapes**	Constructed from light to heavy fabrics such as cotton, silk, and blackout, with pleats, grommets, or hooks for mounting.	Involves header tape or eyelet construction and use of pleats, gathers, or rod pockets

Category	Examples	Construction Features
 **Towels & Bathrobes**	Hand towel, bath towels.	Created for absorbency by using terry cloth and looped pile construction.
 **Cushions & Sofa Covers**	Tend to employ quilting or piped edges for their durability and looks.	Involves zipper or flap closures with overlocked edges for durability.
 **Kitchen Textiles**	Aprons, oven mitts, kitchen towels	Involves double-stitched seams and heat-resistant padding (for mitts).

Table 2.1.2: Made-ups construction

3. **Home Furnishing Articles and Their Construction:** Home furnishings improve interiors and promote comfort. Construction differs according to the intended function and look.

Category	Examples	Construction Features
 **Upholstery Fabrics**	Applied in sofas, chairs, and pillows.	Involves heavy-duty seams, double seams, and reinforced edges.

Category	Examples	Construction Features
 **Carpet & Rugs**	Area rugs, floor mats.	Woven, tufted, or knotted constructions with backing to make them sturdy.
 **Blankets & Quilts**	Decorative throws, woollen blankets.	Often contain padded sections with quilting methods to retain the filling within.
 **Decorative Wall Hangings**	Tapestries, textile art pieces	Composed of embroidered or printed materials with embellishing designs and finish work.
 **Mattress Covers & Protectors**	Decorative and functional pieces	Built with water-repellent materials, elastic finishes, and durable seams.

Table 2.1.3: Home furnishing articles construction

2.1.2 Types of Woven, Knit, Upholstery Fabrics

Fabric is the foundation of the textile and apparel industry, serving as the canvas upon which fashion, function, and design come to life. From everyday clothing to luxurious upholstery, the choice of fabric plays a crucial role in determining the aesthetics, durability, and comfort of the final product. With advancements in textile technology, fabrics are no longer simply classified by their natural or synthetic origins—they are defined by their construction methods, weaving or knitting techniques, and specialised applications.

Woven, knit, and upholstery fabrics represent three distinct categories, each offering unique properties and performance characteristics. Woven fabrics, known for their structured and durable nature, are a staple in apparel, home décor, and industrial applications. In contrast, knit fabrics, recognised for their flexibility and stretch, are favoured in activewear and casual fashion. Meanwhile, upholstery fabrics, designed for resilience and style, play a significant role in interior décor, offering both functionality and visual appeal.

As the demand for customised and performance-driven textiles grows, understanding the distinct features, advantages, and uses of these fabric types is essential for designers, manufacturers, and consumers alike.

- **Woven Fabrics:** Woven fabric is produced through interlacing two groups of yarns (warp and weft) at right angles with the use of a loom.

Fabric type	Structure & Construction	Trade names/ Common uses
 **Cotton**	Plain, twill, or satin weave; breathable, strong, and absorbent	Poplin, Muslin, Voile, Denim, Chino, Canvas
 **Satin**	Weave with long floats for a smooth, glossy surface	Duchess Satin, Charmeuse, Peau de Soie

Fabric type	Structure & Construction	Trade names/ Common uses
 **Silk**	Natural protein fiber; can be plain, twill, or satin weave	Habotai, Crepe de Chine, Taffeta
 **Denim**	Twill weave, typically cotton, durable and rugged	Selvage Denim, Stretch Denim
 **Twill**	Distinct diagonal rib pattern, strong and drapes well	Gabardine, Herringbone, Drill
 **Jacquard**	Intricately woven pattern using a special loom	Brocade, Damask

Fabric type	Structure & Construction	Trade names/ Common uses
 **Chiffon**	Lightweight, sheer fabric with a plain weave	Silk Chiffon, Polyester Chiffon
 **Organza**	Crisp, sheer fabric with a plain weave	Silk Organza, Synthetic Organza

Table 2.1.4: Structure of woven fabrics

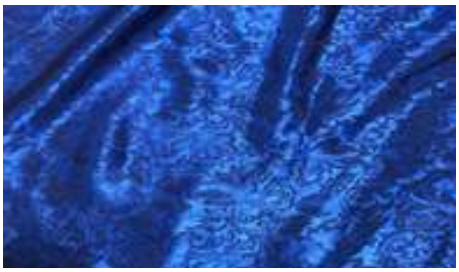
- **Knit Fabrics:** Fabric made from looping yarns in order to permit flexibility and elongation is known as knit fabric.

Fabric type	Structure & Construction	Trade names/ Common uses
 **Lycra (Spandex)**	Stretchy, synthetic fiber, often blended with other fabrics	Lycra (Spandex)
 **Interlock**	Double-knit structure, smooth on both sides, stable	Interlock

Fabric type	Structure & Construction	Trade names/ Common uses
 **Jersey**	Single-knit fabric, lightweight, stretchy	Cotton Jersey, Rayon Jersey
 **Rib Knit**	Alternating knit and purl stitches, stretchy with good recovery	Ribbing, Cuff Fabric
 **Ponte Knit**	Double-knit, stable, thick	Ponte di Roma
 **Fleece**	Soft, brushed surface, warm	Polar Fleece, Microfleece

Table 2.1.5: Structure of knit fabrics

- **Upholstery Fabrics:** These materials are strong and usually treated against stains and endurance.

Fabric type	Structure & Construction	Trade names/ Common uses
 **Jacquard**	Intricate woven designs with textured patterns	Damask, Brocade
 **Polyester**	Synthetic, wrinkle-resistant, and strong	Microfiber,Velvet
 **Blends (Cotton/Poly, Wool/Nylon, etc.)**	Combines properties of different fibres for strength and comfort	Chenille, Tweed
 **Velvet**	Cut-pile fabric with a plush surface	Crushed Velvet, Mohair Velvet

Fabric type	Structure & Construction	Trade names/ Common uses
 **Tapestry**	Heavy, decorative woven fabric	Needlepoint, Kilim
 **Leather & Faux leather**	Natural or synthetic material, durable and stylish	Bonded Leather, PU Leather

Table 2.1.6: Structure of upholstery fabrics

2.1.3 Types of Trims & Accessories Used in Garment Manufacturing

Trims and accessories play a critical role in garment construction as they offer functionality, durability, and appearance. There are main three trims functional trims, decorative trims, and supportive accessories.

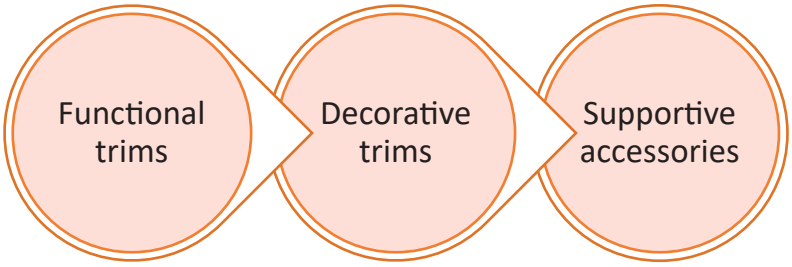


Fig. 2.1.2: Types of trims & accessories

1. **Functional Trims:** These trims play a structural or functional role in garments. Some of the most frequently used ones are:

 **Zippers**	Metal, plastic, and coil types, zippers offer secure fastening for tops like jackets, bottoms like jeans, and dresses.
 **Buttons**	Fabricated from shell, wood, plastic, or metal, buttons exist in shape and size difference and are largely applied to blazers, coats, and shirts.
 **Snaps & Press Studs**	Metallic or plastic components which snap fast together and mostly apply to infants' clothing as well as to jackets.
 **Hooks & Eyes**	Miniature-sized metal fastenings used on waistbands, some dresses, and bras in order to maintain firm closures.
 **Velcro (Hook & Loop)**	Two-component fastener system consisting of hook and loop components, predominantly employed in sportswear and childrenswear.

Table 2.1.7: Functional trims

2. **Decorative Trims:** These are utilized for aesthetic decoration and beauty:

 **Laces & Ribbons**	Cotton, silk, or man-made fibre composition, making these more visually beautiful for enhancing clothing beauty, primarily in evening and bridal wear.
 **Piping & Cording**	These decorations impart definition to edges and seams and are employed mainly in upholstery, formal garments, and accessories.
 **Embroidery & Appliqué**	Ornaments of decorative stitch work and overlays of fabrics applied to adorn customary and high-fashion clothing.
 **Sequins, Beads & Studs**	Glittering or textured material attached to fabrics to produce elaborate designs, widely used in couture and celebratory wear.

Table 2.1.8: Decorative trims

3. **Supporting Accessories:** These elements serve to improve durability and comfort of clothing:

 **Elastic Tapes & Bands**	Applied to waistbands, cuffs, and undershirts to supply stretch and elasticity.
 **Interlinings & Fusings**	Give shape and stability to collars, cuffs, and tailored garments.
 **Shoulder Pads & Foam Cups**	Applied in formal and structured garments for added shape and support.
 **Labels & Tags**	Brand labels, size tags, care labels, and price tags that are necessary for product identification and compliance.

Table 2.1.9: Supporting accessories

UNIT 2.2: Cutting Tools, Operations, and Production Planning

Unit Objectives

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

1. Identify the operation and handling of cutting tools such as electrical straight blade cutters, rotary cutters, and side cutters.
2. Analyse the production plan for cutting based on style, product category, and class.
3. Discuss and verify fabric quantity as per production requirements.

2.2.1 Operation and Handling of Cutting Tools

When handling cutting tools like electrical straight blade cutters, rotary cutters, and side cutters, it is vital to know their operation, how to handle them, and their safety precautions. Below is the division of each tool:

1. Electrical Straight Blade Cutters

Fig. 2.2.1: Electrical straight blade cutters

Operation:

- They are motor-driven cutting tools utilized for producing accurate straight cuts on materials such as fabric, plastic, and thin metals.
- The motor powers a sharp straight blade that advances in a cutting action.
- Some models come with adjustable pressure and speed settings for various materials.

Handling & Safety:

- Use a sharp blade and correctly install it prior to using the cutter.
- Use both hands to hold the cutter tightly for balance.
- Do not keep fingers close to the cutting path.
- Wear safety goggles and gloves at all times.
- Disconnect the tool or take out the battery before maintenance.

2. **Rotary Cutters**

Operation:

- These devices operate with a round blade that spins to cut objects such as fabric, leather, or paper.
- They facilitate smooth and accurate cutting on curved and straight edges.
- A few rotary cutters feature safety locks against unintentional cuts.

Fig. 2.2.2: Rotary cutters

Handling & Safety:

- Cut on a self-healing cutting mat underneath to shield surfaces and prolong blade life.
- Maintain firm, even pressure while cutting.
- Avoid placing fingers close to the blade and utilize a ruler for edge guides.
- Store with the blade guard locked in the off position.

3. **Side Cutters (Diagonal Cutting Pliers)**

Operation:

- Side cutters are hand tools utilized for cutting wire, zip ties, and tiny metal parts.
- They consist of sharp, angled jaws that deliver accurate cutting action.
- Commonly utilized in electrical work, jewellery making, and small metal cutting operations.

Fig. 2.2.3: Side cutters

Handling & Safety:

- Hold the handles firmly for control.
- Cut materials at a slight angle for increased precision.
- Avoid using side cutters on hardened steel or thick cables unless instructed.
- Wear safety glasses to prevent flying debris.

2.2.2 Production Plan for Cutting

The cutting plan for garment production is based on some factors, which are style, product category, and class. All of these factors are important in deciding how fabric is laid, marked, and cut in order to be efficient, cost-effective, and of high quality.

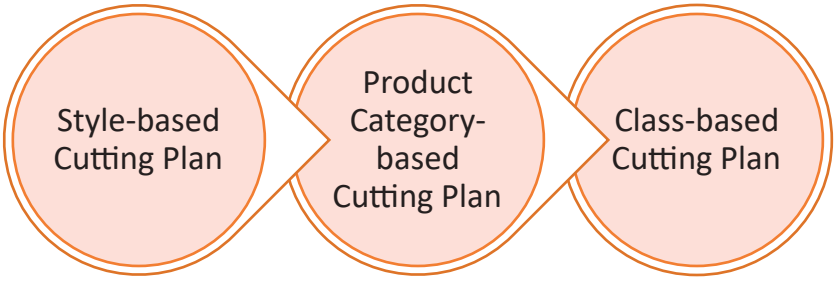


Fig. 2.2.4: Cutting plan for garment production

1. **Style-Based Cutting Plan:** The intricateness of the style of a garment influences the cutting process. An easy style, like plain T-shirts or shift dresses, has fewer pattern pieces and can be cut effectively through mechanized machines. Such styles tend to provide good fabric utilization with fewer pattern alignment restrictions.

   Conversely, intricate styles such as fitted jackets, suits, or formal evening gowns call for more refined cutting methods. Such garments possess multiple panels, darts, pleats, and linings, necessitating accurate pattern fit and manual interference. For all these types, cutting markers must be well-researched and planned to follow prints, texture, and grainlines to accommodate correct garment construction and high standard finish.

 **Complex Styles (e.g., evening gowns, jackets)**	Require precise pattern alignment due to complex design elements.
	Use single-layer cutting or automated cutting machines to maintain accuracy.
	Special attention is given to matching prints, grainlines, and seam placements.
	Involves higher cutting wastage due to irregular shapes or patterns.
	Example: In premium brands, delicate dresses with asymmetric hemlines need slow, meticulous cutting.

 **Simple Styles (e.g., T-shirts, casual shirts)**	Allow for multi-layer fabric cutting to increase efficiency.
	Use bulk cutting machines for consistent shapes and faster output.
	Lower wastage due to uniformity in pattern shapes.
	Example: In mass production, basic tees are cut in stacks of 50-100 layers to reduce processing time.

Table 2.2.1: Style-based cutting analysis

2. **Product Category-Based Cutting Plan:** Various product lines determine various types of fabric, spreading of layers, and cutting procedures. For example, light clothing like intimate apparel or sportswear demands precise treatment of elastic fabrics, frequently demanding high-tech cutting machines to keep the process precise and avoid distortion.

   Conversely, workwear, outerwear, or denim requires heavy fabrics that need high-capacity straight-blade or band-knife cutting machines. Cutting will have to include allowance for shrinkage, and reinforcements for seams must position properly.

 **Apparel (e.g., formal wear, casual wear)**	Requires accurate pattern cutting to maintain consistent fit.
	Uses band knife or straight knife cutting for bulk production.
	Involves marker planning to optimise fabric usage and reduce waste.
	Example: Formal suits require meticulous cutting with precise seam allowances for tailored fitting.
 **Activewear and Sportswear**	Needs stretch-appropriate cutting techniques due to elastic fabrics.
	Incorporates laser cutting for precision and clean edges.
	Prioritises minimal distortion during cutting to preserve fit and performance.
	Example: Yoga leggings use precision cutting to align with stretch properties.

 **Luxury or Couture Garments**	Involves single-ply cutting for high precision.
	Requires hand cutting or laser techniques for intricate detailing.
	Ensures pattern alignment for visual consistency.
	Example: Designer gowns by labels like Rahul Mishra involve intricate hand-cut appliqués

Table 2.2.2: Product category-based cutting analysis

3. **Class-Based Cutting Plan:** Garment categorization according to production quantity and quality requirements greatly influences the cutting process. In large-scale production, bulk cutting methods like computer cutting or laser cutting optimize efficiency, minimize material wastage, and provide consistency in thousands of pieces.

   For high-end or luxury clothing, the cutting may be semi-automatic or fully manual to ensure exact detailing. For such applications, single-layer cutting is typical in order to achieve high accuracy, especially for upscale materials such as silk or wool, where pattern matching and low fabric tension are essential.

 **Mass Production (Economy Class)**	Uses bulk cutting techniques (layered cutting) for efficiency.
	Prioritises speed over precision.
	Minimal manual intervention.
	Example: Fast fashion brands like Zara and H&M use multi-layer cutting machines for quick turnover.
 **Mid-Tier Production (Standard Class)**	Combines precision and efficiency with moderate fabric wastage.
	Uses automated cutting machines for consistency.
	Applies marker efficiency techniques to optimise fabric consumption.
	Example: Brands like Van Heusen and Arrow use semi-automated cutting methods.

 **Luxury and Designer Production (Premium Class)**	Prioritises precision and detailing over speed.
	Uses single-layer cutting for high-end fabrics.
	Incorporates manual inspection and hand-cutting for intricate designs.
	Example: Sabyasachi and Shantanu & Nikhil use meticulous hand-cutting for their couture pieces.

Table 2.2.3: Class-based cutting analysis

Key Factors in Production Plan Analysis

1. **Fabric Characteristics:**
   - Stretch, shrinkage, and weight of fabric influence the cutting method.
   - Delicate fabrics require lower tension cutting techniques.
2. **Marker Planning:**
   - Ensures optimal fabric utilisation with minimal wastage.
   - Requires precision in marker placement for efficiency.
3. **Cutting Equipment:**
   - Straight knife cutting for large volumes.
   - Band knife cutting for curves and intricate shapes.
   - Laser cutting for precision in high-end garments.
4. **Efficiency and Accuracy:**
   - Automated systems increase productivity for bulk production.
   - Manual cutting ensures precision for luxury garments.

2.2.3 Verifying Fabric Quantity as Per Production Requirements

In the apparel manufacturing industry, precision and efficiency are key to ensuring smooth production processes and maintaining profitability. One of the most critical aspects of garment production is accurately determining and verifying fabric quantity. Fabric accounts for nearly 60-70% of the total production cost (Source: Textile Today), making it the most significant raw material investment. Therefore, even minor discrepancies in fabric estimation can lead to substantial financial losses, material wastage, or production delays.

To optimise production, manufacturers must carefully calculate the fabric yield, wastage margins, and buffer quantities based on garment specifications, design patterns, and production volume. This requires collaboration between the production, procurement, and quality control teams to ensure that the right quantity of fabric is ordered, inspected, and allocated. Moreover, verifying the fabric against production requirements helps detect defects, shrinkage variations, or mismatched dye lots early, preventing costly errors later in the process.

Effective fabric quantity management is not only essential for cost control and resource efficiency but also plays a vital role in meeting delivery timelines and maintaining product quality. By incorporating precise calculation methods, accurate record-keeping, and regular verification processes, apparel manufacturers can enhance operational efficiency and reduce material waste.

1. **Learn the Production Specifications**
   - **Product Type:** Identify the kind of garments or products being made (e.g., shirt, trousers, jacket).
   - **Design and Size Breakdown:** Learn the size range (small, medium, large, etc.) and any design details such as pleats, folds, or prints that influence fabric usage.
   - **Pattern Layout:** The amount of fabric used can vary based on how the pattern pieces are laid out on the fabric. For instance, one may use the fabric to the best extent, whereas another may end up using more fabric wastefully.

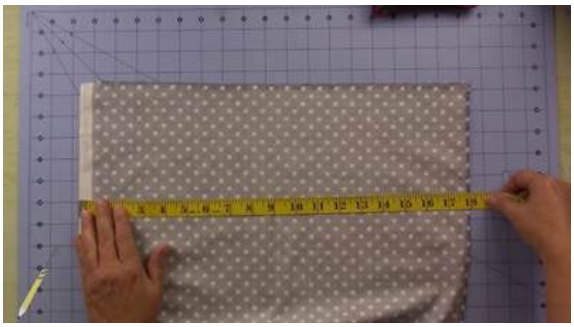


Fig. 2.2.5: Pattern layout process

2. **Fabric Width**
   - Fabric is available in various widths (typically 36", 44", 58", 60", or 72").
   - The fabric width determines how much of the pattern can be spread out on it.
   - Check the fabric width complies with the pattern requirements.
3. **Fabric Consumption Calculation**

   Fabric consumption is typically calculated based on the area of fabric needed for one unit of the product. The basic formula for fabric consumption is:

   Fabric Consumption (m): Area of one piece (m^2)×No.of pieces divide by Width of fabric (m)

   For example, if you're making shirts, calculate the fabric required for one shirt and then multiply by the number of shirts required.
4. **Account for Fabric Wastage**
   - Wastage may happen as a result of cutting inefficiencies, flaws, or misalignment of pattern pieces. A standard convention in the industry is to provide for around 10-15% wastage.
   - For instance, where the overall fabric requirement is 100 meters, you can allow for 10 to 15 extra meters for wastage.
5. **Fabric Type**
   - Fabric Type (linen, cotton, polyester, etc.) impacts the amount of fabric needed due to varying drape characteristics and thickness of fabrics.
   - Light fabric can take up more meters in order to create the same level of coverage compared to heavier ones.
6. **Confirmation of the Order**
   - Check your calculations again and confirm the amount of fabric needed based on the production time and yield expectation per meter of fabric.
   - Include the potential of overproduction or faults and affirm the delivery date of the fabric supplier.

Example Calculation:

Let's assume the following for a basic shirt production:

- **Pattern size for one shirt:** 1.5 meters
- **Production order:** 500 shirts
- **Fabric Width:** 1.5 meters
- **Wastage:** 10%

Step-by-Step Calculation:

- **Basic fabric consumption:** Fabric for 500 shirts=1.5 m/shirt×500 =750 m
- **Include wastage:** Total fabric with wastage=750 m×1.10=825 m
    - So, for 500 shirts, you would need approximately 825 meters of fabric, considering wastage.

Final Confirmation and Communication with Suppliers: After confirming the amount of fabric, relay the final order to the fabric provider. Confirm the delivery times and ensure they adhere to production timelines.

Summary

- Participants will learn to identify various garment types, made-ups, and home furnishing articles, including their construction.
- They will understand different woven, knit, and upholstery fabrics, their structures, construction, and trade names.
- Various trims and accessories used in garment manufacturing will be covered in detail.
- Participants will learn the operation and handling of cutting tools such as electrical straight blade cutters, rotary cutters, and side cutters.
- They will be able to analyse production plans for cutting based on style, product category, and class.
- The module also includes verifying fabric quantity as per production requirements.

Exercise

Multiple-choice Question:

1. Which of the following is a woven fabric?
   a. Lycra
   b. Satin
   c. Interlock
   d. Jacquard

2. What is a rotary cutter primarily used for in garment manufacturing?
   a. Stitching
   b. Cutting fabric
   c. Ironing
   d. Weaving

3. Which of the following is an example of an upholstery fabric?
   a. Polyester
   b. Cotton
   c. Lycra
   d. Silk

4. What is the purpose of trims and accessories in garment manufacturing?
   a. To enhance aesthetics and functionality
   b. To replace fabrics
   c. To reduce fabric usage
   d. To increase fabric thickness

5. Why is it important to verify fabric quantity before production?
   a. To reduce cutting time
   b. To ensure there is enough fabric for production
   c. To increase product variety
   d. To eliminate fabric defects

Descriptive Questions:

1. Explain the difference between woven and knit fabrics with examples.
2. Describe the role of trims and accessories in garment manufacturing.
3. What are the different types of cutting tools used in garment production, and how are they operated?
4. How does the production plan influence the cutting process in garment manufacturing?
5. Why is fabric quantity verification crucial in the production process?

Notes

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

https://youtu.be/CW7pNhOJXFg?si=mD2LdYNmTkoH8dKG

Different Types of Garments

https://youtu.be/_p5UjCLK0R0?si=CkHwg6cnGgMyPN9L

Types Of Knit Fabric

https://youtu.be/DdtfyENJ6dY?si=qoPQbG1r4X6torNh

Modern Cutting Tools

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RE>IMAGINE FUTURE

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2. Prepare for the Processes of Cutting

Unit 3.1 - Fabric Identification, Layering, and Spreading Techniques

Unit 3.2 - Pattern Marking, Cutting, and Quality Checks

AMH/N0611

Key Learning Outcomes

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

1. Demonstrate the types of fabric layering techniques like face over face, face over back, etc.
2. Demonstrate the mechanism to work on pattern/ marker.
3. Demonstrate lying of the fabric considering the type of texture, weave, and print.
4. Demonstrate the laying of pattern/ marker on the fabric. Identify different types of fabric faults like stains, sub, etc.
5. Identify the fabric for the types of prints, weaves, grain line and textures,
6. Identify the precautions required for cutting of specialty fabric design/motif like check designs, plaids, prints etc.
7. Check the fabric for various fabric faults. Select the best mechanism out of different mechanisms of spreading like manual spreading, mechanical spreader, etc.
8. Select the appropriate tools and equipment required for cutting.
9. Check the marker for details like grain line, notches, part name, clarity of markings, complete for all components etc.

UNIT 3.1: Fabric Identification, Layering, and Spreading Techniques

Unit Objectives

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

1. Understand fabric layering techniques such as face-over-face and face-over-back.
2. Identify different types of fabric faults like stains and slubs, and inspect fabric for faults before cutting.
3. Identify fabric types based on prints, weaves, grain lines, and textures.
4. Understand the proper lying of fabric considering texture, weave, and print alignment.
5. Analyse and apply the best spreading mechanism, such as manual spreading or mechanical spreaders.

3.1.1 Fabric Layering Techniques

Fabric Layering is a critical operation in the cutting process that provides accuracy, minimizes fabric wastage, and maximizes production efficiency. The most widely used fabric layering techniques in the garment industry are Face-over-Face (FOF) and Face-over-Back (FOB).

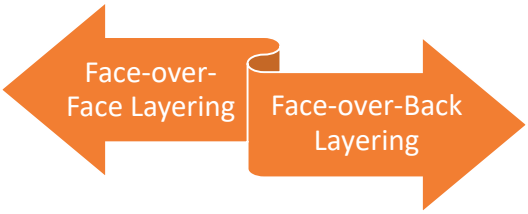

Fig. 3.1.1: Face-over-Face (FOF) and Face-over-Back (FOB)

Face-over-Face (FOF) Layering

Face-over-Back or FOB is a layering method where two fabric layers face each other and are stacked alternatively. It works best when one has to cut symmetrical parts of the garment, making the left and right pieces mirror their counterparts perfectly.

- Effective for non-directional prints as well as for symmetrical design.
- Cuts down on colour shading faults.
- Discourages the fabric from shifting while it is being cut.

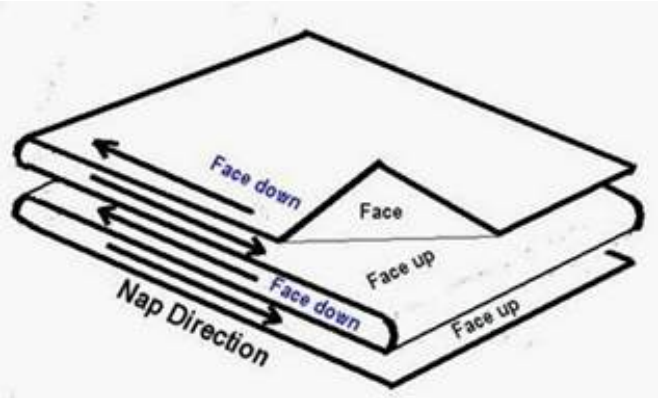

Fig. 3.1.2: Face-over-Back or FOB layering

Face-over-Back (FOB) Layering

In this technique, all layers of fabric are arranged with the right side up in the same direction. It is employed primarily for fabrics that have directional print, nap, or pile, including velvet, corduroy, and brushed fabrics.

- Ensures uniformity of print and nap direction.
- Suitable for cutting fabrics that have a strong texture and need to be cut in a certain direction.
- Minimizes differences when constructing garment pieces.

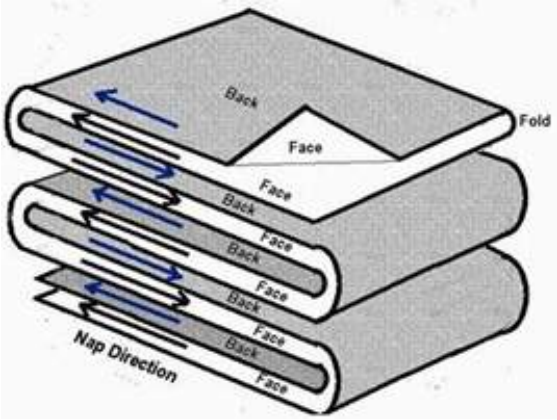

Fig. 3.1.3: Face-over-Back (FOB) layering

A number of factors impact the selection of fabric layering methods, such as the fabric type, cutting technique applied, and production quantity. Loosely woven or stretchy fabrics demand delicate handling to avoid distortion, whereas laser or die cutting might necessitate varying layering techniques from other cutting techniques. Multi-layer stacking is popular in mass production, whereas single-layer cutting is ideal for bespoke or low-production runs.

3.1.2 Checking Fabric Faults Prior to Cutting

Inspecting the fabric prior to cutting is very important, since invisible defects could lead to material losses, rejections of garments, and time delay in production. Various faults on the fabric are to be located and systematically inspected by supervisors during cutting pre-planning.

Fig. 3.1.4: Checking fabric faults

Regular Fabric Faults and the Reason behind:

- **Stains:** Dye marks, oil marks, or ink marks occurring due to poor dyeing methods or improper handling.
- **Slubs:** Irregular thick spots of yarn due to uneven spinning of yarn.
- **Holes/Tears:** Small tears or weak areas in fabric resulting from production flaws or storage errors.
- **Shading Variations:** Irregular colour shades in fabric as a result of unevenness in the dyeing process.
- **Knots in Yarn:** Tiny knots in fabric resulting from yarn breakage during weaving, resulting in uneven texture.

Fabric Inspection Methods:

- **Visual Inspection:** The fabric is unrolled under lighting to identify any visible defects like stains, holes, or shading irregularities.
- **Touch and Feel Test:** Rubbing hands against the fabric to identify slubs, knots, and texture inconsistencies.
- **Backlit Inspection:** Having a light source behind the fabric to spot pinholes or thin areas.
- **Shading Comparison:** Stacking multiple rolls of different fabrics to inspect for colour discrepancies prior to spreading.

Inspection Best Practices

- Implement fabric checking tables or inspection machines for precise results.
- Identify defective areas with stickers or chalk to prevent cutting defective parts.
- Implement the 4-point or 10-point inspection system for uniform quality checks.

3.1.3 Determining Fabric Types Based on Prints, Weaves, Grain Lines, and Textures

Fabric types are important to identify for accurate cutting because different materials behave uniquely when spreading and cutting. Supervisors of cutting need to identify fabrics carefully depending on their prints, weaves, grain lines, and textures in order to avoid making mistakes while cutting.

Determining Fabric Based on Prints

The pattern and design printed on the cloth play a great role in determining the manner in which it must be cut. Inconsistency in prints creates irregularity in the end-product garment.

1. **Directional Prints:** There are certain prints on fabrics that must be placed in a specific direction, for instance, florals, geometric patterns, or animal prints. Without proper placement, the pattern will be upside down or misaligned on the garment.

Fig. 3.1.5: Directional prints on fabric

2. **Non-Directional Prints:** Such fabrics carry random designs, e.g., polka dots or abstract prints, which do not need to be aligned in any particular direction. These are simpler to cut and spread.

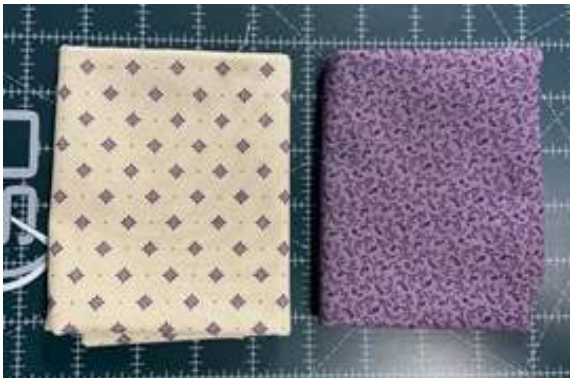

Fig. 3.1.5: Non-directional prints on fabric

3. **Plaids and Checks:** Such patterns need very high accuracy while cutting so that there is continuity at seams. Misalignment of plaid or check fabric can result in an unclean and unprofessional appearance in the final garment.

Fig. 3.1.6: Plaids and checks prints on fabric

Determining Fabric by Weave Types

The strength, stretchiness, and drape of the fabric depend on the weaving process employed to build the fabric.

1. **Plain Weave:** This is the most basic weave, with warp and weft yarns crossing one over the other in a one-over, one-under sequence. Often used in cotton and poplin, it gives durability but not stretch.

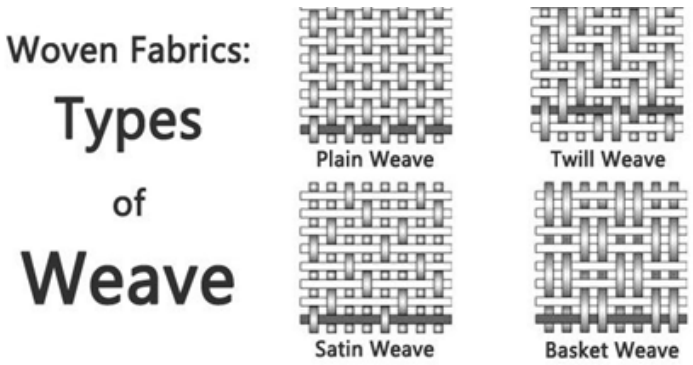

Fig. 3.1.7: Types of weaves

2. **Twill Weave:** This weave produces a diagonal ribbed effect, which is found in denim and gabardine. Twill-weave fabrics need to be handled with care when cutting so that the diagonal lines are consistent.
3. **Satin Weave:** This weave produces a smooth, shiny surface because of the manner in which threads float over several warp or weft threads. Satin fabrics are slippery and fragile and need special care when spreading and cutting.
4. Basket weave is a variation of the plain weave, where two or more warp and weft threads are grouped together before interlacing. This results in a fabric with a looser weave, a more textured appearance, and enhanced flexibility compared to a standard plain weave.

Understand Grain Lines

Grain lines guide cutting fabrics the right way so they fit correctly and are of correct structure.

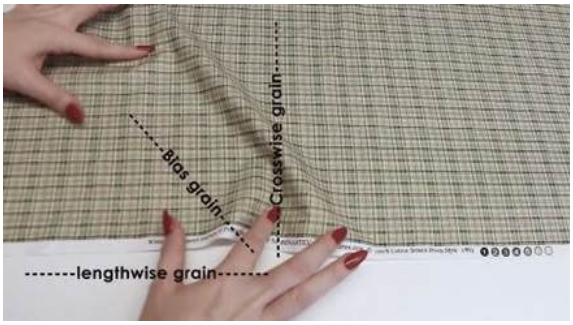

Fig. 3.1.8: Grain lines guide

1. **Warp (Lengthwise Grain):** The grain will lie parallel to a piece's selvedge with least flexibility. The most parts are cut following the warp grain for utmost strength.
2. **Weft (Crosswise Grain):** This is perpendicular to the selvedge and slightly more elastic than the warp. Certain parts of garments like waistbands are cut on this grain for elasticity.
3. **Bias (Diagonal Grain):** This is 45 degrees from the warp and weft, providing maximum drape and stretch. Bias cutting is applied in flowing dresses and skirts.

Recognizing Fabric by Texture

Texture influences how a fabric must be managed while cutting and construction.

Fig. 3.1.9: Types of fabric textures

1. **Smooth Textures:** Satin and silk have a smooth surface and need firm holding while cutting to avoid slippage.
2. **Rough or Textured Surfaces:** Wool, tweed, and corduroy have surface textures and need alignment to appear the same.
3. **Sheer and Delicate Fabrics:** Chiffon and organza require extra support, like placing them over paper, to avoid distortion during cutting.

3.1.4 Proper Lying of Fabric Based on Texture, Weave, and Print Alignment

Fabric spreading, or fabric laying, is the act of preparing fabric layers on the cutting table prior to cutting. Correct laying guarantees that fabric is tension free, unwrapped, and accurately placed.

Influencing Factors in Fabric Lying:

Texture

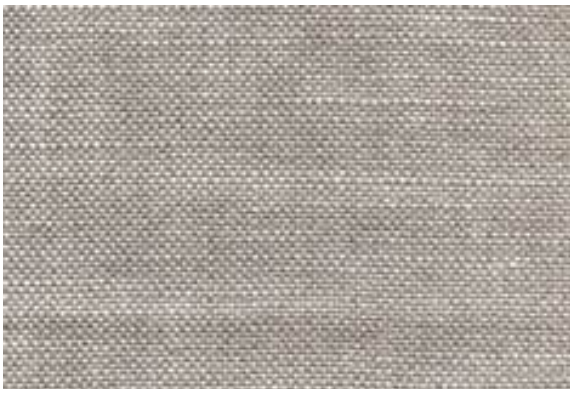

Fig. 3.1.10: Texture fabric

- Napped fabrics like velvet and suede need to be spread in the same direction to have a uniform appearance.
- Stretch fabrics must be spread with controlled tension to avoid misalignment and size irregularities.

Weave

Fig. 3.1.11: Weave fabric

- Loose-weave materials such as chiffon and organza need to be handled gently to prevent shifting.
- Twill-weave materials need to be inspected for uniform diagonal weaves, since misalignment will ruin the design of the fabric.

Print Alignment

Fig. 3.1.12: Maintaining print alignment of fabric

- Stripes, plaids, and checks need to be aligned very accurately to provide a seamless match at garment seams.
- Directional prints need to be placed with care to ensure visual continuity across the garment.

Fabric Tension

Fig. 3.1.13: Tension on fabric

- Too much tension will stretch fabric measurements, resulting in inaccurate cuts.
- Asymmetrical spreading can cause uneven shrinking during garment construction.

Fabric Lying Best Practices:

- Spread each layer of fabric flat, taking care not to wrinkle a layer before the next is laid down.
- Make use of an air-suction spreading table in order to keep lightweight fabrics level.
- Ensure correct grain line alignment to prevent twist in the completed garment.
- Give the fabric some time to relax for a couple of hours, particularly for knit or stretch fabric.
- Secure edges with clamps or weights to avoid movement during cutting.

Fig. 3.1.14: Secure edges with clamps or weights during cutting

3.1.5 Spreading Mechanism Techniques

Fabric spreading is an important process in the cutting process that impacts efficiency, accuracy, and material usage. The selection of spreading method relies on fabric type, production level, and garment complexity.

Types of Fabric Spreading:

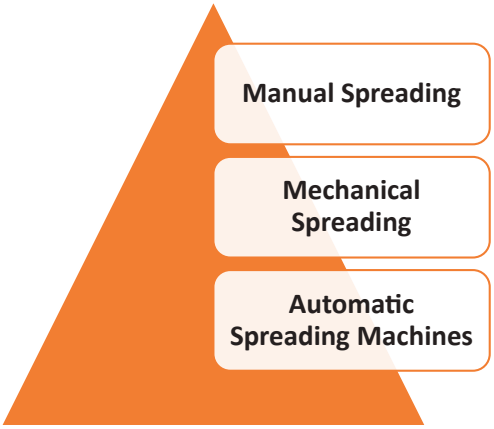

Fig. 3.1.15: Types of fabric spreading

Manual Spreading

Fig. 3.1.16: Manual spreading

- Applicable for small-scale production or fragile fabrics requiring delicate handling.
- Permits flexibility but may be slow and vulnerable to inconsistencies.

Mechanical Spreader

Fig. 3.1.17: Mechanical spreader

- Employed in the medium- to large-scale production where there is a need for speed and accuracy.
- Assists in maintaining even fabric tension and minimizing fabric wastage.

Automatic Spreading Machines

Fig. 3.1.18: Automatic spreading machines

- Ideal for mass production, providing precision and evenness.
- Saves on labour costs but demands greater initial investment.

Important Factors to Consider in Choosing a Spreading Mechanism

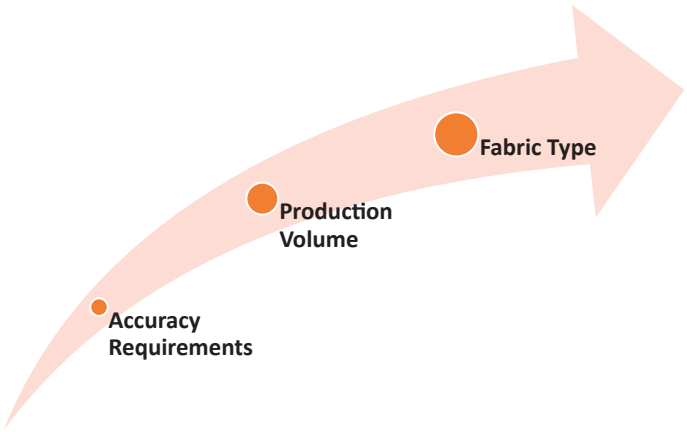

Fig. 3.1.19: Factors to consider in a spreading mechanism

- **Fabric Type:** Stretch fabrics call for spread control to avoid elongation, while fragile fabrics require gentle care.
- **Production Volume:** Large volume production takes advantage of automated spreading for cost-effectiveness, whereas custom clothing can be done with manual spreading.
- **Accuracy Requirements:** High precision cutting operations necessitate uniform spreading to prevent distortions.

Spread Methods for Various Fabrics

- **For Stretch Fabrics:** Employ machinery with tension control to avoid over-stretching.
- **For Sheer or Lightweight Fabrics:** Spread on paper backing to give stability.
- **For Plaids and Stripes:** Hand arrange each layer slowly to align patterns perfectly.

Problems in Fabric Spreading and Solutions

- **Fabric Wrinkling:** Refrain from pulling the fabric too tight and let it relax before cutting.
- **Edge Curling:** Apply weights or edge clamps to maintain the fabric flat.
- **Shading Variations:** Always inspect for shading variations between rolls of fabric prior to spreading.

UNIT 3.2: Pattern Marking, Cutting, and Quality Checks

Unit Objectives

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

1. Apply the mechanism for working with patterns and markers.
2. Discuss patterns and markers accurately on fabric for efficient cutting.
3. Identify precautions for cutting specialty fabric designs, including checks, plaids, and prints.
4. Identify appropriate cutting tools and equipment for different fabric types.
5. Analyse markers for essential details such as grain line, notches, part names, and clarity of markings.

3.2.1 Pattern and Marker Working Mechanism

Garment cutting accuracy is greatly influenced by the effectiveness of patterns and markers. Defects in placing or marking patterns result in faulty garments, wastage of fabric, and expensive manufacturing mistakes. Cutting supervisors need to know the pattern layout, marker positioning, and execution technique for ensuring precision in cutting processes.

Role of Patterns in Cutting

Patterns are guides for clothing parts to ensure every component is cut precisely to specifications. A properly prepared pattern includes such important information as:

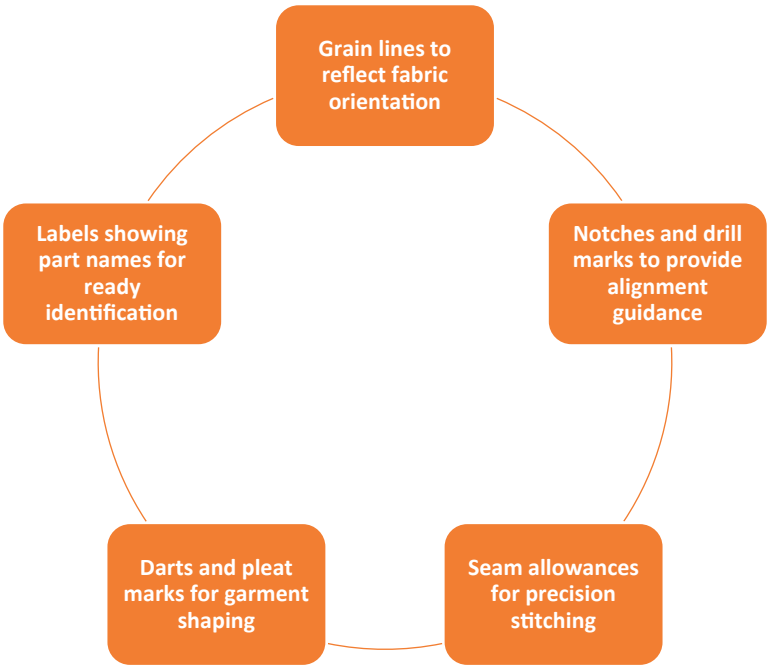

Fig. 3.2.1: Role of patterns in cutting

Mechanism for Marker Planning and Execution

1. **Marker Planning and Development**
   - Markers are patterns of pattern pieces placed systematically to minimize fabric wastage.
   - Hand-drawn markers were traditionally done, but computer-aided design programs are used now for accuracy and efficiency.
   - The prime goal is to utilize the maximum amount of fabric without compromising the integrity of the garment.

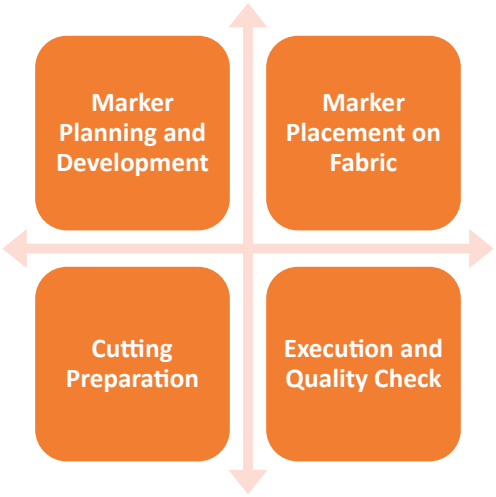

Fig. 3.2.2: Marker planning and development

2. **Marker Placement on Fabric**
   - The marker has to be placed on the spreading table carefully with the direction of the fabric grain.
   - Patterns should be aligned to prevent duplication, ensure symmetry, and match prints or textures properly.
3. **Cutting Preparation**
   - After the marker has been approved, the fabric is placed as per the spreading technique (face-up, face-down, face-to-face).
   - The cutting operator makes sure all markings on the pattern are properly transferred onto the fabric with chalk or digital pens.
4. **Execution and Quality Check**
   - Cutting is initiated using the required cutting tools for the fabric type.
   - The supervisor verifies that cut pieces are identical to the marker layout exactly before moving on to sewing.

3.2.2 Patterns and Markers on Fabric for Smooth Cutting

Patterns and markers are blueprints of cutting fabric to ensure that all the pieces of a garment are cut with accuracy and economy. Distortion, wrong positioning, or inadequate marking can lead to defects, causes of delays in production, and wastage of material.

Factors Affecting Marker Accuracy on Fabric

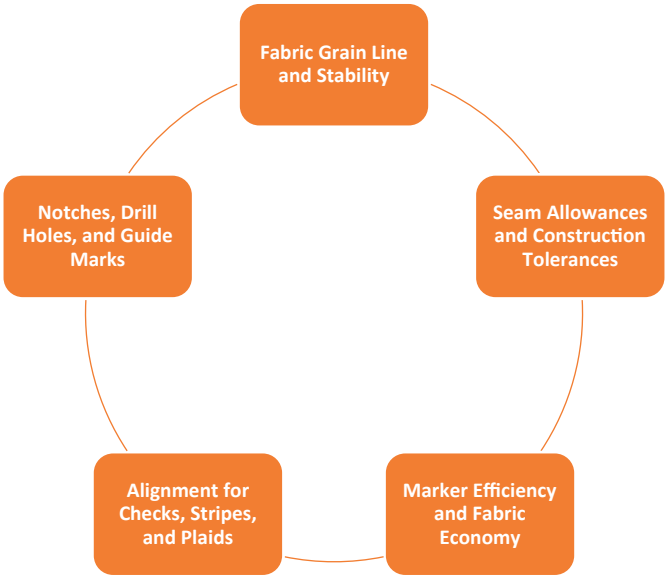

Fig. 3.2.3: Factors affecting marker accuracy

1. **Fabric Grain Line and Stability**
   - Patterns must be positioned precisely over the grain line to ensure the natural drape of the fabric.
   - Misalignment results in fabric twisting, uneven hemlines, and ill-fitting garments.
2. **Seam Allowances and Construction Tolerances**
   - All pattern pieces should have uniform seam allowances to facilitate easy assembly.
   - Inadequate seam allowance results in stitching issues, whereas excessive allowances result in bulkiness.
3. **Marker Efficiency and Fabric Economy**
   - An efficiently optimized marker minimizes fabric wastage by as much as 10-15% in mass production.
   - Nested patterns enable improved space utilization without compromising cutting accuracy.
4. **Alignment for Checks, Stripes, and Plaids**
   - Stripes and checks should be matched at critical points (e.g., side seams, shoulders, and pockets).
   - Printed fabrics should be consistent to prevent visual distortion in the finished garment.
5. **Notches, Drill Holes, and Guide Marks**
   - Well-placed notches assist garment workers in correctly assembling the pieces.
   - Drill holes should be marked to guide pocket positions and pleats.

3.2.3 Precautions for Cutting Specialty Fabric Designs

Cutting specialty fabrics involves precision and experience to ensure consistency, alignment, and garment quality. Checks, plaids, and printed fabrics present special challenges because their designs have to be continuous and symmetrical on garment panels. Even slight misalignment leads to visual distortions, misaligned seams, and production wastage.

Challenges of Specialty Fabrics

In contrast to solid textiles, specialty textiles have repeating patterns that need to align perfectly at seams, collars, pockets, and other strategic locations. Such textiles pose difficulties in:

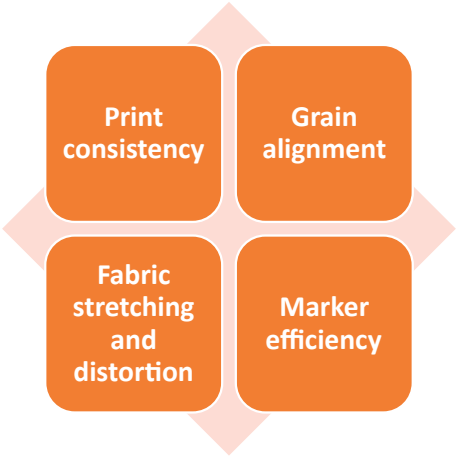

Fig. 3.2.4: Challenges of specialty fabrics

- **Print consistency:** Misplacement of even one element causes misaligned patterns on seams.
- **Grain alignment:** These textiles need precise grain placement to ensure visual symmetry.
- **Fabric stretching and distortion:** Certain specialty textiles (such as printed knits) have a tendency to stretch readily, causing distortions.
- **Marker efficiency:** Cutting plaids, checks, and prints calls for additional fabric allowance, which affects material usage.

Safety Precautions for Cutting Plaid and Check Fabrics

Plaids and checks possess both horizontal and vertical lines that need to be identical, so their cutting is more difficult than that of plain fabrics.

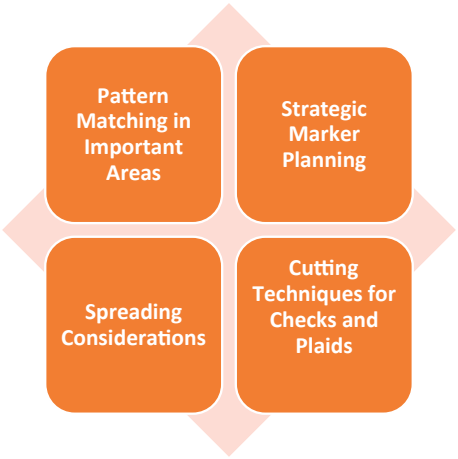

Fig. 3.2.5: Safety precautions for cutting plaid and check fabrics

1. **Pattern Matching in Important Areas**
   - Plaids and checks need to match at side seams, shoulder seams, centre fronts, and centre backs.
   - Symmetrical placement is essential for a professional finish.

- Additional seam allowance (approximately 0.5 to 1 cm) needs to be left to make pattern matching adjustments when sewing.

2. **Strategic Marker Planning**
   - The main check or plaid lines must be placed in the centre of the garment for symmetry.
   - Sleeves, pockets, collars, and plackets should match the overall body pattern.
   - Computer-aided marker making (CAD) facilitates accurate pattern alignment.
3. **Spreading Considerations**
   - Fabric is to be spread layer by layer to ensure continuity of the pattern in bulk production.
   - Certain plaid fabrics need to be cut in single-layer format for utmost accuracy.
   - Cutting operators need to apply templates to double-check the position of patterns.
4. **Cutting Techniques for Checks and Plaids**
   - Die-cutting machine or band knife is best for mass cutting.
   - Precision chalking for manual cutting is employed for upscale garments.
   - Fabric needs to be cut with care along the vertical and horizontal design lines to avoid distortions.

Safety Precautions for Printed Fabric Cutting

Printed fabrics pose new challenges, including one-way print designs, asymmetrical prints, and those with motifs that demand precise positioning.

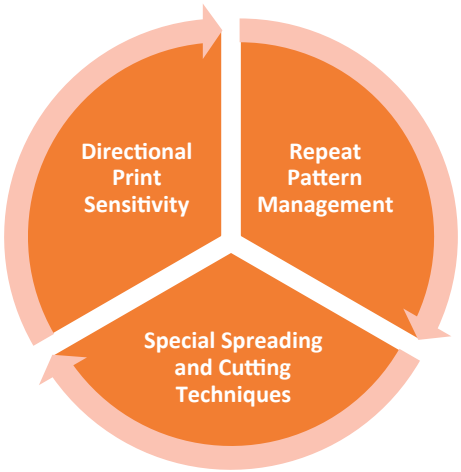

Fig. 3.2.6: Safety precautions for printed fabric cutting

1. **Directional Print Sensitivity**
   - Certain prints have one-way design (e.g., floral, animal prints, text prints).
   - These need to be cut in the same direction on all garment pieces to ensure uniformity.
   - Garment designs should consider mirror imaging to avoid upside-down prints.
2. **Repeat Pattern Management**
   - Some printed fabrics have large repeat distances that must be considered when placing the marker.
   - Markers should be adjusted so that prints appear symmetrical across different garment panels.
3. **Special Spreading and Cutting Techniques**
   - Printed fabrics should be spread in single-layer face-up mode for accuracy.
   - Cutting tools should be extra sharp to prevent fraying or stretching of prints.

3.2.4 Appropriate Cutting Tools and Equipment for Different Fabric Types

The selection of cutting tools affects cutting precision, efficiency, and quality of garments. Different fabrics need particular tools to provide crisp cuts without distortion, fraying, or blemishes.

Types of Cutting Methods

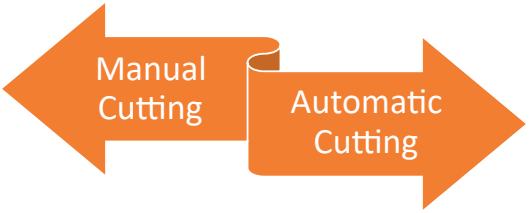

Fig. 3.2.7: Types of cutting methods

Manual Cutting (For low-volume, high-precision cutting)	 Hand shears are employed for production of samples and specialty fabrics.
	 Rotary cutters are applied to sensitive fabrics such as chiffon and silk.
Automatic Cutting (For mass production)	 Straight knife cutters cut most woven fabrics.

	 Band knives are ideal for heavy fabrics such as denim and canvas.
	 Synthetic and fragile fabrics are cut using laser cutting machines to avoid fraying.

Table 3.2.1: Types of cutting methods

Cutting Tools Depending on Fabric Type:

1. Lightweight and Sheer Fabrics (Chiffon, Organza, Lace)

Fig. 3.2.8: Rotary cutters

Tool: Rotary cutters or fine-blade scissors.

Why? Prevents snagging and fraying.

2. Medium-Weight Fabrics (Cotton, Polyester, Linen)

Fig. 3.2.9: Straight knife cutters

Tool: Straight knife cutters.

Why? Provides precision and efficiency for bulk cutting.

3. Heavyweight Fabrics (Denim, Canvas, Wool)

Fig. 3.2.10: Band knife or die-cutting machine

Tool: Band knife or die-cutting machine.

Why? Ensures clean cuts through thick layers.

4. Stretch and Knit Fabrics (Jersey, Lycra, Spandex)

Fig. 3.2.11: Circular knife cutters

Tool: Circular knife cutters.

Why? Prevents excessive stretching during cutting.

5. **Delicate or Specialized Fabrics (Leather, Velvet, Suede)**

Fig. 3.2.12: Hand shears

Tool: Laser cutters or hand shears.

Why? Maintains precise edges without damaging material integrity.

3.2.5 Analysing Markers for Essential Details

Markers are of paramount importance in cutting garments, as they determine the precision of every piece and how they will be aligned with the final garment. Inadequate marker analysis may lead to fabric wastage, faulty garments, and delayed production.

Fig. 3.2.13: Fabric markers and chalks

Key Elements to Analyse in Markers

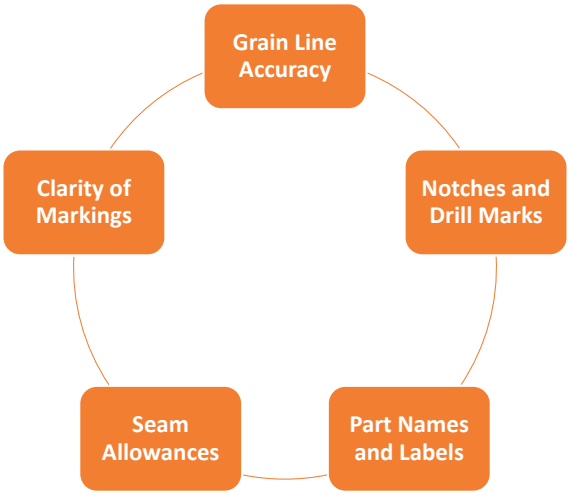

Fig. 3.2.14: Elements to analyse in markers

1. **Grain Line Accuracy**
   - All pattern pieces must have well-defined grain line markings.
   - Improper alignment of grain causes garment distortion and impacts durability.
2. **Notches and Drill Marks**
   - Notches direct fabric direction for sewing workers.
   - Drill marks indicate important details such as pocket placement, darts, and pleats.
3. **Part Names and Labels**
   - Every pattern piece should be named (e.g., front bodice, sleeve, collar) to identify easily.
   - Misnaming creates confusion at sewing and assembly time.

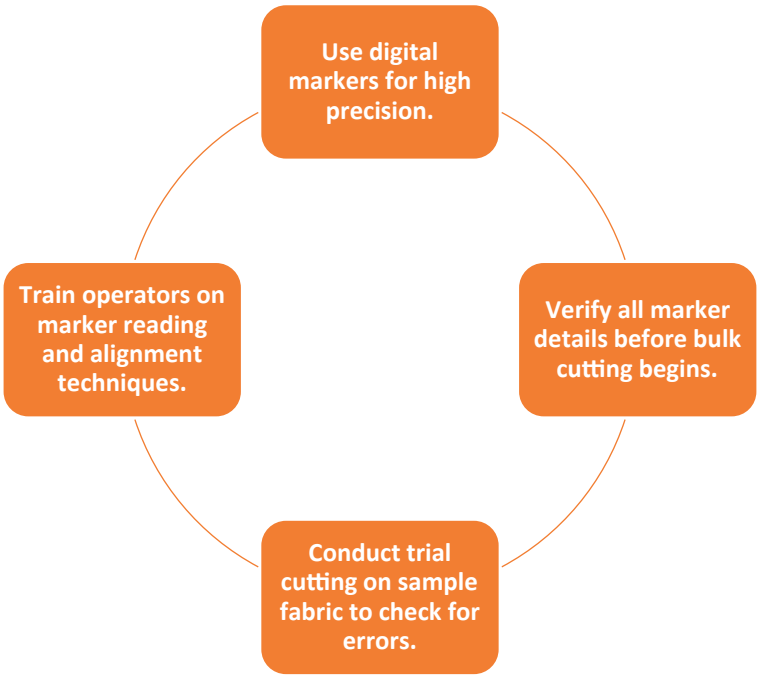

Fig. 3.2.15: Marker quality control measures

4. **Seam Allowances**
   - Proper seam allowance markings ensure correct stitching and structural stability.
   - Standard allowances (0.5 cm to 1.5 cm) must be maintained depending on fabric type.
5. **Clarity of Markings**
   - All markings should be easily readable and long-lasting to avoid misinterpretation.
   - Inadequate visibility of markings results in misaligned cutting and sewing faults.
   - Marker Quality Control Measures

Summary

- Participants will learn fabric layering techniques like face-over-face and face-over-back to ensure proper alignment.
- They will identify fabric faults such as stains and slubs, inspecting fabrics before cutting to ensure quality.
- Understanding fabric types based on prints, weaves, grain lines, and textures will be covered for accurate identification.
- Proper fabric lying techniques will be studied, considering texture, weave, and print alignment for precision.
- Various spreading mechanisms, including manual and mechanical spreaders, will be analyzed and applied for efficiency.
- Participants will also learn pattern marking, cutting techniques, and quality checks, focusing on accurate marker placement and suitable cutting tools.

Exercise

Multiple-choice Question:

1. What is a common fabric layering technique?
   a. Face-over-face
   b. Roll-over-back
   c. Cross-layering
   d. Side-by-side

2. Which fabric fault involves uneven thickness in yarn?
   a. Stain
   b. Slub
   c. Wrinkle
   d. Print defect

3. What should be considered while lying fabric?
   a. Colour variation
   b. Print alignment
   c. Fabric cost
   d. Storage location

4. Which spreading technique is suitable for high-volume production?
   a. Manual spreading
   b. Mechanical spreading
   c. Single-layer spreading
   d. Random layering

5. What is crucial in marker analysis for pattern cutting?
   a. Fabric colour
   b. Notches and grain lines
   c. Washing instructions
   d. Thread count

Descriptive Questions:

1. Explain the difference between face-over-face and face-over-back layering techniques.
2. How can fabric faults impact the final garment, and how can they be identified?
3. Describe the key factors to consider when aligning prints and weaves before cutting.
4. What are the advantages of using mechanical spreaders over manual spreading?
5. Discuss the importance of grain lines and notches in pattern marking and cutting.

Notes

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

https://youtu.be/_CIw_aTIC5U?si=CdjoaTL_hyxoTqY6

Automatic Fabric Spreading and Fabric Cutting machine

https://youtu.be/8kKbYdc0jik?si=MnNzbIpEycjFtGHE

Cutting Methods

https://youtu.be/7AE5vftSjFk?si=YyzVIwxxnCkuhf3h

Textile Dyeing and Printing

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N·S·D·C
RE IMAGINE FUTURE

4. Carry Out Cutting Operations while Supervising

APPAREL MADE-UPS HOME FURNISHING
SECTOR SKILL COUNCIL

Unit 4.1 - Pattern Making, Cutting, and Material Preparation

Unit 4.2 - Production Workflow and Work Distribution

AMH/N0612

Key Learning Outcomes

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

1. Demonstrate the working of pattern/marker making and cutting software for accurate fabric and material cutting.
2. Perform ticketing and bundling of cut components, trims, and accessories for organized production flow.
3. Identify various production departments and ensure equal distribution of work within groups.
4. Supervise and coordinate work allocation among teams for efficient workflow.
5. Organize and prioritize materials according to the delivery schedule.
6. Ensure the availability of reference samples and cutting equipment near the cutting table.
7. Cut fabric, trims, and accessories with precision as per prescribed quality standards.

UNIT 4.1: Pattern Making, Cutting, and Material Preparation

Unit Objectives

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

1. Assess the use of pattern/marker making and cutting software.
2. Demonstrate the cut fabric, trims, and accessories with precision according to prescribed quality standards.
3. Identify the availability of reference samples and cutting equipment near the cutting table.
4. Outline ticketing and bundling of cut components, trims, and accessories.
5. Analyse materials as per priority against the delivery schedule.

4.1.1 Assessing the Use of Pattern/Marker Making and Cutting Software

Role of pattern/marker making and cutting software is particularly significant in the contemporary textile and garment industry, enhancing efficiency, minimizing fabric waste, and achieving precision in production. Below is a rundown of how these technologies are used and their advantages:

1. **Pattern Making Software:** Pattern making software aids in designing and developing patterns using a computer instead of the age-old paper-based method. The most commonly used software tools are Gerber AccuMark, Lectra, and TUKAcad. Utilizing such tools has many benefits:

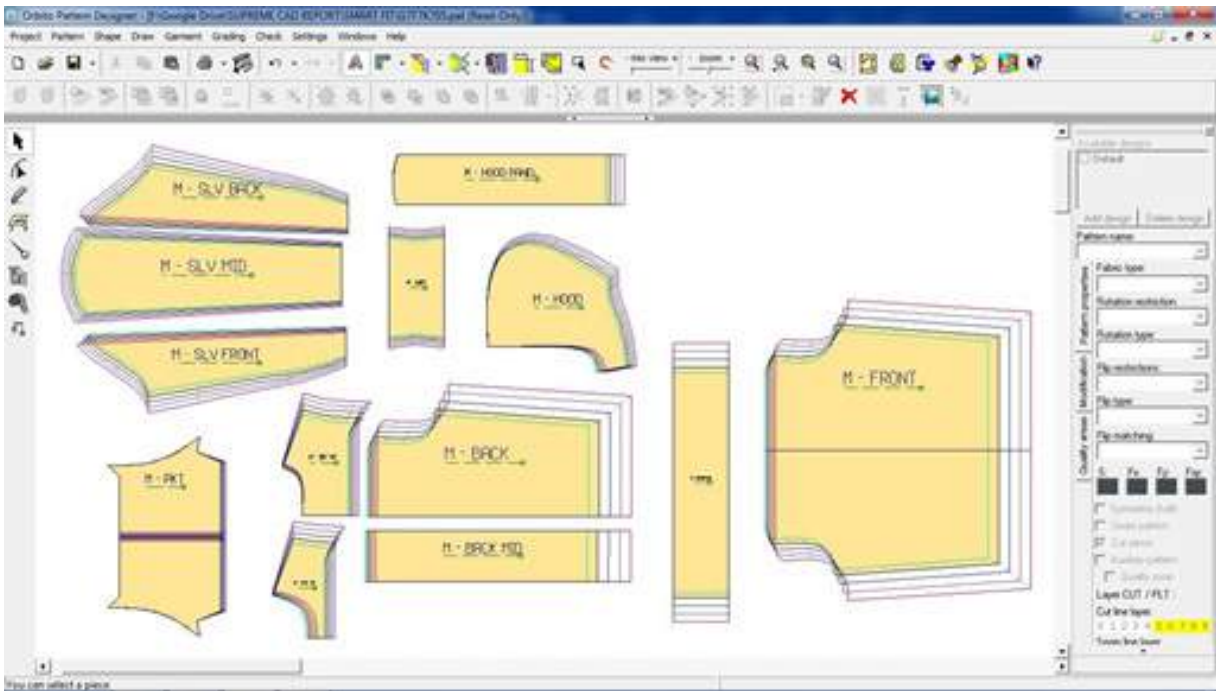


Fig. 4.1.1: Pattern making using software

- **Accuracy and Precision:** Patterns can be sketched and modified with exact measurements, avoiding the possibility of human error while designing.

- **Speed and Efficiency:** Designers are able to swiftly develop patterns, experiment with various iterations, and alter them without physical prototypes, accelerating the design process.
- **Easy Modifications:** Patterns can be readily altered in electronic format, i.e., changing sizes, shapes, or grading.
- **Storage and Access:** Digital patterns can be stored on a centralized server, making it convenient to access and retrieve, which optimizes team collaboration across different locations.
- **Integration with Other Systems:** Pattern-making software is integrated with other components of the production process, including marker making and cutting systems, making it a continuous production line.

2. **Marker Making Software:** Marker making is the method of placing pattern pieces on a fabric layout to reduce wastage of fabric. Marker making software does this automatically, providing the best possible arrangement. Some popular marker making software are Gerber AccuMark Marker Making, Lectra Modaris, and Optitex. The major advantages are:

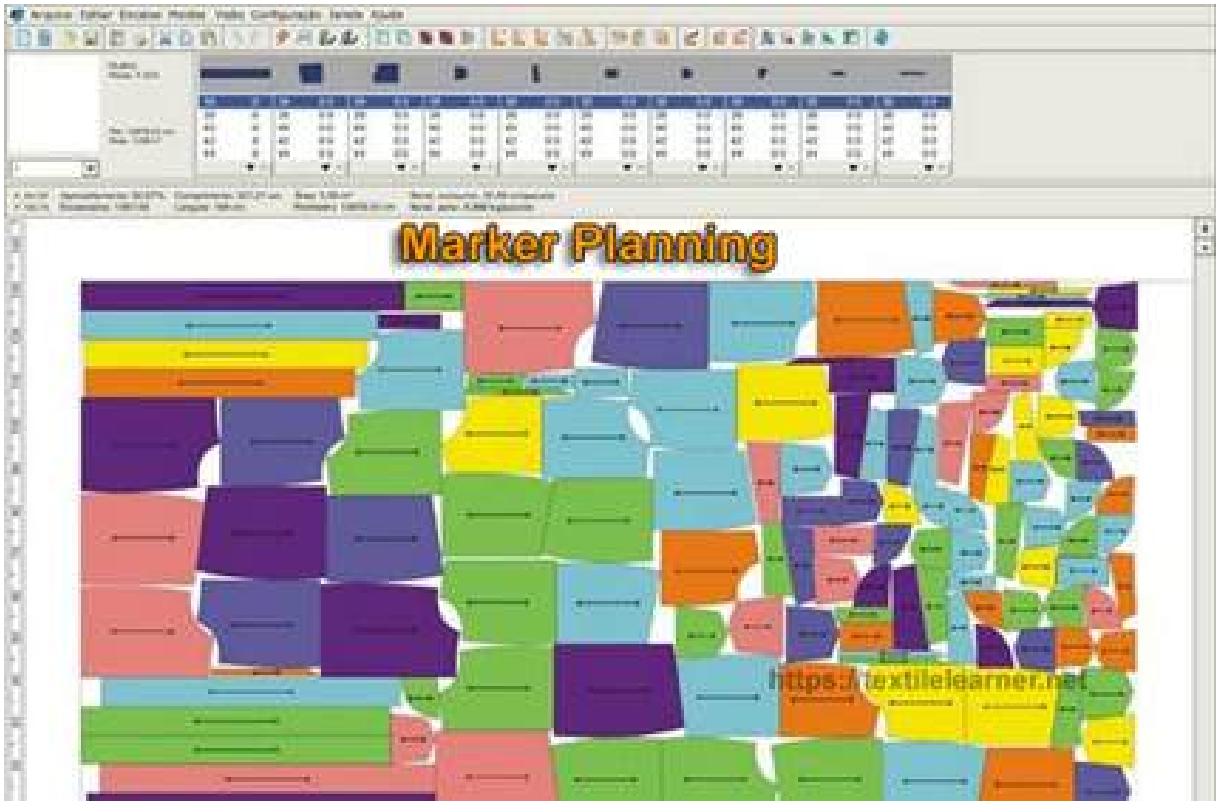


Fig. 4.1.2: Marker making on software

- **Fabric Utilization:** The software determines the most efficient placement of pattern pieces on the fabric to reduce waste, resulting in considerable material savings.
- **Time Savings:** It takes time to make markers manually; the software saves time in creating a marker, enabling operators to work on other jobs.
- **Cost Reduction:** Improved utilization of fabric can help companies cut down on material costs, a significant advantage for industries where fabric costs form a significant portion of production expenses.
- **Consistency:** Software helps to ensure that markers are always generated with the same degree of accuracy, ensuring consistency and quality, as well as standardization in different batches.

3. **Cutting Software:** Cutting software assists in converting digital markers and patterns into cutting instructions for automated cutting machines. These systems play a vital role in minimizing human errors and speeding up production. Some of the commonly used cutting software are Gerber CutWorks, Lectra Cutting Room, and KUKA Robotics (for robotic cutting systems).

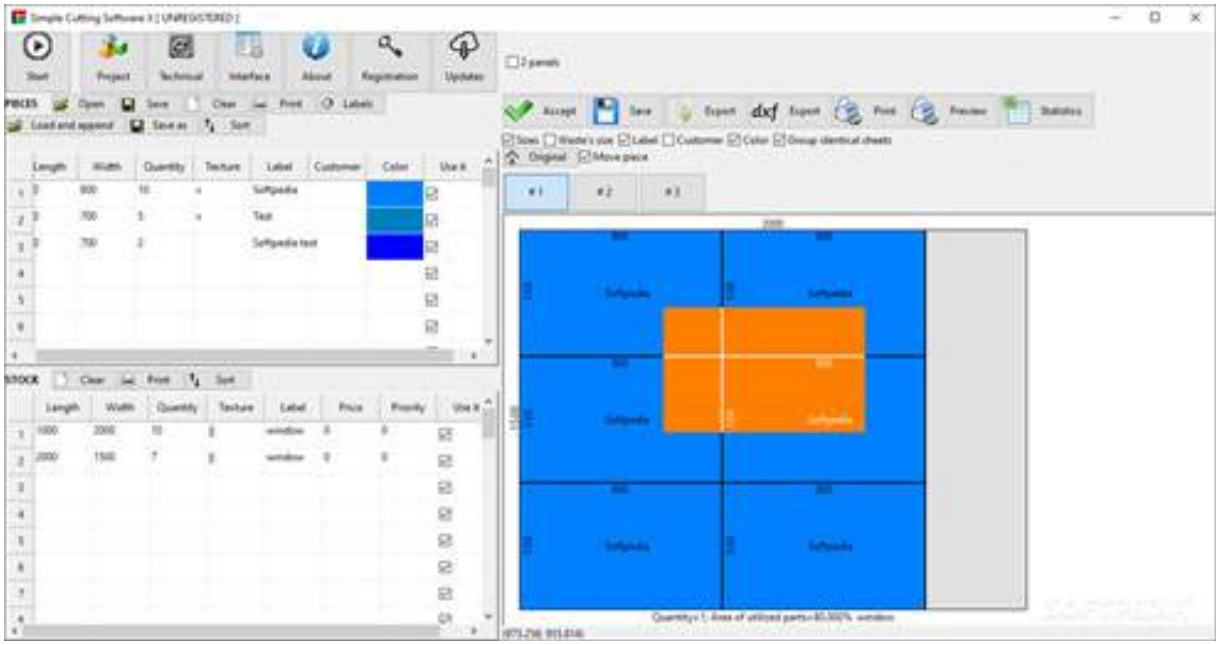


Fig. 4.1.3: Cutting software

- **Automated Cutting:** Cutting software transfers optimized cutting plans directly to automated cutting machines, which can cut several layers of fabric at once, enhancing productivity.
- **Error Reduction:** The software prevents the cutting machine from deviating from accurate instructions, reducing the likelihood of misalignment or errors in cuts.
- **Real-Time Monitoring:** Cutting software enables supervisors to track the cutting process in real-time, allowing the machine to operate at optimal levels and monitoring progress. The data can also be utilized for troubleshooting in case of any problem.
- **Material Savings:** Similar to marker-making programs, cutting programs save material by minimizing waste by streamlining cutting patterns so that each piece has a minimum of leftover fabric.

4. **General Advantages**
   - **Shorter Lead Time:** All these computer systems streamline operations from design through production, reducing lead time and enabling companies to meet deadlines better.
   - **Sustainability:** Through reduced fabric waste, the utilization of cutting software and marker-making tools ensures more sustainable processes in the clothing industry.
   - **Quality Control:** Digital markers and patterns enhance the overall uniformity of the product, resulting in higher quality garments with reduced defects.
5. **Challenges**
   - **High Initial Cost:** Pattern making, marker making, and cutting software installation can be costly, especially for small and medium-sized businesses.
   - **Training Requirement:** Employees need to be trained to use the software, and the learning curve can be steep, especially for those accustomed to traditional methods.
   - **Software Integration:** Ensuring that the software integrates well with other manufacturing systems can sometimes be a challenge, requiring additional investment in IT infrastructure.

4.1.2 Performing the Cut Fabric, Trims, and Accessories with Precision

As a Cutting Supervisor in the textile and garment field, precision when cutting fabric, trims, and accessories must be ensured in order to live up to given quality standards as well as confirm that the finished product is commensurate with customer requirements and expectations. Here's a discussion of how one can exhibit precision in cutting as well as managing fabric, trims, and accessories according to industry standards:

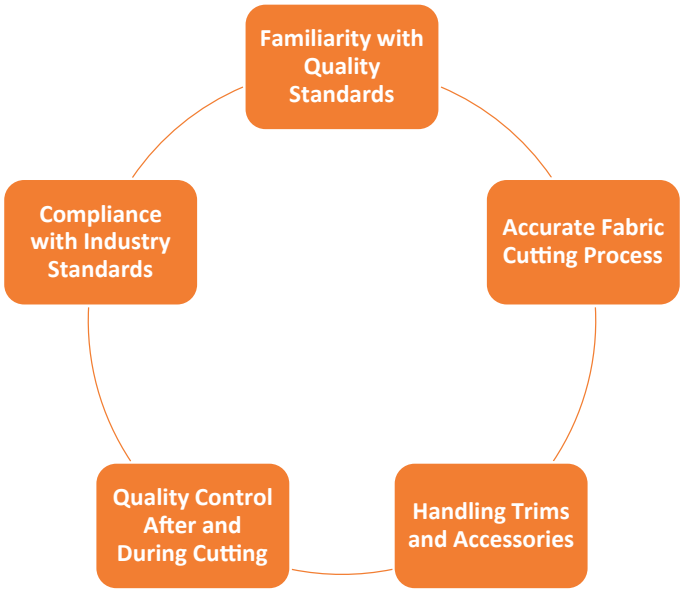


Fig. 4.1.4: Performing the cut fabric, trims, and accessories with precision

1. **Familiarity with Quality Standards:** Prior to cutting, one needs to know the quality standards that are prescribed for your organization or the specifications of the client. These may include:
   - **Fabric Quality:** Fabric type (woven, knitted, etc.), GSM (grams per square meter), colour fastness, texture, and overall strength. For instance, materials for high-end clothes may have stricter quality specifications (e.g., improved colour uniformity, no faults, etc.).
   - **Trim and Accessory Specifications:** This encompasses requirements for zippers, buttons, labels, threads, linings, and other accessories. The trim must complement the design of the garment and not detract from the aesthetics or functionality of the garment.
   - **Measurement and Alignment:** All the components must conform to exact measurements as per design specifications or pattern, including margin, seam, and hem allowances.
2. **Accurate Fabric Cutting Process:** Accuracy in cutting is crucial to help ensure the fabric pieces are correctly fitted and the garment is properly constructed. Here's how to illustrate the process of cutting with accuracy:
   - **Fabric Preparation:**
     - Make sure the fabric is pre-shrunk (if needed) and correctly ironed or steamed to eliminate wrinkles that might throw measurements off.
     - Check the material for any imperfections, like stains, tears, or uneven colour, which may impact the final garment. These need to be remarked and rectified prior to continuing.
   - **Grain Direction:**
     - Grain direction means the orientation of fabric fibers. See that all pattern pieces are cut in proper grain direction (warp, weft, or bias). For example, the pattern must be aligned along the straight grain so that the garment drapes as it should.

- **Using Appropriate Tools:**
  - Cutting tools like electric or manual cutting machines must be sharp and well-maintained to avoid fraying or uneven edges.
  - Cutting mats or cutting tables must be used so that the fabric is flat and evenly stretched prior to cutting.
- **Marker Making and Fabric Layout:**
  - Utilize digital marker-making software or manual processes to maximize fabric use. The layout must avoid waste while making sure all pattern pieces fit together without overlapping.
  - Carefully note the cutting marker layout to prevent cutting mistakes.
- **Cutting Accurately:**
  - Cut on the edges of the fabric along the pattern lines. Make sure there is an even seam allowance based on the design of the garment, normally 1/4 to 5/8 inch, based on the type of style.
  - Maintain a firm hand while cutting to keep the edges smooth and avoid shifting or jaggedness in the cut.

3. **Handling Trims and Accessories:** Trims (e.g., zippers, buttons, laces, and embellishments) and accessories (e.g., labels, tags, elastics) should be handled with care to meet quality standards. Here's how to demonstrate precision when working with trims and accessories:
   - **Pre-Inspection:**
     - Inspect all trims and accessories before use for defects such as misalignment, broken parts, or colour mismatches.
     - Check the size and functionality of zippers, buttons, or any fastening components to ensure they operate smoothly.
   - **Placement and Alignment:**
     - Correctly place trims such as zippers or buttons on the garment according to the pattern or design requirements. Utilize templates or markers to make placements consistent.
     - Make sure that when placing embellishments (such as embroidery, lace), the placement is symmetrical to prevent any imbalance.
     - Adhere to trimming threads or excess material after securing accessories so that the end result is clean and professional.
   - **Attachment with Precision:**
     - Apply the proper stitching methods to secure trims and accessories. For instance, machine stitching when closing zippers, hand-stitching for fragile details such as beads or buttons, and overlocking or serging to finish raw edges.
     - Ensure that trims are securely attached, with no loose ends or potential for failure during use.
4. **Quality Control After and During Cutting:** Quality control (QC) is a crucial step in cutting, which guarantees that all fabric pieces, trims, and accessories are up to standard. This can be achieved in the following manner:
   - **In-Process Inspection:**
     - Inspect the cut fabric on a regular basis for accuracy, assuring that every piece follows the recommended measurements and that there are no mistakes or flaws.
     - Check the cutting machines and shift settings if need be to ensure accuracy.
   - **Post-Cutting Inspection:**
     - Inspect the cut fabric for precision in size and verify that the edges are clean with no frayed lines or pointed ends.

- Verify accessories such as zippers, buttons, and labels for proper positioning and firm attachment.

- **Batch Testing:**
  - Where necessary, it's recommended to conduct batch testing by sewing a sample garment using the cut pieces to ensure fit, strength, and overall design integrity.

5. **Compliance with Industry Standards:** In order to achieve international and industry-level quality standards, as defined by ISO or AATCC (American Association of Textile Chemists and Colourists), cutting supervisors should ensure that the following are strictly followed:
   - **Consistency in Measurements:** All garment pieces should be cut according to the proper size and proportion.
   - **Quality of Trims:** All trims and accessories should be safe, functional, and aesthetically appealing.
   - **Environmental Factors:** Make sure the factory adheres to sustainable practices, including waste management and energy-efficient machinery, where feasible.

4.1.3 Reference Samples and Cutting Equipment Near the Cutting Table

As a Cutting Supervisor in the garment and fabric sector, it is essential to have all required reference samples and cutting tools at hand close to the cutting table to ensure efficiency in workflow and high-quality production. Below is an overview of the significance of having these tools within reach and how they lead to efficient and accurate cutting operations.

Reference Samples

Reference samples are crucial to guarantee that the fabric is cut in the right way, style, and design as per the specifications. They serve as a tangible and visual guide that can be adhered to by cutters, guaranteeing uniformity and precision.

Fig. 4.1.5: Cutting fabric based on reference sample

Availability and Placement of Reference Samples

- **Fabric Samples:** A piece of the fabric to be cut should always be present at the cutting table to make sure that the texture, stretch, grain direction, and other fabric-related qualities are taken into account while cutting. The cutter can check against it to assure the fabric's behaviour (e.g., whether it is likely to shrink, stretch, or fray).

Fig. 4.1.6: Fabric samples

- **Pattern Samples:** Print patterns, or computer pattern drawings, should be readily available. This way, all the pattern pieces can be properly laid out and cut using the correct allowances and grain direction. Even examples of similar clothes made before can serve as a guide to ensure that mistakes do not happen.

Fig. 4.1.7: Pattern samples for clothes

- **Sample Garment:** If a prototype or sample garment has already been made, having it available for reference is extremely useful for understanding how the final product should fit, drape, and look after assembly. This helps cutters double-check their work, especially if there are adjustments to be made in sizing or design features.
- **Trim and Accessory Samples:** If particular trims (e.g., buttons, labels, zippers) are needed for the garment, a sample of these trims being available is crucial. This way, the cutting supervisor can confirm the correct positioning, style, and number of accessories while cutting.
- **Colour and Quality Samples:** Colour swatches or sample fabrics with the final approved colour are important for ensuring that the fabric cutting aligns with the desired aesthetic. Checking for fabric dye consistency against reference swatches can also help in ensuring no discrepancies in colour appearance.

Fig. 4.1.8: Colour swatches

Cutting Equipment

Having the cutting equipment in close proximity to the cutting table is essential to ensure productivity, speed, and accuracy. It allows the cutting team to perform their tasks with minimal time lag and maximum accuracy. The following is a list of critical equipment and why it is essential for them to be near the cutting table:

Fig. 4.1.9: Cutting equipment

Essential Cutting Equipment Near the Cutting Table:

1. **Cutting Machines:**
   - **Manual Cutting Tools:** Sharp scissors, rotary cutters, and shears are fundamental for precise cutting. Having a set of sharp, well-maintained cutting tools close at hand reduces the need for the cutter to walk to another station to retrieve them.
   - **Electric Cutting Machines:** To cut on a big scale, electric or pneumatic cutting machines (e.g., straight knife cutting machines or circular knife machines) are indispensable for speed and accuracy. Such machines must be installed at the cutting table or built into it to enable effortless movement between fabric laying out and cutting.

Fig. 4.1.10: Electric cutting machine

2. **Cutting Tables**
   - A large cutting table is needed to lay out the fabric, fit the patterns, and have room for precise cutting. The cutting table preferably has a changeable height to adapt to varying thicknesses of fabric and desired cutting styles.

Fig. 4.1.11: Cutting table

3. **Measuring Tools:**
   - **Tape Measures:** Precise measurement devices such as flexible tape measures need to be kept within reach of the cutting space so that fabric pieces are cut to the specified sizes.

Fig. 4.1.12: Measuring tape

- **Rulers and Curved Templates:** To achieve accurate straight lines or curves, have rulers, straight edges, and dedicated curved templates in easy reach of the cutting area.

Fig. 4.1.13: Rulers and curved templates for clothes

4. **Weights and Pins:**

   Fabric Weights or pattern weights ought to be on hand to prevent fabric from moving during the cutting process. Pins or clamps may also be necessary to hold pieces of fabric in place while cutting, at least temporarily. These little aids can serve to provide precision while cutting, especially when working with delicate materials or multi-layered substances.

Fig. 4.1.14: Fabric weights or pattern weights

5. Cutting Mat:

A cutting mat shields the cutting surface and the tools from harm. A long-lasting cutting mat ensures that the fabric is not harmed by the cutting tools, and it also offers a clear, flat surface for measuring and cutting accurately.

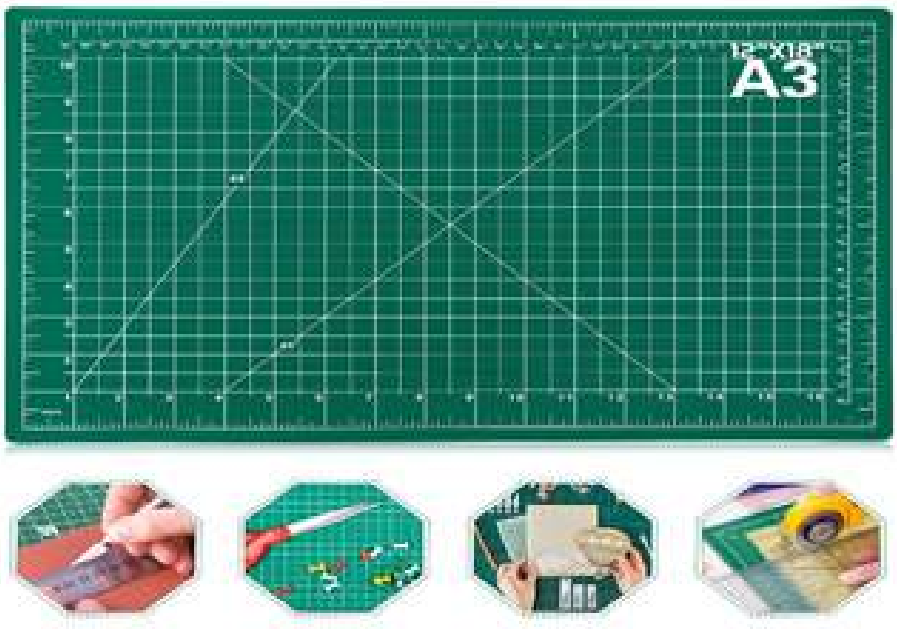


Fig. 4.1.15: Cutting mat

6. Marking Tools:

Chalk or Fabric Markers are used for marking pieces of fabric prior to cutting. The markings define seam allowances, grainlines, and other crucial points. Keeping these tools at hand means all the marks will be clear and precise, which is particularly handy with complex designs.

Fig. 4.1.16: Chalk or fabric markers

7. Fabric Roll Holders

For roll fabric, the presence of a fabric roll holder or rack beside the cutting table provides ready access to large amounts of fabric. It enables the fabric to be unrolled and spread out uniformly prior to cutting, minimizing errors caused by fabric tension or non-uniform spreading.

Fig. 4.1.17: Fabric roll holder rack

8. Pressing Equipment:

A nearby steam press or iron ensures wrinkles and folds are smoothed out in the fabric prior to cutting, making the fabric flat for proper measurement. Pressing is particularly important for fragile fabrics that need to be handled gently.

Fig. 4.1.18: Steamer or iron

Preparation of the Workstation to Maximize Efficiency

So that everything mentioned above is readily accessible and the cutting process is seamless, the cutting space must be structured with a well-sequenced flow of procedures:

- **Vertical Storage:** Make use of vertical shelves or hanging units for placing rolled fabrics, trim, and accessories so they are readily accessible and not getting into the way.
- **Dedicated Tool Stations:** Provide separate areas for various cutting tools, markers, and measuring instruments. This eliminates the loss of tools and saves the cutting team time spent in finding equipment.
- **Clear Labelling:** Label reference samples, trims, and cutting tools placed in drawers or shelves. Labelling makes it certain that each tool is where it belongs and is easily available in critical work situations.
- **Safety Considerations:** Ensure that the cutting area is safe and free of obstacles, with proper safety guidelines for handling cutting machines and tools. Items should be stored in a way that prevents accidents, such as keeping sharp tools away from the edge of the table or providing proper storage for hazardous materials like sprays or adhesives.

4.1.4 Ticketing and Bundling of Cut Components, Trims, and Accessories

Ticketing and bundling are essential steps in garment production, particularly in the cutting area. They enable efficient workflow, proper assignment of parts, and prevention of mistakes in assembly. As a Cutting Supervisor, control of ticketing and bundling of cut parts, trims, and accessories is necessary for keeping things in order and each part of the garment processed in an efficient manner. Here's a step-by-step guide to handling ticketing and bundling:

Fig. 4.1.19: Guide to handling ticketing and bundling

1. **Ticketing of Cut Components:** Ticketing is the marking or tagging of individual pieces of fabric, trims, and accessories to give information about the garment and parts. The ticket must include all the details that are required to assemble the garment correctly, i.e., size, style, fabric, and colour.

   Key Elements of a Cutting Ticket:

   - **Style Number:** A unique identifier for the garment or design.
   - **Cutting Lot or Batch Number:** A reference to the specific batch in which the components were cut, which helps trace production history.
   - **Fabric Information:** Details such as fabric type, colour, texture, and any special treatments (e.g., washing, dyeing).
   - **Size and Quantity:** Indicating the number of pieces cut for each size (S, M, L, XL, etc.).
   - **Component Details:** Specifics on which pieces these are (e.g., sleeve, front panel, back panel, etc.).
   - **Trim and Accessories:** Information about any trims, buttons, zippers, or labels associated with the component, including their quantities.
   - **Cutting Date:** The date the components were cut, useful for tracking production timelines.
   - **Quality Control Status:** A section for marking if the cut components passed initial inspection or require rework.

   Types of Tickets:

   - **Printed Tickets:** Can be printed on paper or fabric labels and attached to the cut components with safety pins or tags.

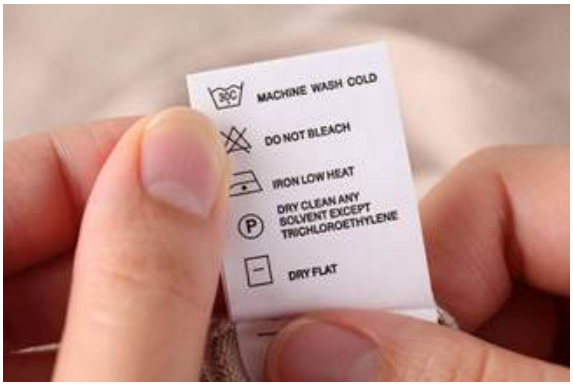


Fig. 4.1.20: Printed tickets

- **Barcode Tickets:** A more modern approach where a barcode or QR code is attached to the component for digital tracking and easier integration with inventory management systems.

Fig. 4.1.21: Barcode tickets

Process of Ticketing:

- **Generate Tickets:** Use software or a ticketing system to generate labels or tickets for each cut component. The software may pull data from the design specifications, such as fabric type, pattern, and sizes.
- **Labelling:** As the fabric is cut, tickets are attached to each piece of fabric to denote its specifications. This could be done manually or automatically, depending on the system in place.
- **Verification:** Before cutting, ensure all components are assigned proper ticketing to prevent errors and confusion later in the production process.

2. **Bundling of Cut Components:** Bundling is the process of packing cut pieces together by garment specification and placing them in a manner that each bundle will have the right components to make up each garment size. Bundling also increases the speed at which the next phases of garment assembly are carried out.

Fig. 4.1.22: Bundling of cut components

Key Elements of Bundling:

- **Components Grouped by Size:** All pieces (front, back, sleeves, etc.) of a single size (e.g., Small, Medium, Large) should be bundled together.
- **Consistency:** Ensure that each bundle contains the correct number of pieces for the garment size and that each piece is properly cut to specifications.
- **Trims and Accessories:** Any trims (e.g., zippers, buttons, labels) or accessories for the garment should be bundled alongside the corresponding cut pieces. The trims should be identified with additional tags or tickets for easy identification.

Bundling Process:

- **Sorting and Grouping:** Once the fabric is cut and tagged, the cut pieces will be sorted by size and style. Sorting happens manually in most cases, but some bigger facilities might have automated sorting machines.
- **Package by Size and Style:** All pieces for specific size (and possibly style) are grouped together in bundles. For instance, all Small-sized front and back panels, sleeves, etc., will be grouped together.
- **Add Trims and Accessories:** Add any related trims or accessories to the package. These may be buttons, zippers, labels, or other hardware. These are typically packaged separately within the same package to keep them tidy.
- **Bundle Verification:** Double-checking each bundle to make sure all the pieces for the specific size and style are present and there are no missing parts is important. This might include a separate inspection or quality control procedure.

Packaging and Labelling of Bundles:

- **Bundle Ticket:** Every bundle should have a bundle ticket that outlines the contents of the bundle, including the number of pieces per size and any trims or accessories included. It can include information such as:
  - Size (S, M, L, etc.)
  - Style/Design Number
  - Total Number of Pieces in the Bundle
  - Fabric and Trim Details
  - Production Batch/Date

Fig. 4.1.23: Bundle ticket

- **Physical Packaging:** After bundling, the components can be packaged in plastic bags, boxes, or bins for easy transportation to the next stage of production. Packaging should be sturdy enough to prevent damage during storage or transport.

Fig. 4.1.24: Physical packaging in boxes

3. **Handling Trims and Accessories:** Aside from the cut pieces of fabric, accessories and trims (like zippers, buttons, laces, and labels) also need to be properly sorted and banded. These components are essential to the finished design of the garment and should be readily available at the garment assembly process.

Fig. 4.1.25: Accessories and trims

Steps for Handling Trims and Accessories:

- **Individual Storage:** Trims and accessories need to be stored individually but close to cutting area for easy access. Whenever possible, these need to be stored in clear bins or drawers, labelled with size, style, or component type.
- **Ticketing for Trims:** Each set of trims (e.g., buttons for a specific size or style) should be ticketed, similar to the process for fabric components. This ensures that the correct amount of each trim is included with each bundle.
- **Bundling with Components:** After ticketing the trims, they should be added to the respective fabric bundles. For example, a bundle of size Medium fabric pieces will also receive a bundle of Medium-sized buttons or zipper trims that match that garment size.
- **labelling and Packaging:** Each batch of trims should be individually labelled with the style and size it corresponds to. These accessories should be packed securely in smaller bags or containers to prevent mix-ups or loss during storage or transport.

4. **Final Quality Check and Shipment:** Before shipping bundles to the next production stage, a final quality check should be performed:

Fig. 4.1.26: Performing final quality check before shipment

- **Check Bundle Completeness:** Ensure each bundle has the correct number of pieces (including trims and accessories) and that everything is tagged properly.
- **Visual Inspection:** Check for any visible defects in fabric pieces or trims. If any issues are spotted, remove the affected parts and rework them before bundling.
- **Documentation and Reporting:** Record the number of bundles, sizes, and any discrepancies during the process. This helps track production progress and resolve issues quickly.

4.1.5 Materials for Cutting in the Fabric Industry

The cutting supervisor plays a key role in the continuity of fabric movement from the warehouse to the cutting table, minimizing wastage and maximizing efficiency. In evaluating material against the delivery schedule, the cutting supervisor needs to prioritize by a number of factors to produce on time and accurately. The following is an outline of how they would handle this:

1. **Know the Production Schedule and Order Specifications**
   - **Check production orders:** Prior to the cutting process, the supervisor must know the precise fabric and material specifications according to the production schedule. This includes checking the order sheets, patterns, and exact material types.
   - **Fabric types and priorities:** Various fabric types can have varying levels of urgency or priority based on customer timelines, fabric supplies, or cutting complexity. For instance, higher-end fabrics may need more attention and consequently more time and resources, whereas low-end materials can get turned around faster.
2. **Identify Material Specifications and Quantities**
   - **Fabric width and length:** Know the exact fabric requirements for every order. The cutting supervisor must be aware of the exact fabric sizes required, how much fabric is available, and how much fabric is needed.
   - **Quality checks:** Ensure the material has undergone quality control checks for defects, shrinkage, or colour consistency. Poor-quality fabric would have to be rejected or sent for further quality improvement.
3. **Evaluate Material Lead Times and Delivery Schedules**
   - **Fabric lead times:** The Cutting Supervisor must coordinate with procurement or stores to determine when the materials will be delivered. If there are holdups in fabric or trims delivery, the cutting schedule could be rescheduled accordingly.
   - **Verify availability of fabrics:** Confirm that the fabric needed is available in sufficient quantity and that it is supplied on time. Delayed delivery of fabrics can slow down the cutting process and impact total production.

4. **Prioritize Cutting According to Delivery Needs**
   - **Time-sensitive orders:** Orders with delivery due dates sooner should be cut first. This is particularly important for high-priority or rush orders, including those needed for fashion shows, seasonal collections, or retail shipments.
   - **Cutting sequence:** Schedule and order cutting by fabric type and urgency of the order. That is, begin with orders for faster turnaround and simpler cuts and then progress to more complicated designs and labour-intensive cuts.
   - **Fabric wastage and utilization:** Maximize fabric usage by seeing to it that the cutting plan uses minimal wastage. Here's where complex cutting plans or marker making steps in.
5. **Work with the Fabric Store and Suppliers**
   - **Regular contact with fabric shops:** The Cutting Supervisor should have regular contact with the fabric shop and suppliers. In the event of discrepancies in fabric delivery or quantity issues, it should be addressed immediately to prevent cutting delays.
   - **Have alternative fabric suppliers:** In situations where there are fabric shortages or delays, the supervisor should have alternative plans with substitute suppliers or fabric types to prevent production delays.
6. **Ensure Proper Handling and Storing of Fabric**
   - **Proper storage of materials:** Fabric must be properly stored in an environment where it remains in optimal condition, free from damage, wrinkles, or contamination. The Cutting Supervisor ensures that the fabric is safely rolled or folded as per specifications.
   - **Reduce fabric wear and tear:** Monitoring fabric processing operations like spreading, laying, and cutting are important to prevent errors that would result in material wastage, measurement errors, or misalignment of the cuts in the fabric.
7. **Real-Time Monitoring and Adjustment of the Cutting Plan**
   - **Material arrival tracking:** The Cutting Supervisor must constantly monitor the arrival and flow of materials across the store and production facilities. Discrepancies or delays should be reported and corrected as a matter of urgency.
   - **Adjust to changes:** Any changes in the material delivery schedule or availability should have the cutting plan revised in real time to prevent bottlenecks or production delay.
8. **Coordinate with the Production Team**
   - **Feedback loop:** The Cutting Supervisor collabourates closely with other departments like sewing, quality control, and finishing. In case there are any issues regarding fabric delivery or cutting accuracy, they need to be resolved with the concerned departments.
   - **Workload balance:** Make sure that the schedule of fabric cutting is synchronized with the capacities of the assembly lines and sewing. In case there is a lag in the cutting process, the whole production chain will be directly affected.

UNIT 4.2: Production Workflow and Work Distribution

Unit Objectives

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

1. Identify various departments in production and explain the distribution of bundles to units like sewing.
2. Analyse the formation and manage groups for equal workload distribution.
3. List teams while ensuring smooth workflow and task completion.
4. Identify and organize work based on the delivery schedule.

4.2.1 Various Departments in Production

In a clothing manufacturing plant, the production activity is segmented into different departments, each handling different stages of the production of a finished garment. Following the cutting stage, the bundles of cut pieces are routed to other departments for additional processing. Proper coordination and effective routing of bundles to each department are important to achieve the production schedule and produce quality garments.

1. **Departments in Garment Production:** Each department in garment manufacturing plays a specific role, contributing to the garment's transformation from raw materials to finished product. Here are the key departments:

Fig. 4.2.1: Departments in garment production

Fig. 4.2.2: Different departments in garment production

- **Cutting Department:** The cutting department is responsible for preparing the fabric and cutting it into pattern pieces. After cutting, the bundles of cut fabric, trims, and accessories are prepared for distribution to the next stages of production.

Fig. 4.2.3: Cutting department

- **Cutting Room (Fabric Inspection):** Before cutting begins, fabric is usually inspected for defects, and patterns are laid out to maximize fabric usage. The cutting room is a critical area for ensuring that materials are used efficiently and that defects are detected early.
- **Trimming and Accessories Department:** This department manages all the trims, such as zippers, buttons, labels, and any other non-fabric components. These trims are typically organized, stored, and distributed to the sewing department or wherever needed in the production process.
- **Sewing Department:** The Sewing Department is where the bulk of garment assembly happens. This is where the cut pieces are stitched together to form the basic structure of the garment. This department typically handles:
  - Seam stitching
  - Attaching sleeves, collars, cuffs
  - Sewing up side seams, inseams

- Buttonholes, pockets, and other small details

Fig. 4.2.4: Sewing department in garment factories

- **Finishing Department:** The Finishing Department handles the final touches before the garment is ready for packaging. This includes:
  - Trimming excess threads
  - Pressing or steaming to remove wrinkles
  - Attaching final trims (labels, zippers, buttons)
  - Quality inspection

Fig. 4.2.5: Fabric inspection department

- **Quality Control (QC) Department:** The QC Department ensures that the garments meet the required quality standards. The garments are inspected at various stages:
  - In-line inspection during sewing
  - Final inspection before packaging and shipment
  - Fabric inspection before cutting

Fig. 4.2.6: Quality inspection in garment factories

- **Packing Department:** The Packing Department prepares the finished garments for shipment. This includes:
  - Folding garments
  - Tagging with size and price labels
  - Packing garments into boxes for shipment to retail stores or customers

Fig. 4.2.7: Packing department for fabric in garment factories

2. **Distribution of Bundles to units:** After the cutting department has finished cutting and ticketing the parts, the bundles of cut parts are shipped out to the sewing department (and other departments) as required. This process is very controlled so that things move smoothly through the factory.

Fig. 4.2.8: Fabric bundles

- **Preparation of Bundles for Distribution:** Prior to sending the bundles to the sewing or other departments, the following must be done to each bundle:
  - **Sorted by Style and Size:** Bundles are sorted by size (e.g., Small, Medium, Large) and style (e.g., shirts, pants). This is to make sure that every department receives the proper components for each particular garment.
  - **Ticketed:** Every bundle has a ticket or label stating the garment style, size, and the components contained therein. This prevents confusion and mistakes in assembling.
  - **Checked for Completeness:** Double-check that each bundle has all of the required parts, including the principal pieces of fabric and any trim or accessories. Take a moment to double-check that nothing is lost or out of place.
- **Distribution to Sewing Department:** Distribution of bundles to the sewing department is one of the most important phases. Here is how it usually goes:
  - **Departmental Coordination:** The cutting department coordinates with the sewing supervisor to ascertain the precise number of bundles needed for each style and size. The bundles are then shipped to the sewing department based on the production schedule and sewing line capacity.

- **Sewing Line Assignments:** In larger factories, there could be several sewing lines running simultaneously, each making different components of the garment. For instance:
  - Line 1 could be for stitching sleeves and backs,
  - Line 2 can take care of the front and side seams,
  - Line 3 can be for details like collars and cuffs.
  - Bundles are assigned based on sewing line capacity and workload to avoid bottlenecks.

Fig. 4.2.9: Different sewing lines in garment factories with each person in charge of various things

- **Sewing Operators:** After the bundles are delivered to the sewing department, they are allocated to the sewing operators. The operator proceeds with the stitching based on the work order, as per the specifications of the garment (e.g., type of stitching, seam allowance, etc.).

Fig. 4.2.10: Sewing operators

- **Material Handling and Movement:** The transfer of bundles from one department to another must be smooth and systematic:
  - **Conveyor Systems or Trolleys:** Conveyor systems or trolleys are employed in some factories to transfer bundles from one department to another. This facilitates a quicker and more systematic movement of materials.

Fig. 4.2.11: Overhead conveyor system

- **Manual Distribution:** In less automated or smaller plants, employees carry bundles from one department to the next by hand or on carts.

- **Tracking Bundles:** In order to confirm proper distribution and track the flow of materials, most factories apply production tracking systems (manual or electronic) for recording the transfer of bundles between departments. Bundles are followed through:
  - **Barcode or RFID Systems:** These permit the scanning of bundles at each step, reporting real-time data about their status and position within the production cycle.

Fig. 4.2.12: Barcode or RFID systems

  - **Production Reports:** Well-documented reports from every department (cutting, sewing, finishing, etc.) enable the supervisors to track progress and detect any possibility of delays in the workflow.

4.2.2 Formation and Managing Groups for Equal Workload Distribution

Effective workload allocation in the cutting department is necessary to sustain productivity and avoid overloading any individual or team. The Cutting Supervisor needs to study the creation of working groups and allocate work in a manner that maximizes efficiency without compromising quality and consistency. This is done by assessing team capacity, workload balancing, and enforcing a structured workflow.

Understanding the Formation of Groups

Cutting department is usually organized into various groups handling different tasks including fabric spreading, marking, cutting, bundling, and ticketing. The groups' numbers and types are subject to a number of factors:

Order volume	Higher order volumes require larger or multiple teams working simultaneously.
Fabric type and complexity	Delicate fabrics or intricate patterns may require more skilled workers or specialized cutters.
Available workforce	The number of workers available and their skill levels determine how tasks can be assigned.
Cutting equipment	The type and availability of cutting machines influence group formations.

After group formation, the workload distribution should be analysed. Inefficient distribution of work can result in inefficiency, delays, and lower morale. Some of the most important aspects to consider when balancing workloads are:

Time required for each task	Skill-based assignment	Parallel task execution	Avoiding bottlenecks
•Estimating the time needed for fabric spreading, cutting, and bundling helps in assigning tasks evenly.	•Complex cutting jobs should be given to experienced workers, while simpler tasks can be handled by less experienced staff.	•Assigning multiple teams to work on different sections of the same order can speed up the process.	•Ensuring that one stage does not slow down the entire workflow by distributing work evenly.

Fig. 4.2.13: Important aspects to consider when balancing workloads

For instance, if one group completes cutting ahead of schedule and another is experiencing difficulties with fabric spreading, then there is a lack of balance. There is a need to make adjustments in order to maintain the workflow consistent.

Implementing a Structured Workflow

To ensure equal workload distribution, a structured workflow must be established. This involves:

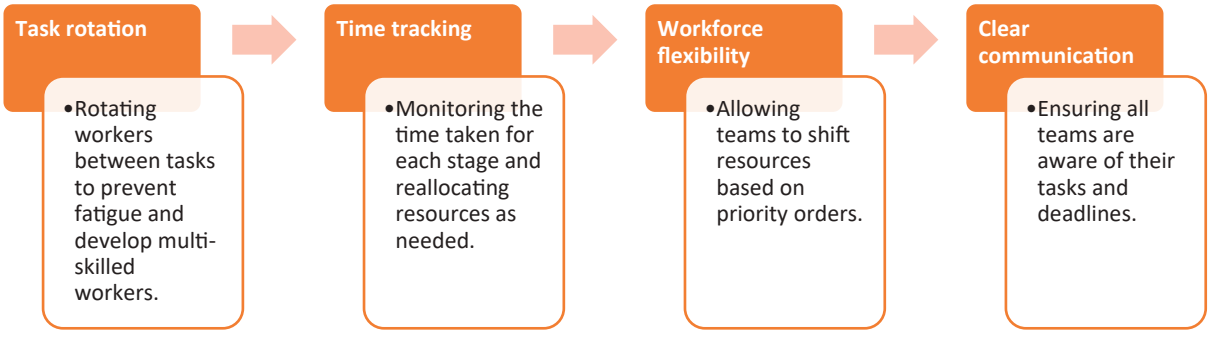


Fig. 4.2.14: Process of implementing a structured workflow

Using real-time tracking tools or manual logs can help in assessing workload balance and making necessary adjustments.

Monitoring and Adjusting Workload Distribution

Real-time tracking software or manual logs can assist in workload balance assessment and making adjustments.

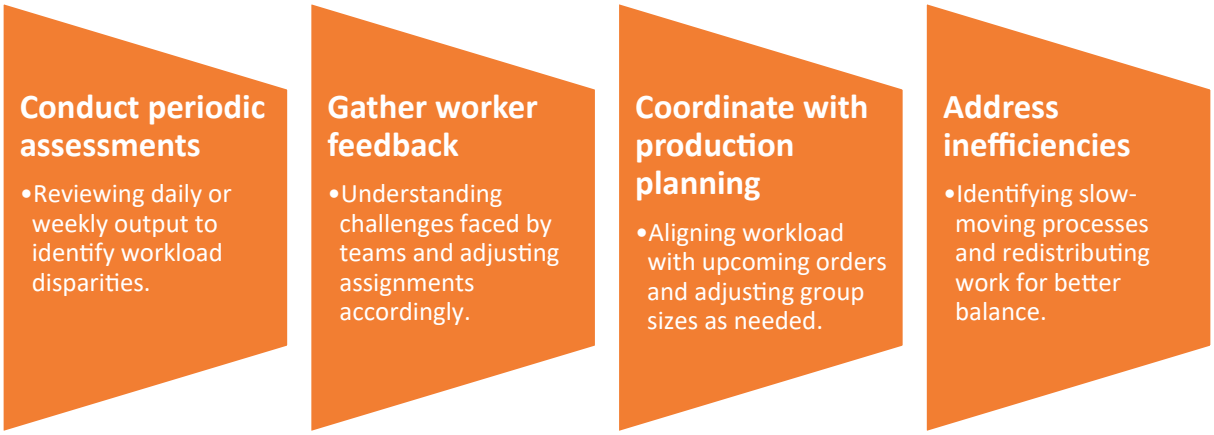


Fig. 4.2.15: Methods of monitoring and adjusting workload distribution

4.2.3 Ensuring Smooth Workflow and Task Completion in Garment Production

In apparel manufacturing, smooth production and timely completion of tasks necessitate the formation of well-functioning teams. The teams should have dedicated tasks, each team working together to finish their tasks efficiently and without any delay. The major teams involved in the production of garments and best practices for efficient completion of tasks.

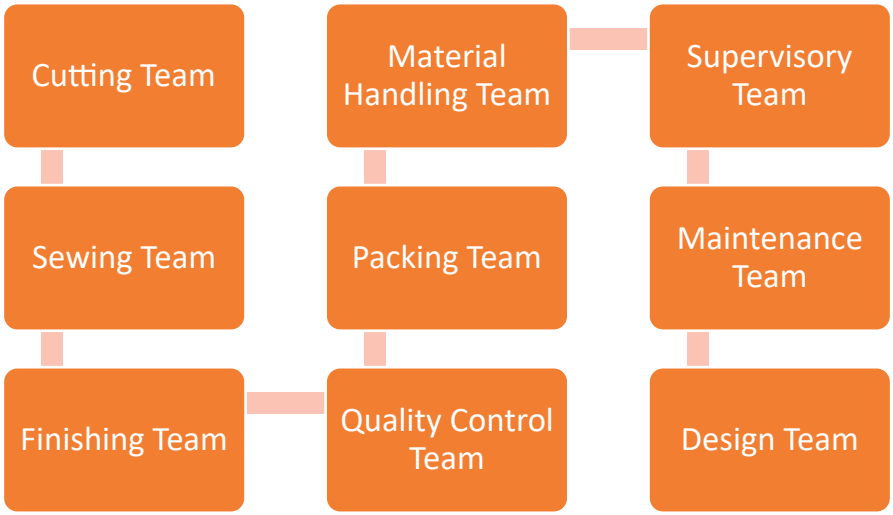


Fig. 4.2.16: Major teams involved in the production of garments

1. **Cutting Team:** Cutting Team cuts the fabric to shape and prepares the fabric as required. It is important for the Cutting Team to work efficiently to make sure that the overall production process goes on as scheduled.

   Key Tasks:

   - Fabric inspection for defects.
   - Pattern making and marker making.
   - Fabric cutting (manual or using automated cutting machines).
   - Sorting and bundling cut pieces according to sizes and styles.

   Smooth Workflow Tips:

   - Ensure fabric is laid out properly to avoid wastage and errors.
   - Use cutting software to optimize fabric usage and minimize waste.
   - Regularly check material inventory to ensure there is no shortage of fabric.
   - Timely distribution of cut pieces to other departments like sewing.

2. **Sewing Team:** The Sewing Team is also the biggest team in garment manufacturing, as they are responsible for putting the garment together by sewing the different cut pieces together.

   Key Tasks:

   - Sewing seams for the body, sleeves, and other components.
   - Attaching trims (such as zippers, buttons, collars, cuffs, etc.).
   - Finishing the garment (e.g., hemming, topstitching, adding labels).

   Smooth Workflow Tips:

   - Ensure groups are split up into specialist groups per task (i.e., one group for side seams, another group for collar stitching).
   - Implement workstations to minimize walking and downtime between tasks.
   - Use quality control checkpoints at various stages to identify and resolve issues early.
   - Rotate workers through different tasks to develop cross-functional skills.

3. **Finishing Team:** The Finishing Team is responsible for completing the garment prior to it going on to packing.

   Key Tasks:

   - Pressing and steaming garments to remove wrinkles and shape them.
   - Trimming threads and ensuring neatness.
   - Attaching final trims (e.g., buttons, hang tags, labels).
   - Final inspection to ensure the garment meets quality standards.

   Smooth Workflow Tips:

   - Ensure the pressing machines and steaming equipment are functioning optimally.
   - Organize and store trims efficiently to avoid delays when attaching them.
   - Conduct spot checks during finishing to catch any overlooked issues.

4. **Quality Control (QC) Team:** The QC Team is responsible for maintaining the quality of the clothing during the process of production. They conduct check-ups at several stages to maintain high standards.

   Key Tasks:

   - In-line inspections during sewing and assembly to catch defects early.
   - End-of-line inspections to check the finished garments.
   - Pre-shipment checks to ensure garments meet customer specifications.

   Smooth Workflow Tips:

   - Develop clear quality checklists to guide inspections.
   - Use visual aids for workers to recognize quality standards (e.g., colour swatches, size charts).
   - Inform problems immediately to the sewing or finishing teams in order to make quick corrections.

5. **Packing Team:** The Packing Team is the one that will pack the final clothing for transportation to clients or stores.

   Key Tasks:

   - Folding garments neatly according to size.
   - Tagging garments with size, care labels, and any required branding.
   - Packing garments into boxes, bags, or other packaging materials.
   - Shipping preparations, ensuring items are labelled correctly for dispatch.

   Smooth Workflow Tips:

   - Use standardized folding techniques to ensure uniformity and avoid mistakes.
   - Implement a barcode system for tracking the garments.
   - Organize the packing area to keep the garments well-arranged and reduce time spent looking for items.

6. **Material Handling Team:** The Material Handling Team is in charge of ensuring smooth material flow (raw materials like fabric, trims, accessories) from department to department and the distribution of finished goods.

   Key Tasks:

   - Transporting materials from storage to the cutting, sewing, and finishing departments.
   - Managing inventory to ensure that materials are available when needed.
   - Stocking and restocking raw materials and trims in the appropriate areas.
   - Delivering finished garments to the packing area.

   Smooth Workflow Tips:

   - Implement barcoding or RFID systems for easy tracking of materials and finished products.
   - Use conveyor belts or carts to streamline movement between departments.
   - Coordinate delivery schedules with production timelines to avoid delays.

7. **Supervisory Team:** The Supervisory Team coordinates the whole production process, ensuring smooth coordination between departments and ensuring uninterrupted workflow.

Key Tasks:

- Planning production schedules and assigning tasks to different teams.
- Monitoring progress and ensuring deadlines are met.
- Resolving any issues related to resources, machinery, or manpower.
- Communicating between departments to ensure smooth transitions of work.

Smooth Workflow Tips:

- Use production management software to track team progress and adjust schedules dynamically.
- Conduct regular meetings with team leaders to discuss challenges, delays, and solutions.
- Ensure that supervisors are highly trained in conflict resolution and problem-solving to eliminate any production bottlenecks promptly.

8. **Maintenance Team:** Maintenance Team is responsible for ensuring smooth running of all the equipment and machinery so that there is always a steady production flow.

Key Tasks:

- Regular maintenance of cutting, sewing, and finishing machinery.
- Troubleshooting and repairing equipment when it breaks down.
- Calibration of machines to ensure precision in garment production.
- Ensuring a safe working environment by maintaining equipment safety.

Smooth Workflow Tips:

- Set up a preventive maintenance schedule to reduce machine downtime.
- Use predictive maintenance technologies (e.g., IoT sensors) to predict failures before they occur.
- Ensure that workers are trained to report minor issues before they escalate.

9. **Design Team (Optional):** In certain plants, there is a Design Team that also collabourates very closely with the production process, particularly for made-to-order garments or new designs.

Key Tasks:

- Creating garment designs and patterns.
- Modifying designs based on customer requests or production feedback.
- Collabourating with production teams to ensure that the design is feasible to produce.

Smooth Workflow Tips:

- Ensure the design team interfaces early with production to avoid last-minute changes in design.
- Release definite design specifications to cutting and sewing teams to avoid confusion and delay.
- Prototype testing of new designs before full-scale production.

4.2.4 Identifying and Organizing Work According to the Delivery Schedule

A cutting supervisor has a very important role to play in coordinating fabric cutting operations with the general production schedule. Organizing work according to delivery schedules is crucial to maintaining efficiency, avoiding bottlenecks, and making on-time shipments. This involves careful planning,

Understanding the Delivery Schedule

Delivery schedule is a schedule of a programmed timeline indicating when completed garments have to be despatched to customers. The merchandising and production planning departments usually finalize it depending upon customer orders, production capability, and logistical needs. To oversee cutting operations well, the Cutting Supervisor needs to study the schedule to ascertain how work should progress and what level of priority, if any.

Every order included in the delivery schedule contains certain important elements

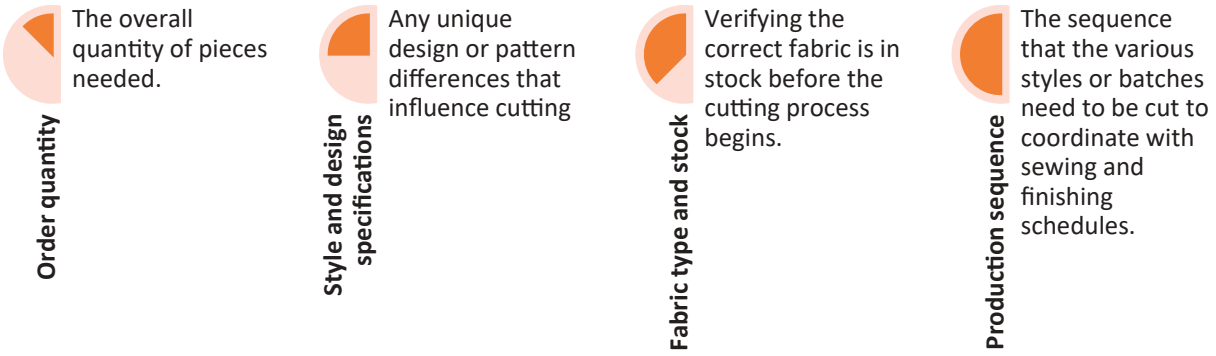


Fig. 4.2.17: Important elements in delivery schedule

Prioritization of Work According to Urgency

Not all orders are equally urgent. Some may be for instant delivery, while others can be done on a flexible schedule. Prioritization should be according to:

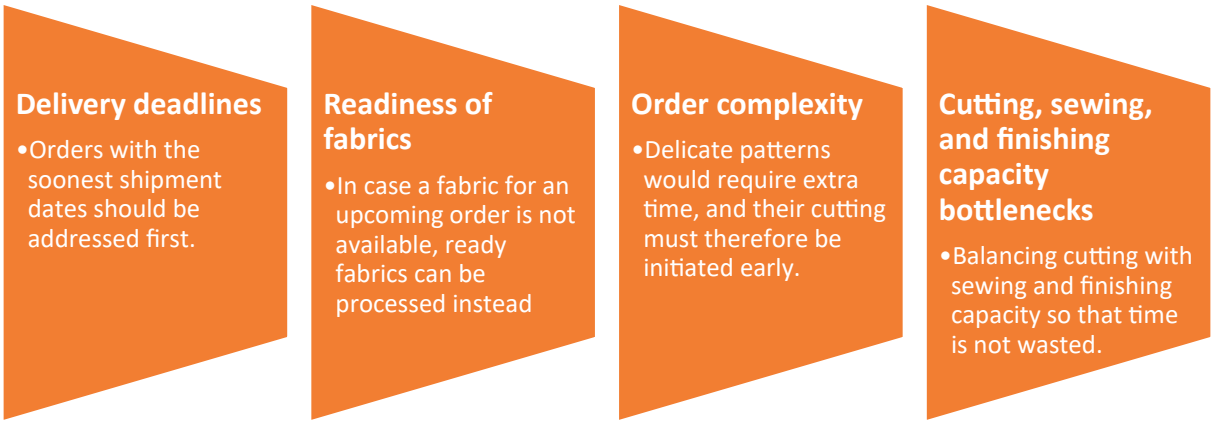


Fig. 4.2.18: Way of prioritization of work

Designing a Cutting Plan

When priorities are assigned, the cutting supervisor needs to create a workflow and make a schedule to coordinate the workload. While doing so, the following points should be considered:

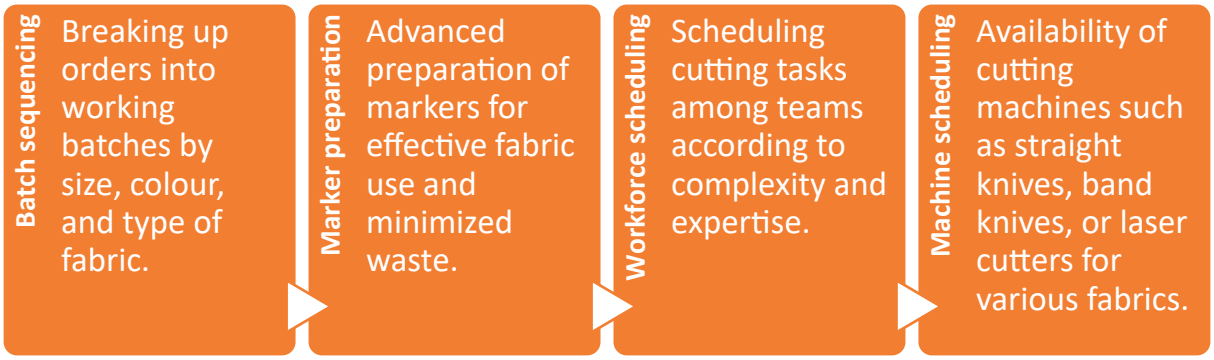


Fig. 4.2.19: Ways of designing a cutting plan

Monitoring and Adapting Workflows

No matter how well-crafted the plan is, last-minute interruptions happen. The manager has to continuously check on development and make fine-tuning depending on the necessity. Periodic meetings with the production planning divisions assist in gauging if the cutting unit is on its schedule. Key monitoring methods are:

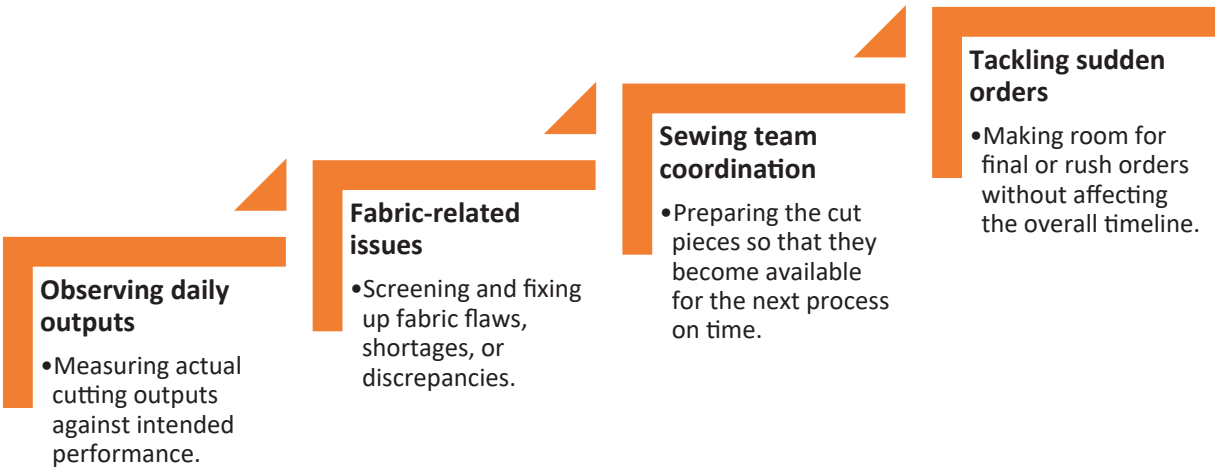


Fig. 4.2.20: Ways of maintaining workflows

Summary

- Participants will learn to use pattern/marker-making and cutting software effectively.
- They will develop skills to cut fabric, trims, and accessories precisely as per quality standards.
- Identifying reference samples and cutting equipment near the cutting table will be covered.
- Ticketing and bundling of cut components, trims, and accessories will be outlined.
- Materials will be analysed and prioritised according to the delivery schedule.
- Participants will also learn about production workflow, work distribution, and organizing tasks efficiently.

Exercise

Multiple-choice Question:

1. What is the purpose of pattern/marker-making software?
   a. To design garments digitally
   b. To create patterns and optimize fabric usage
   c. To stitch fabric together
   d. To check fabric quality

2. What must be ensured while cutting fabric, trims, and accessories?
   a. Speed of cutting
   b. Colour of the material
   c. Precision and quality standards
   d. Availability of extra fabric

3. Why is ticketing and bundling important in the cutting process?
   a. To decorate the cut fabric
   b. To organize cut components for production
   c. To speed up the sewing process
   d. To reduce fabric wastage

4. How can work be distributed efficiently in production?
   a. By assigning tasks randomly
   b. By forming balanced groups
   c. By allowing workers to choose their tasks
   d. By focusing on one section at a time

5. What factor is considered while organizing work in production?
   a. Worker preferences
   b. Delivery schedule
   c. Availability of lunch breaks
   d. Number of machines

Descriptive Questions:

1. Explain the importance of using pattern/marker-making and cutting software in the garment industry.
2. Describe the role of ticketing and bundling in the production process.
3. How can production workflow be managed to ensure efficiency?
4. What are the key considerations when analyzing materials based on priority?
5. Explain how workload distribution can improve productivity in a manufacturing unit.

Notes

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

https://youtu.be/A_VCh45IDN4?si=jl2ikix7cOjGwbmG

Garment Manufacturing Technology

https://youtu.be/xbCIe1VIc_M?si=ECI58U4X5rty0LX_

Garments Cutting Section

https://youtu.be/dSn7iz-bFN8?si=cgBinegFJfnnGffC

Introduction to Apparel Industry

Skill India
कौशल भारत-कुशल भारत

सत्यमेव जयते
GOVERNMENT OF INDIA
MINISTRY OF SKILL DEVELOPMENT
& ENTREPRENEURSHIP

N·S·D·C
RE IMAGINE FUTURE

5. Maintain Health, Safety and Security in the Cutting Department with Gender and PwD Sensitization

APPAREL MADE-UPS HOME FURNISHING
SECTOR SKILL COUNCIL

Unit 5.1 - Workplace Safety and Hazard Management

Unit 5.2 - Emergency Preparedness and First Aid

AMH/N0613

Key Learning Outcomes

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

1. Demonstrate the process of first-aid.
2. Demonstrate handling of fire extinguisher in case of any fire emergency.
3. Demonstrate correct use of PPE (Personal Protective Equipment i.e., stainless steel mesh gloves)
4. Identify hazards related to cutting equipment like electrical cutter.
5. Handle tools and equipment's like scissors, Knives, etc. safely.
6. Observe potential risks and threats associated with workplace and equipment like, hot iron, knife, stain removers etc.
7. Ensure appropriate PPE (Personal Protective Equipment) is used while operating the handheld electrical cutter with the help of mesh gloves.
8. Monitor workplace and work processes for potential risks and threats like physical injuries or disabilities.
9. Participate in mock-drills/evacuation procedures organized at the workplace.

UNIT 5.1: Workplace Safety and Hazard Management

Unit Objectives

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

1. Identify hazards related to cutting equipment, tools, and workplace risks such as hot iron, knives, and stain removers.
2. Evaluate handle of tools and equipment like scissors and knives safely.
3. Ensure the correct use of PPE, including stainless steel mesh gloves, while operating cutting tools.
4. Organise the workplace and work processes for potential risks, injuries, or disabilities.

5.1.1 Hazards Related to Cutting Equipment, Tools, and Workplace Risks

A cutting supervisor should ensure that the cutting department is safe by recognizing possible hazards related to cutting equipment, tools, and workplace hazards. The cutting process includes the use of sharp blades, high-speed machinery, and chemical substances that can lead to injuries or health risks if mishandled. Recognizing these risks and taking preventive measures is necessary to ensure a safe and effective work environment.

Hazards Related to Cutting Equipment

Cutting machines are among the most hazardous items in the fashion production process. Some of the hazards include:

- Understand the fundamentals of fabric layering, lay planning, and marker efficiency to optimise fabric usage in cutting operations.
- Identify and differentiate between types of fabric lays (flat lay, face-to-face lay, stepped lay, etc.) and select appropriate laying methods based on fabric type, texture, and production volume.
- Operate and maintain fabric spreading equipment, both manual and automatic, ensuring tension-free lays and alignment accuracy as per production specifications.

Fig. 5.1.1: Blade-related injury

- Inspect fabric rolls for defects, shading, and directional properties before spreading, and record fabric consumption and wastage with proper documentation.
- Follow standard safety practices and quality protocols during the laying process, ensuring minimal material damage and alignment with production and quality benchmarks.
- Collaborate effectively with cutting room personnel to interpret lay orders, manage fabric stock, and contribute to overall cutting room efficiency and productivity.

Risks Associated with Cutting Tools

Hand tools are often used in the cutting department, and misuse can cause injury. Some of the most common hazards are:

Hand cuts and lacerations

Hand shears, rotary cutters, and trimming scissors can cause injuries if used without caution.

Blade breakage

Dull or poorly cared-for blades can break, and sharp pieces fly to cause injury to workers

Repetitive strain injuries

Continuous use of hand tools without ergonomic practices can lead to muscle fatigue and long-term strain injuries.

Fig. 5.1.2: Risks associated with cutting tools

Workplace Risks

The cutting department is also subjected to other occupational hazards beyond cutting equipment. Some of them include:

- **Hot iron burns:** When cutting sections are adjacent to pressing or fusing operations, workers may accidentally touch hot irons or fusing machines, leading to burns.

Fig. 5.1.3: Hot iron burns

- **Chemical exposure from stain removers:** Stain removal solvents frequently contain strong chemicals that may cause skin irritation, breathing problems, or even long-term illnesses. Poor ventilation or spills raise the risk.
- **Slipping hazards:** Loose fabric pieces, spilled chemicals, or misplaced tools can create slippery conditions, leading to falls.
- **Fire risks:** Fabric dust, heat-generating equipment, and improper electrical wiring can increase fire hazards. Certain synthetic fabrics are also highly flammable.

Implementing Safety Measures

To maintain a safe cutting environment, the Cutting Supervisor should:

Conduct regular safety training	Enforce proper machine maintenance	Establish clear safety guidelines	Monitor workplace conditions
•Ensuring that workers are aware of equipment hazards, PPE usage, and emergency protocols.	•Keeping cutting machines and hand tools in optimal condition to prevent malfunctions.	•Enforcing policies like proper dress (no loose clothes or jewellery), safe chemical-handling procedures, and ergonomic work practices	•Conducting routine inspections to identify and eliminate potential hazards.

Fig. 5.1.4: Safety measures

5.1.2 Safe Handling of Tools and Equipment

A cutting supervisor needs to ensure all cutting equipment and tools, i.e., knives and scissors, are used with safety to avoid accidents and be efficient in the cutting of materials. Safe handling practices, periodical maintenance, and training employees are essential steps to minimize accidents and ensure good workflow.

Understanding the Risks of Cutting Tools

Cutting tools such as scissors, straight knives, rotary cutters, and band knives are several risks when not properly handled. The most frequent hazards are:

Fig. 5.1.5: Sharp blades can cause severe injuries

- **Lacerations and deep cuts:** Sharp blades can cause severe injuries if mishandled or used without safety precautions.
- **Blade slippage:** Poor grip or excessive force can cause tools to slip, leading to accidental injuries.
- **Improper posture and strain injuries:** Continuous use of cutting tools without ergonomic handling can lead to wrist and hand strain over time.
- **Accidental contact with moving blades:** Power-driven knives, such as straight or band knives, require special precautions to avoid hand injuries.

Safe Handling Practices for Cutting Tools

Proper techniques, proper usage, and employee awareness are the keys to safe handling of scissors, knives, and other cutting tools. Some of the most important handling practices are:

Using the right tool for the job	Maintaining a firm grip	Dull blade retention	Cutting away from the body	Storing tools properly
•Choosing the correct cutting tool for the fabric type, thickness, and cutting need. For instance, thick fabrics need heavy-duty shears, whereas rotary cutters are more appropriate for layered cutting	•Having workers maintain a firm grip on scissors and knives to avoid slippage. Ergonomic handles minimize strain and enhance control.	•Dull blades need extra pressure, contributing to the possibilities of hand cramping and unwitting slippage. Regular sharpness maintenance offers smooth and hazard-free cutting.	•Workers should always direct the cutting motion away from their hands and body to minimize injury risks.	•Scissors and knives should be stored in designated holders or sheaths when not in use to prevent accidental injuries.

Fig. 5.1.6: Safe handling practices for cutting tools

Safe Operation of Power-Driven Cutting Equipment

When dealing with power-operated cutting tools like straight knives, band knives, and laser cutters, supplementary precautions need to be taken into consideration:

Using protective guards	Machines should have blade guards to minimize direct contact with the cutting surface.
Maintaining stable positioning	Workers must ensure the fabric is properly secured and their hands are positioned safely away from the cutting path.
Following emergency stop protocols	Knowing how to immediately shut down a machine in case of malfunction or accidental contact.
Wearing appropriate PPE	Workers should wear cut-resistant gloves when handling high-risk cutting tasks, ensuring they do not interfere with precision.

Fig. 5.1.7: Safe operation of power-driven cutting equipment

Training and Supervision for Safe Handling

Regular training programs can be enforced by the Cutting Supervisor to train personnel in safe usage methods. Some of these practices include:

Demonstrations on proper tool use	• Showing the correct way to hold and operate scissors and knives to prevent injuries.
Ergonomic training	• Teaching workers how to reduce strain injuries by adjusting grip, posture, and work surface height.
Maintenance workshops	• Ensuring workers know how to clean, sharpen, and store tools correctly.
Emergency response training	• Training employees on how to respond to accidents, e.g., blade cuts or equipment failure.

Fig. 5.1.8: Training and supervision for safe handling

5.1.3 Ensuring Proper PPE When Using Cutting Tools

In the apparel and textile industry, cutting operations play a vital role in shaping raw fabrics into precise patterns and components for garment production. This process involves the use of sharp and powerful cutting tools, such as straight knives, band saws, and rotary cutters, which operate at high speeds and demand precision handling. However, the very tools that enable accuracy and efficiency also pose significant safety risks. Even a minor lapse in concentration or a small slip of the hand can lead to severe cuts, lacerations, or puncture wounds, making workplace safety a top priority.

To mitigate these risks, the use of Personal Protective Equipment (PPE) is essential. Among the various PPE, stainless steel mesh gloves stand out as a critical safeguard for cutting supervisors. These gloves, designed with interlocking metal rings, provide superior resistance to sharp blades, effectively preventing deep cuts and enhancing safety during cutting operations. In addition to gloves, other PPE such as cut-resistant sleeves, safety goggles, and protective aprons further shield supervisors from potential hazards.

Ensuring the correct use of PPE not only protects individuals from injuries but also fosters a safer work environment, reduces downtime due to accidents, and promotes compliance with industry safety standards.

Key PPE Used by Cutting Supervisors

PPE Type	Purpose	Features	Materials Used
 **Stainless Steel Mesh Gloves**	Protects hands from cuts and lacerations	Cut-resistant, flexible, durable	Stainless steel, corrosion-resistant
 **Cut-Resistant Sleeves**	Shields arms from accidental blade contact	Elastic fit, high cut resistance	Kevlar, high-performance polyethylene
 **Protective Eyewear**	Guards eyes from flying fabric particles	Anti-fog, scratch-resistant lenses	Polycarbonate, impact-resistant

PPE Type	Purpose	Features	Materials Used
 **Safety Shoes**	Protects feet from falling objects	Slip-resistant, steel-toe reinforcement	Leather, steel, rubber
 **Aprons or Cut-Resistant Vests**	Shields torso from accidental blade contact	Adjustable fit, blade-resistant	Kevlar, puncture-resistant fabric

Table 5.1.1: List of PPE used by cutting supervisors

Importance of Stainless Steel Mesh Gloves in Fabric Cutting Operations

1. **Enhanced Hand Protection Against Cuts**
   - Stainless steel mesh gloves provide maximum protection against cuts, slashes, and abrasions from sharp blades.
   - Their interlocking metal rings form a protective barrier that prevents deep penetration by blades.
   - The gloves offer full hand coverage, including fingers and the back of the hand, reducing injury risks.
2. **Improved Grip and Dexterity**
   - The gloves offer a textured surface that enhances grip on cutting tools and fabric, preventing accidental slippage.
   - Despite their metal construction, they are flexible and lightweight, allowing for comfortable and precise hand movements.
3. **Durability and Longevity**
   - Mesh gloves are made of corrosion-resistant stainless steel, making them highly durable and long-lasting.
   - They can withstand repeated use and regular cleaning without losing their protective properties.
4. **Compliance with Safety Regulations**
   - According to OSHA (Occupational Safety and Health Administration) standards, the use of PPE, including mesh gloves, is mandatory in workplaces with sharp cutting equipment.
   - Enforcing the use of mesh gloves ensures compliance with industry regulations, reducing the risk of legal liabilities.

Guidelines for Ensuring Correct Use of Mesh Gloves and PPE

Guidelines	Description
Pre-Shift Inspection and Fit Check	Cutting supervisors must inspect mesh gloves for any signs of wear, tear, or broken links before each shift.
	Ensure that gloves fit snugly to prevent slippage and allow for precise hand movements.
Proper Wearing Techniques	Always wear mesh gloves over protective sleeves for full arm protection.
	Use secure wrist straps to prevent gloves from slipping during cutting operations.
	Ensure that the gloves cover the entire hand, including the fingers and knuckles, for maximum protection.
Regular Cleaning and Maintenance	Mesh gloves should be cleaned and sanitised regularly to prevent contamination.
	Use mild detergent and water for cleaning, followed by thorough drying.
	Store gloves in a clean, dry location to prevent rust or corrosion
PPE Training and Compliance Checks	Cutting supervisors should conduct regular training sessions on the correct use of PPE.
	Implement random compliance checks to ensure that all employees wear PPE correctly.
	Address non-compliance with corrective action plans and reinforcement training.
Safe Cutting Techniques	Encourage supervisors and operators to use slow and controlled cutting movements while wearing mesh gloves.
	Emphasise keeping fingers away from the blade path and using guiding tools or fabric clamps where possible.

Table 5.1.2: Correct use of mesh gloves and PPE

Best Practices for Mesh Glove Safety in Cutting Operations and PPE Compliance

Best Practice	Description	Benefits
Double Gloving for Extra Protection	Wearing a cotton liner glove underneath the mesh glove	Provides extra comfort and reduces friction
Colour-Coded Gloves	Use different coloured gloves for specific tasks	Prevents cross-contamination
Frequent Glove Inspection	Check gloves for damage or missing links before each use	Ensures consistent protection
Employee Refresher Training	Regular training on correct glove usage and handling	Reduces human errors

Best Practice	Description	Benefits
Incident Reporting System	Set up a protocol for immediate reporting of PPE-related issues	Improves safety protocols
Clear Signage and Guidelines	Display PPE requirement signs in cutting areas as reminders.	Reinforces PPE compliance among staff.
Enforcement of PPE Policies	Make it mandatory for all cutting supervisors to wear mesh gloves and other PPE.	Promotes consistent safety practices.

Table 5.1.3: Methods of using mesh glove safely and PPE compliance

Key Benefits of Using Mesh Gloves and PPE in Cutting Operations

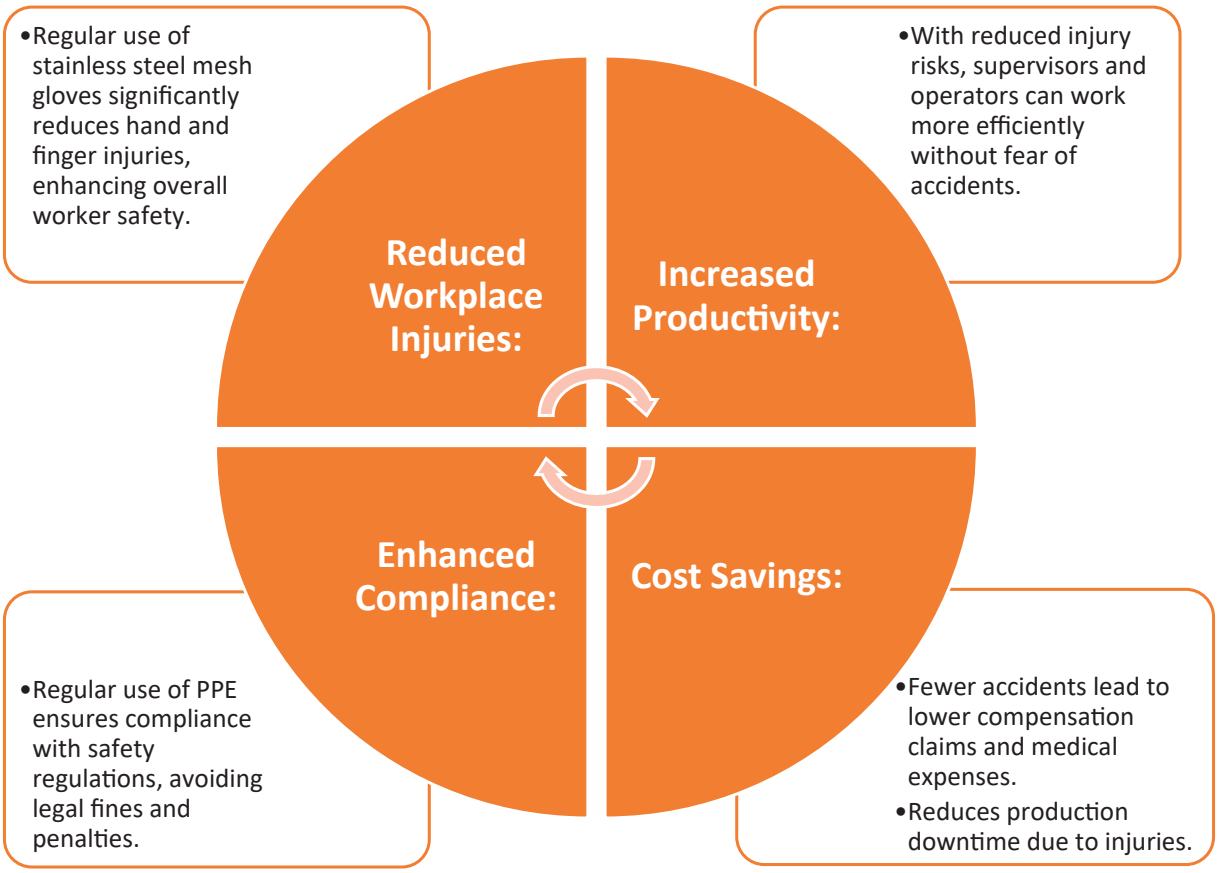


Fig. 5.1.9: Benefits of using mesh gloves and PPE in cutting operations

5.1.4 Organizing the Workplace and Work Processes to Prevent Risks, Injuries, and Disabilities

An efficiently organized cutting room reduces workplace dangers, lowers the number of injuries, and keeps employees from receiving long-term disabilities. The cutting supervisor has to put in place systematic workplace organization tactics, maintain safety practices, and streamline work procedures to provide a secure and productive cutting operation.

Identifying Workplace Risks and Hazards

The cutting room poses a number of possible workplace hazards that can result in injury or long-term illness. These dangers include:

Sharp tool injuries	•Knives, scissors, and cutting machines can cause lacerations if not handled properly.
Repetitive strain injuries (RSI)	•Continuous cutting, lifting, and fabric handling can lead to wrist, shoulder, and back strain.
Slips and falls	•Loose fabric scraps, spills, or misplaced tools can create slipping hazards.
Chemical exposure	•Stain removers and adhesives used in the cutting process may cause skin irritation or respiratory issues.
Hearing damage	•Prolonged exposure to noisy cutting machines can lead to hearing impairment over time.

Fig. 5.1.10: Workplace risks and hazards

Organizing the Workplace for Safety

An efficiently organized cutting room enhances workflow without reducing efficiency. Some important organizational tactics are:

Proper tool storage

•Scissors, knives, and rotary cutters should be stored in designated holders when not in use to prevent accidental injuries.

Clear workstation layout

•Cutting tables should have enough space to allow free movement, preventing congestion that can lead to accidents.

Anti-slip flooring

•Floors should be kept free from fabric scraps and liquid spills, with anti-slip mats placed in high-risk areas.

Proper lighting

•Adequate lighting is essential to prevent cutting errors and reduce eye strain, especially in detailed cutting tasks.

Ventilation and air quality control

•Proper ventilation ensures that fabric dust and chemical fumes do not pose health risks.

Fig. 5.1.11: Important organizational tactics

Structuring Work Processes to Reduce Injuries

Besides planning the physical work environment, streamlining work processes minimizes injuries and increases productivity. This involves:

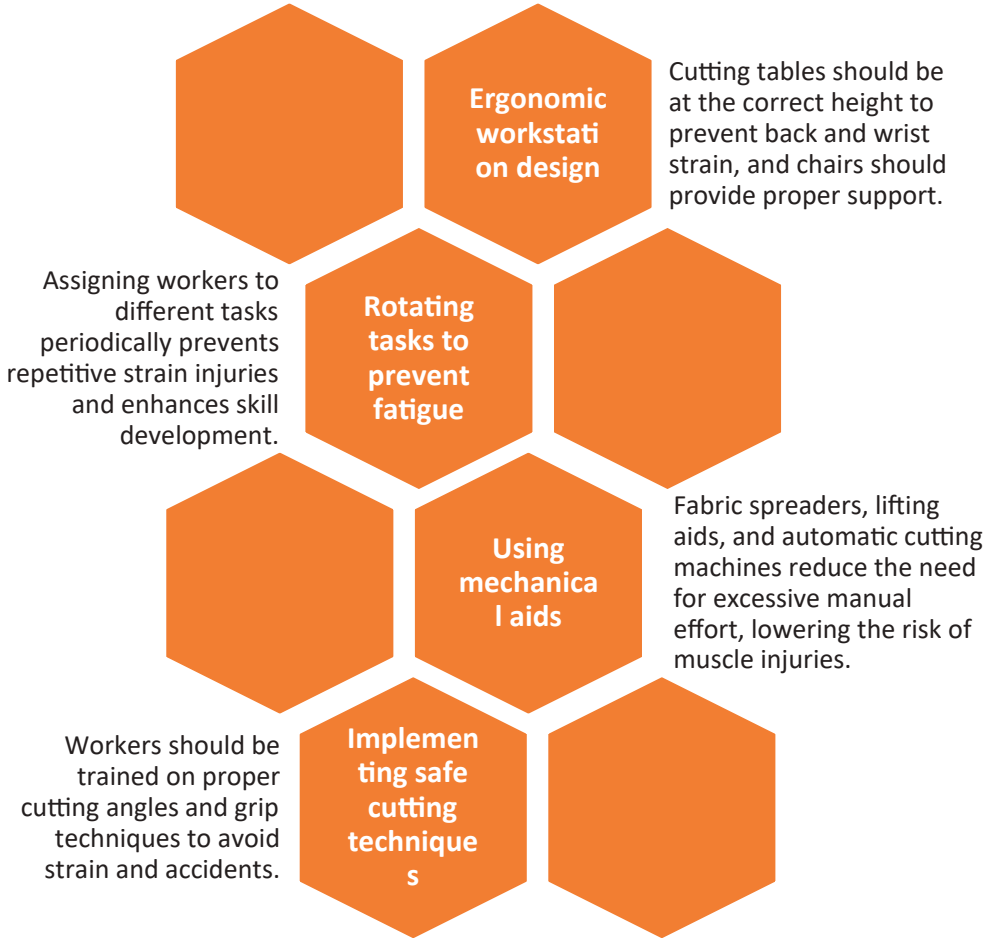


Fig. 5.1.12: Ways of structuring work processes to reduce injuries

Preventing Long-Term Disabilities

Repeated motions, a poor posture, or continuous contact with hazards may lead to long-term health issues. To avert disabilities, the cutting supervisor ought to:

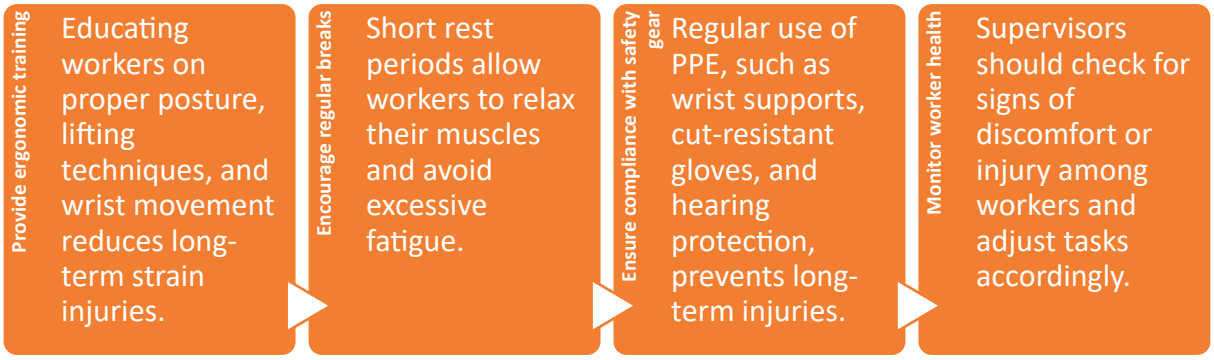


Fig. 5.1.13: Methods to avert disabilities

Implementing Safety Policies and Training

In order to have a secure cutting department, the cutting supervisor must have tough safety policies in place and ensure frequent training is carried out. This involves:

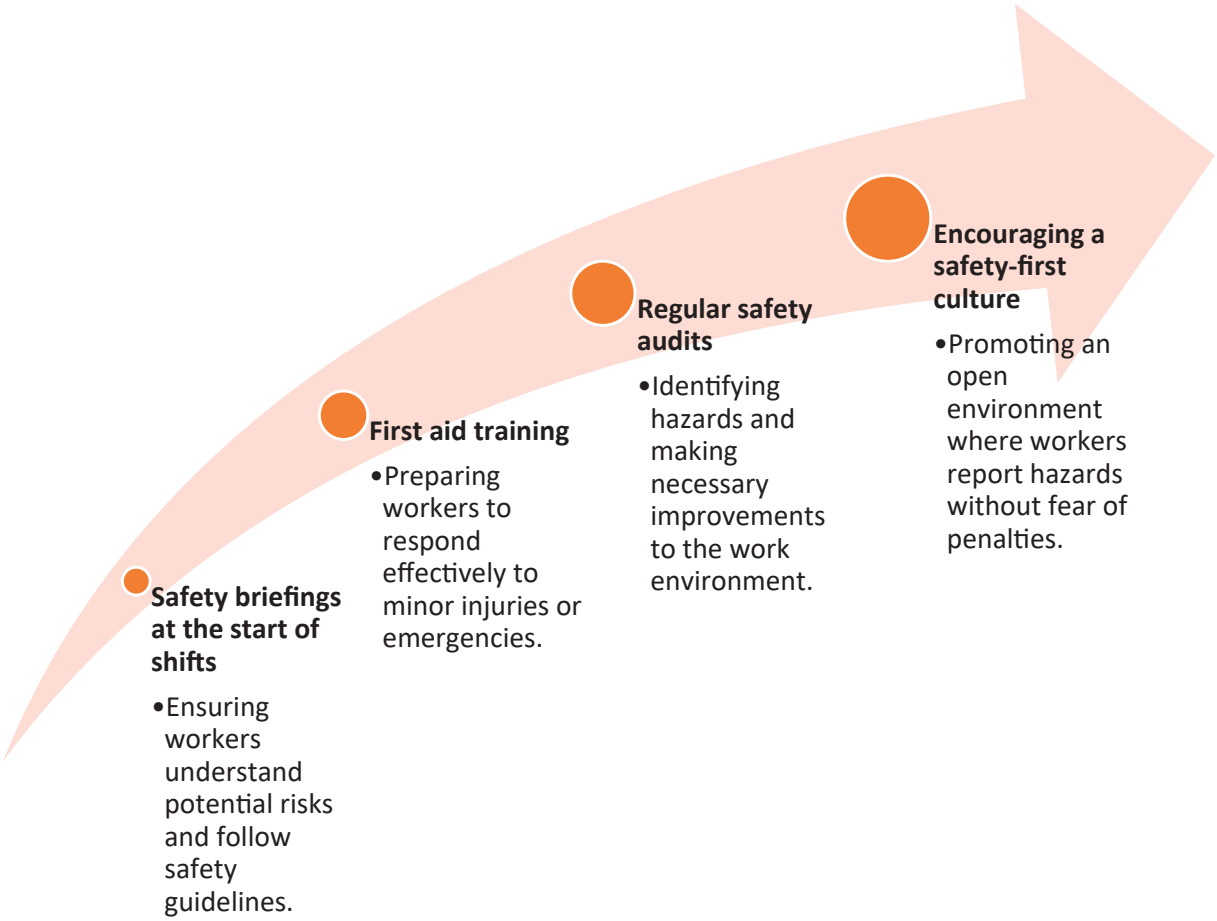


Fig. 5.1.14: Methods of implementing safety policies

UNIT 5.2: Emergency Preparedness and First Aid

Unit Objectives

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

1. Apply the process of first aid.
2. Discuss the handling of a fire extinguisher in case of an emergency.
3. Analyse workplace mock drills and evacuation procedures.

5.2.1 Process of First Aid

First aid refers to the immediate treatment provided to an injured or sick worker prior to professional medical aid. In the cutting department, where heavy machinery and sharp tools are employed, the cutting supervisor has to make sure that workers are able to apply first aid promptly and accurately. Effective first aid measures can avoid minor injuries from becoming major ones, decrease downtime, and enhance overall workplace safety.

A well-equipped first aid kit is crucial in dealing with immediate health concerns and injuries that may crop up during their shifts. While conventional items would do the trick, advanced and less frequently used items can complement readiness and enhance the effectiveness of response. Equipped with the following list of items and their uses, a cutting supervisor will know how to respond to critical situations.

Fig. 5.2.1: First aid items

Item	Use	Considerations
Adhesive Plasters (Various Sizes)	To cover small cuts, blisters, and abrasions.	Include hypoallergenic options for sensitive skin and varied sizes for different wounds.
Antiseptic Wipes and Cotton Balls	To clean wounds and prevent infection.	Opt for alcohol-free wipes to avoid irritation and discomfort for prolonged use.
Sterile Gauze Pads	To cover and protect larger wounds.	Ensure they are individually packaged to maintain sterility.
Adhesive Tape	To secure gauze pads or bandages in place.	Choose a tape that is gentle on the skin but adheres well to prevent slippage.
Antiseptic Solution	For disinfecting wounds and surfaces.	Consider solutions with a broad-spectrum antimicrobial effect and minimal irritation.
Instant Cold Packs	To reduce swelling and numb pain from injuries.	Ensure they are easy to activate and dispose of. Consider packs that do not require refrigeration.
Elastic Bandage	For applying compression to sprains or strains.	Include various widths and lengths to accommodate different injuries.
Burn Gel or Ointment	To treat minor burns and soothe affected skin.	Choose gels with cooling properties and pain relief, like aloe vera gels. Ensure the gel is safe for use on all types of burns.
Scissors and Tweezers	For cutting bandages and removing splinters or foreign objects.	Include stainless steel instruments that are easy to sterilize.
CPR Mask with One-Way Valve	To provide safe rescue breaths during CPR.	Ensure the mask is compact and includes a valve to prevent cross-contamination.
Thermometer	To check body temperature and monitor for fever.	Prefer digital thermometers for accuracy and ease of use.
First Aid Manual	For reference on first aid procedures and emergency care.	Choose a manual with clear illustrations and instructions relevant to common injuries and emergencies.
Emergency Blanket	To retain body heat and provide warmth in shock or cold conditions.	Compact and lightweight; consider a blanket that is easy to store and deploy quickly.
Medicines (Pain Relief, Antihistamines)	For managing pain and allergic reactions.	Include commonly used medications like paracetamol and Ibuprofen and Benadryl with attention to expiry dates.
Hydration Salts	To rehydrate and replenish electrolytes in case of dehydration.	Consider packets that are easy to dissolve and suitable for various conditions like heatstroke.

Item	Use	Considerations
Finger Splints	To immobilize injured fingers.	Include splints of different sizes to accommodate various injuries.
Eye Wash or Irrigation Solution	To flush out foreign substances or chemicals from the eyes.	Opt for sterile, preservative-free solutions to avoid irritation.

Table 5.2.1: Importance and usage of first aid

Steps of First Aid Application

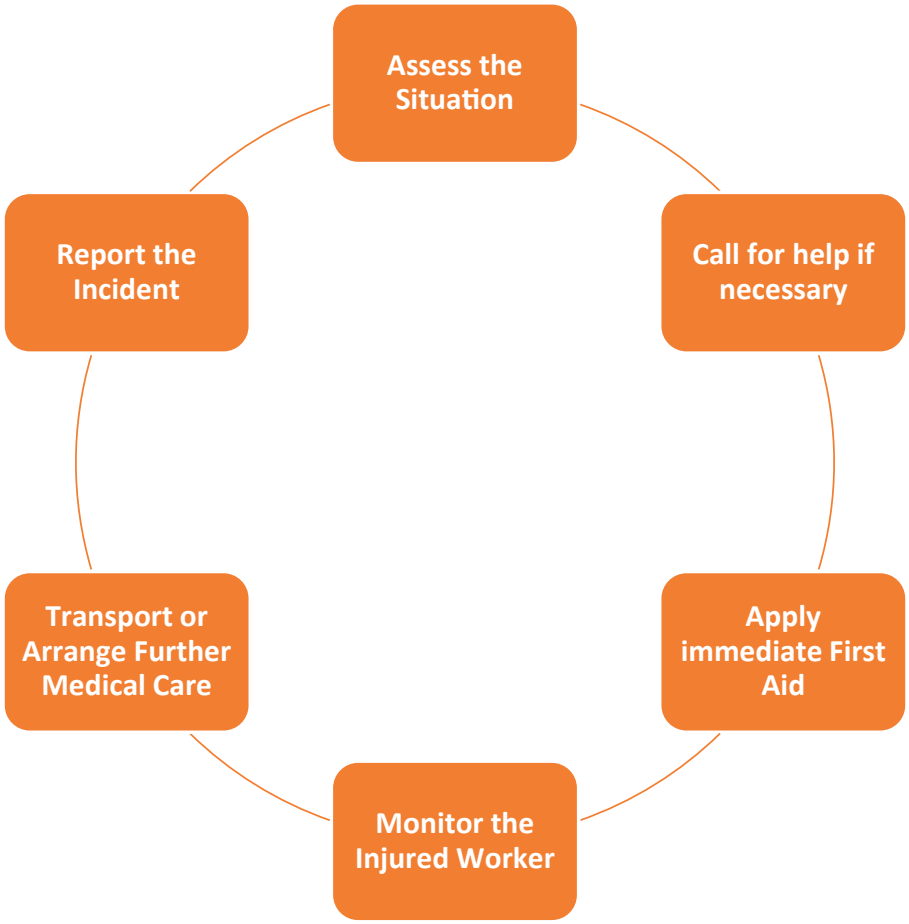


Fig. 5.2.2: Steps of first aid application

1. **Assess the Situation**
   - Check for dangers before approaching the injured worker.
   - Ensure that the area is safe from hazards such as running machinery, exposed blades, or chemical spills.
   - Identify the type of injury and its severity.
2. **Call for Help if Necessary**
   - If the injury is serious, call for medical assistance immediately.
   - Notify the first aid responder or supervisor if present.

- If the worker is unconscious or has difficulty breathing, seek emergency medical help immediately.

3. **Apply Immediate First Aid**
   - **For Cuts and Lacerations:**
     - Apply direct pressure to stop bleeding using a clean cloth or sterile bandage.
     - If bleeding is severe, elevate the injured limb above heart level.
     - Clean the wound with an antiseptic solution to prevent infection.
     - Cover with a sterile bandage and monitor for signs of infection.
   - **For Deep Cuts or Amputations:**
     - Apply firm pressure using sterile gauze.
     - Wrap the injured area with a clean bandage.
     - Keep the worker calm and in a comfortable position.
     - If a finger or part of the hand is severed, keep it in a clean cloth and place it in a sealed plastic bag over ice while transporting the worker to the hospital.
   - **For Burns (Chemical or Heat-Related):**
     - Remove the worker from the source of the burn.
     - Run cool water over the burn for at least 15 minutes.
     - Do not apply ice, butter, or creams.
     - Cover with a sterile, non-stick dressing.
     - For chemical burns, rinse the injured area with water and take off contaminated clothing.
   - **For Fabric Dust Inhalation or Respiratory Issues:**
     - Move the worker to fresh air immediately.
     - Loosen tight clothing to aid breathing.
     - Provide a dust mask or wet cloth to breathe through.
     - Seek medical help if symptoms persist.
   - **For Electrical Shock:**
     - Turn off the power source before touching the worker.
     - Check for breathing and pulse.
     - If unconscious, begin CPR if trained to do so.
     - Seek immediate medical assistance.
   - **For Eye Injuries (Fabric Particles, Chemical Exposure):**
     - Use an eyewash station to flush the eyes with clean water for at least 15 minutes.
     - Do not rub the eyes, as this may worsen the injury.
     - Seek medical help if irritation persists.
4. **Monitor the Injured Worker**
   - Keep the worker calm and reassured.
   - Check for signs of shock, such as pale skin, rapid breathing, or fainting.
   - If necessary, keep the worker warm and in a comfortable position.
5. **Transport or Arrange Further Medical Care**
   - If the injury is serious, arrange for immediate transport to a medical facility.
   - Ensure that another worker accompanies the injured person if needed.
   - Provide medical personnel with details of the injury and first aid given.

6. **Report the Incident**
   - Record the details of the injury in the workplace incident log.
   - Investigate the cause to prevent future occurrences.
   - Ensure corrective actions, such as safety training or equipment modifications, are implemented.
7. **Ensuring Workplace Readiness for First Aid:** To apply first aid effectively, the Cutting Supervisor should:
   - Ensure that first aid kits are stocked and accessible.
   - Conduct first aid training for workers regularly.
   - Assign trained first aid responders in the workplace.
   - Clearly mark emergency exits and medical aid stations.

5.2.2 Handling a Fire Extinguisher in Case of an Emergency

Blazes in the cutting department can be caused by electrical malfunction, dust from fabrics, or unsafe handling of chemicals such as stain removers and adhesives. Understanding the use of a fire extinguisher can avert small fires from becoming huge hazards. The Cutting Supervisor should see to it that all employees know fire safety protocol and can successfully operate fire extinguishers in case of emergency.

Types of Fire Extinguishers and Their Uses

There are different fire extinguishers used based on the source type of fire. The commonest types in a cutting department are:

Fig. 5.2.3: Types of fire extinguishers

Types	Fire Class	Components	Applications	Considerations
Water Extinguishers	Class A (Combustible materials)	Water	- Effective against fires involving paper, wood, textiles, and other organic materials.	It is not suitable for electrical or flammable liquid fires; it can conduct electricity and cause shock.
Foam Extinguishers	Class A and B (Liquids)	Aqueous Film-Forming Foam (AFFF)	- Ideal for fires involving combustible materials (Class A) and flammable liquids like oil and petrol (Class B).	It forms a blanket over the fire, cutting off oxygen; it is not suitable for electrical fires or kitchen fires involving cooking oils.
Dry Powder Extinguishers	Class A, B, C (Electrical)	Monoammoni-um phosphate	- Versatile use on fires involving combustible materials, flammable liquids, and gases.	Effective on electrical fires; it can leave a residue that may damage sensitive equipment.
CO2 Extinguishers	Class B and Electrical Fires	Carbon Dioxide	- Best for electrical fires and flammable liquid fires; CO2 displaces oxygen, suffocating the fire.	CO2 can be cold and cause frostbite; a limited cooling effect means the fire can re-ignite if not properly monitored.
Wet Chemical Extinguishers	Class K (Cooking oils)	Potassium acetate solution	- Specifically designed for kitchen fires involving cooking oils and fats (Class K fires).	It forms a soapy layer to cool and prevent re-ignition; it is less effective on other types of fires.
Class D Extinguishers	Class D (Metal Fires)	Powdered graphite, dry powder	- Used for fires involving combustible metals like magnesium, titanium, and sodium.	These extinguishers smother metal fires by forming a barrier between the oxygen and the metal; not suitable for common fires.
Water Mist Extinguishers	Class A, B, C, and Electrical	Ultra-fine water mist	- Versatile, safe for use on almost all types of fires, including electrical, as it does not conduct electricity.	Offers a cooling effect without leaving residue, reducing damage to equipment and surroundings.

Table. 5.2.2: Types of fire extinguishers and its application

Steps to Handle a Fire Extinguisher Using the PASS Method

When using a fire extinguisher, follow the PASS technique:

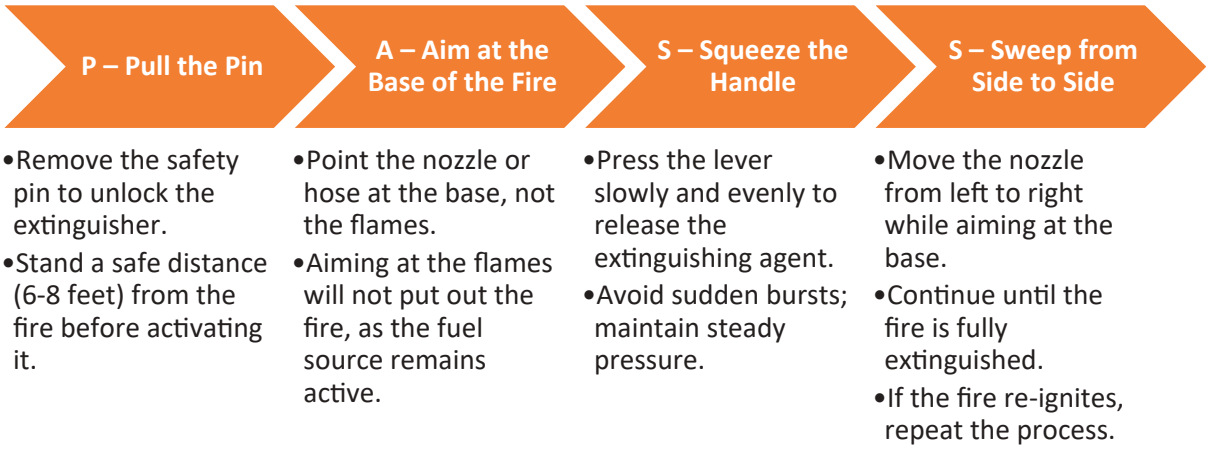


Fig. 5.2.4: Steps to handle a fire extinguisher

Precautions While Using a Fire Extinguisher

- Ensure the extinguisher is appropriate for the fire type. Using a water-based extinguisher on an electrical or oil-based fire can make it worse.
- Maintain a safe distance while discharging the extinguisher. Move closer only if the fire starts to die down.
- Do not turn your back to the fire after extinguishing it. Watch for possible re-ignition.
- Evacuate if the fire spreads beyond control. If the extinguisher is not effective, leave the area immediately and call emergency services.

Fire Safety Measures in the Cutting Department

The cutting supervisor should:

- Train workers on fire extinguisher use at least once a year.
- Ensure fire extinguishers are accessible and fully charged.
- Conduct regular fire drills and safety inspections.
- Keep work areas free of fabric scraps and flammable substances.
- Mark emergency exits clearly and keep them unobstructed.

5.2.3 Workplace Mock Drills and Evacuation Procedures

Mock drills and evacuation procedures are necessary for ensuring that workers are adequately trained to act in the event of an emergency like a fire, chemical spill, or structural danger. In a cutting room, with sharp instruments, flammable cloth, and electrical equipment around, well-rehearsed drills ensure that all staff know their place and can evacuate efficiently in case of an emergency.

Importance of Mock Drills and Evacuation Procedures

Fig. 5.2.5: Importance of mock drills and evacuation procedures

Steps in Conducting a Workplace Mock Drill

Fig. 5.2.6: Steps in conducting a workplace mock drill

1. **Planning the Drill**
   - Identify potential emergency scenarios (fire, gas leak, electrical failure).
   - Assign evacuation leaders and first aid responders.
   - Set clear objectives, such as reducing evacuation time or ensuring 100% participation.
   - Schedule the drill at a time that does not disrupt production but mimics real emergency conditions.
2. **Announcing the Drill (or Conducting Unannounced Drills)**
   - Initially, notify workers to ensure participation.
   - Once they are familiar with the process, conduct surprise drills to assess readiness.

3. **Activating the Emergency Alarm**
   - Ensure the alarm system is loud and distinct.
   - Workers should immediately stop work, turn off machinery if safe, and follow evacuation routes.
4. **Executing the Evacuation**
   - Workers must proceed to the nearest exit in an orderly manner without running or pushing.
   - Fire wardens should check all areas to ensure no one is left behind.
   - First aid responders should assist injured individuals.
   - Once outside, workers must assemble at the designated safe zone for a headcount.
5. **Reviewing the Drill Performance**
   - Evaluate the total evacuation time.
   - Identify bottlenecks, such as slow-moving workers or blocked pathways.
   - Gather feedback from workers to understand difficulties faced.
   - Adjust procedures, retrain workers, and conduct follow-up drills as needed.

Key Elements of an Effective Evacuation Plan

Clearly Marked Exits	Emergency Lighting	Communication System	Assembly Points	Trained Safety Personnel
•Emergency exits should be visible and unobstructed.	•In case of power failure, backup lights must guide workers.	•Alarms, PA systems, or designated personnel should instruct workers during evacuation.	•Workers must know their designated meeting areas to ensure accountability.	•Fire wardens, first aid responders, and evacuation leaders must be well-trained.

Fig. 5.2.7: Methods of an effective evacuation plan

Common Issues in Evacuation Drills and Their Solutions

- **Delayed Evacuations:** Due to lack of seriousness, some employees will delay evacuation or fail to evacuate. Solution: Organize surprise drills and emphasize prompt response.
- **Blocked Exits:** Fabric rolls, storage materials, or equipment could block exits. Solution: Periodic safety audits must ensure passageways are kept unobstructed.
- **Unawareness:** New employees might be unaware of evacuation paths. Solution: Make safety training a part of the induction process.

Summary

- Participants will learn to identify workplace hazards related to cutting tools, hot irons, knives, and stain removers.
- They will understand the safe handling of scissors, knives, and other cutting equipment.
- The correct use of PPE, such as stainless steel mesh gloves, will be ensured while operating cutting tools.
- Workplace organisation and work process adjustments will be emphasised to prevent risks, injuries, and disabilities.
- First aid applications, including basic medical response, will be covered.
- Participants will gain knowledge on handling fire extinguishers and executing workplace mock drills and evacuation procedures.

Exercise

Multiple-choice Question:

1. What is an example of a workplace hazard related to cutting tools?
   a. Loud noises
   b. Hot iron burns
   c. Dust accumulation
   d. Bright lighting

2. Which PPE is essential while using cutting tools?
   a. Cotton gloves
   b. Plastic gloves
   c. Stainless steel mesh gloves
   d. Woollen gloves

3. What should be done to reduce workplace injuries?
   a. Work in an unorganised manner
   b. Ignore safety procedures
   c. Organise work processes and workplace settings
   d. Avoid using PPE

4. How should a fire extinguisher be used in an emergency?
   a. Spray water over the fire
   b. Pull the pin, aim at the base, squeeze the handle, and sweep
   c. Pour sand over the flames
   d. Keep the extinguisher unused and call for help

5. What is the purpose of a workplace mock drill?
   a. To waste employees' time
   b. To create panic among workers
   c. To ensure employees know emergency evacuation procedures
   d. To check the durability of fire alarms

Descriptive Questions:

1. Explain the importance of identifying hazards in the workplace.
2. Describe the correct way to handle cutting tools safely.
3. What are the steps involved in using a fire extinguisher?
4. Why is first aid training important in the workplace?
5. Discuss the role of workplace mock drills in emergency preparedness.

Notes

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

https://youtu.be/PP9dYoN8pTk?si=zihcpM2R9QHC-oJ-

Mechanical and Machinery hazards

https://youtu.be/QtXa6tPUJgk?si=r1uCVme3IZU7ku5z

Safety rules in a sewing lab

https://youtu.be/gUcNA19P6M0?si=nGVUss8kPxuG32_T

What is first Aid

Skill India
कौशल भारत-कुशल भारत

सत्यमेव जयते
GOVERNMENT OF INDIA
MINISTRY OF SKILL DEVELOPMENT
& ENTREPRENEURSHIP

N·S·D·C
RE>IMAGINE FUTURE

6. Ensure Workplace Orderliness and Efficiently Operate Tools and Machinery

APPAREL MADE-UPS HOME FURNISHING
SECTOR SKILL COUNCIL

AMH/N0619

Key Learning Outcomes

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

1. Follow safe working practices for cleaning, maintenance, and handling of equipment to prevent contamination.
2. Identify and use appropriate cleaning equipment, substances, and methods for effective maintenance.
3. Describe various machines used in layering, spreading, marking, and cutting processes, including different cutting tools.
4. Handle materials, tools, and lifting procedures correctly to ensure workplace safety.
5. Carry out scheduled maintenance of tools and equipment within defined responsibilities.
6. Minimize wastage and dispose of waste safely in designated locations.
7. Maintain proper posture while working to ensure comfort and prevent strain.
8. Keep accurate records related to quality, maintenance, and production.
9. Follow organizational procedures, reporting structures, and communication protocols.
10. Report quality issues and resolve work-related problems in coordination with supervisors and colleagues.

UNIT 6.1: Safe Working Practices and Equipment Maintenance

Unit Objectives

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

1. Discuss safe working practices for cleaning and maintenance of equipment.
2. Identify different types of cleaning equipment, substances, and their use.
3. Identify the use appropriate cleaning methods and carry out maintenance within agreed schedules.
4. Analyse materials and tools correctly using proper lifting and handling procedures.
5. List cleaning equipment safely in designated places after use.

6.1.1 Safe Working Practices for Cleaning and Maintenance of Equipment

Routine cleaning and maintenance of fabric spreading and cutting machinery guarantee efficiency, durability, and employee safety. Dust, lint from fabrics, and worn parts can cause equipment breakdowns, decreased accuracy, and even create workplace dangers. Maintenance reduces downtime, enhances accuracy in cutting, and increases productivity. Adherence to strict safety procedures when operating sharp blades, electrical parts, and lubricants minimizes injury risks. Cutting supervisors need to set regular maintenance schedules and implement safety protocols to ensure a smooth operation.

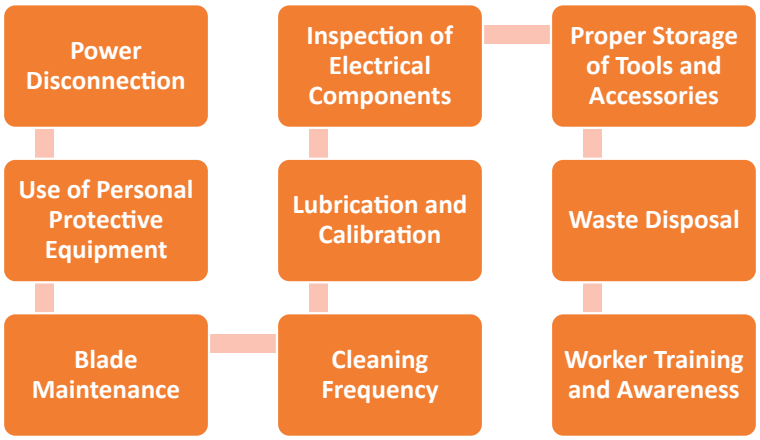


Fig. 6.1.1: Safe working practices

- **Power Disconnection:** Always turn off and disconnect machines prior to cleaning or maintenance to avoid accidental start-up. Lockout/tagout procedures must be implemented for powered machinery.
- **Use of Personal Protective Equipment (PPE):** Gloves for handling blades, safety glasses for dust protection, and masks when using chemical cleaners must be worn by workers to prevent exposure to toxic substances.
- **Blade Maintenance:** Sharpen or replace dull blades regularly to ensure clean cuts. Always use cut-resistant gloves while handling or changing blades and store them safely in designated holders.

- **Cleaning Frequency:** Remove fabric lint, dust, and debris from cutting machines and spreading tables daily. Use compressed air or vacuum systems to clear ventilation paths and prevent overheating.
- **Lubrication and Calibration:** Apply lubricants to moving parts as per manufacturer guidelines to reduce friction and wear. Periodically check calibration settings to ensure cutting accuracy.
- **Inspection of Electrical Components:** Ensure periodic inspection of wiring, plugs, and switches for damage. Replace any exposed or frayed wiring immediately to avoid electrical accidents.
- **Proper Storage of Tools and Accessories:** Keep cutting tools, measuring devices, and maintenance kits in designated areas to prevent misplacement and accidental injuries.
- **Waste Disposal:** Dispose of used blades, fabric scraps, and chemical residues following proper safety guidelines to maintain a clean and hazard-free workspace.
- **Worker Training and Awareness:** Educate employees on the best cleaning practices, maintenance schedules, and emergency shutdown procedures to facilitate a safe working environment and maintain efficiency.

6.1.2 Types of Cleaning Equipment, Substances, and Their Use

Keeping the fabric cutting environment clean is important for equipment efficiency, workplace safety, and product quality. There are different types of cleaning tools and chemicals employed to clean dust, lint, grease, and other impurities from cutting tables, machines, and tools. Proper selection and handling of the cleaning agents avoid equipment damage and adherence to safety standards. Routine cleaning schedules should be implemented by cutting supervisors, and proper materials should be utilized to achieve the best working conditions.

Vacuum Cleaners

Compressed Air Blowers

Microfiber Cloths and Brushes

Degreasers and Solvent Cleaners

Mild Detergents and Soapy Water

Disinfectants and Surface Cleaners

Blade Cleaning Solutions

Lubricants and Anti-Rust Sprays

Waste Disposal Containers

Fig. 6.1.2: Types of cleaning equipment and substances

- **Vacuum Cleaners:** Used to remove dust, lint, and small fabric particles from cutting tables, machine interiors, and floors to prevent clogging and fire hazards.
- **Compressed Air Blowers:** Help clear fine dust and lint from delicate machine parts, including motors, sensors, and moving components, without direct contact.
- **Microfiber Cloths and Brushes:** Perfect for cleaning surfaces, dusting control panels, and cleaning delicate machine parts without leaving marks or residues.

- **Degreasers and Solvent Cleaners:** Used to disintegrate and eliminate grease, oil, and adhesive residues from cutting blades, rollers, and other mechanical parts. Only approved solvents from the manufacturer must be used to avoid damaging equipment.
- **Mild Detergents and Soapy Water:** Effective for cleaning workstations, plastic or rubber machine components, and non-electrical surfaces to remove general dirt and stains.
- **Disinfectants and Surface Cleaners:** Used to sanitize work areas, cutting tables, and frequently touched surfaces to maintain hygiene and prevent contamination.
- **Blade Cleaning Solutions:** Specialized cleaning fluids designed to remove fabric residues and adhesive build-up from cutting blades, ensuring smooth and precise cuts.
- **Lubricants and Anti-Rust Sprays:** Essential for maintaining smooth machine operation and preventing corrosion on metal parts, ensuring long-term performance.
- **Waste Disposal Containers:** Used for gathering and disposing of used cleaning materials, sharp objects, and toxic residues to keep the working area clean and safe.

6.1.3 Cleaning Methods and Scheduled Maintenance in Fabric Cutting Operations

Regular cleaning and maintenance guarantee the efficiency, longevity, and safety of fabric cutting machines. Dust, lint, grease, and fabric residue can impair machine performance, resulting in poor cuts and equipment breakdowns. Adhering to systematic cleaning practices and routine maintenance minimizes downtime and maximizes precision. Cutting supervisors have to create specific guidelines to ensure ideal working conditions and avoid unnecessary equipment wear.

Fig. 6.1.3: Floors must be keep clean

- **Daily Cleaning:** Remove fabric lint, dust, and debris from cutting tables, blades, and spreading machines using vacuum cleaners, microfiber cloths, and compressed air blowers to prevent accumulation.
- **Weekly Deep Cleaning:** Apply degreasers and blade cleaning solutions to remove built-up adhesives, oil, and fibre residues from machine components. Lubricate moving parts as needed to ensure smooth operation.
- **Periodic Inspection and Calibration:** Conduct monthly checks on blade sharpness, belt tension, sensor alignment, and motor performance. Adjust calibration settings to maintain cutting accuracy and prevent misalignment issues.
- **Electrical System Maintenance:** Inspect wiring, plugs, and power connections quarterly for wear or damage. Any faulty electrical components should be replaced immediately to prevent operational failures.

- **Rust Prevention and Surface Protection:** Apply anti-rust sprays to metal components and ensure proper ventilation in storage areas to prevent corrosion. Keep cutting tables and workstations dry to avoid material degradation.
- **Tool and Accessory Maintenance:** Regularly check measuring tools, marking equipment, and storage containers for cleanliness and proper functionality to ensure accuracy in pattern marking and cutting.
- **Waste Management and Disposal:** Implement a routine for disposing of fabric scraps, used blades, and cleaning residues. Ensure hazardous materials are discarded safely following industry regulations.
- **Record Keeping and Scheduling:** Maintain logs of cleaning and maintenance activities, ensuring tasks are completed within agreed schedules. Assign responsibilities to trained personnel to uphold standards.

6.1.4 Proper Lifting and Handling Procedures for Materials and Tools in Fabric Cutting

Proper handling and lifting of materials and tools are essential to worker safety, productivity, and protection of fabrics and equipment from damage. Wrong methods can result in injury, strain, and production inefficiency. Cutting supervisors should ensure all workers use ergonomic lifting techniques and proper handling equipment to reduce risk and ensure flow efficiency.

Fig 6.1.4: Tools must be lifted and used appropriately following proper safety measures

- **Assessing Material Weight and Size:** Before lifting, evaluate the weight, dimensions, and type of fabric roll or cutting tool. Use mechanical aids for heavy or oversized materials to prevent strain.
- **Applying Mechanical Handling Equipment:** Use fabric roll lifters, hoists, or trolleys to transport heavy rolls of fabric and cutting machines in place of manual lifting. Pallet jacks and conveyors facilitate bulk material movement in an efficient manner.
- **Safe Lifting Technique:** Bend at knees, maintain back straight, and lift by muscle power in the legs instead of the lower back. Carry the load near the body in order to be well-balanced and minimize strain.
- **Team Lifting for Large Items:** For oversized materials or heavy equipment, coordinate lifting with a team to distribute weight evenly and prevent sudden movements that might injure.
- **Safe Handling of Cutting Tools:** Always handle sharp blades using protective gloves, and keep tools in their respective holders to avoid accidental cuts. Do not carry cutting tools loose to avoid injury.

- **Fabric Roll Storage and Retrieval:** Store rolls in an organized manner with proper labelling to minimize unnecessary handling. Use racks or horizontal stacking to prevent falling hazards.
- **Avoiding Excessive Reaching and Twisting:** Position materials and tools within easy reach to reduce unnecessary movements. Rotate the entire body instead of twisting the torso when repositioning items.
- **Training and Awareness:** Conduct regular training on lifting techniques, use of mechanical aids, and handling of sharp tools to ensure compliance with safety protocols.

6.1.5 Proper Storage of Cleaning Equipment After Use

The storage of cleaning tools in their respective areas maintains a clean, safe, and productive working area. Storage of tools avoids accidents, prolongs equipment life, and keeps the fabric cutting area clean. Supervisors of cutting must enforce effective rules for storage of cleaning tools after utilization in their respective locations.

- **Vacuum Cleaners and Compressed Air Blowers:** Store in a dry, dust-free area with cords neatly wrapped to prevent tripping hazards. Empty dust containers or filters regularly before storage.
- **Microfiber Cloths and Brushes:** Wash and dry thoroughly before storing in a clean, labelled container to prevent contamination and fibre build-up.
- **Degreasers and Cleaning Solvents:** Keep in tightly sealed containers and store in a ventilated cabinet away from heat sources to prevent evaporation and fire hazards.
- **Lubricants and Anti-Rust Sprays:** Store in a storage rack with effective identification to avoid misuse. Store in a place that is not exposed to sunlight and moisture.
- **Blade Cleaning Solutions:** Keep in tightly sealed, spill-proof containers in a location distant from cutting equipment to avoid the possibility of spilling and mixing with other materials.

Fig. 6.1.5: Cleaning equipment must be stored properly after use

- **Buckets, Mops, and Wipes:** Wash and dry after use and store them in their respective storage locations to avoid mould and stench.

Fig. 6.1.6: Buckets, mops, and wipes

- **Personal Protective Equipment (PPE):** Keep gloves, masks, and safety glasses in a dry, clean cabinet for quick access during the next cleaning operation.

Fig. 6.1.7: Personal protective equipment

- **Waste Disposal Bins:** Regularly empty and keep in a disposal area to ensure cleanliness and avoid dangers

UNIT 6.2: Cutting, Layering, and Marking Techniques

Unit Objectives

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

1. Discuss various machines used for layering, spreading, and cutting (e.g., scissors, straight knife, band knife, laser cutting machine).
2. Identify various markers and tools required for marking.
3. Discuss common equipment faults and methods to rectify them.
4. Analyse a comfortable working position with correct posture.

6.2.1 Machines Used for Layering, Spreading, and Cutting in Fabric Cutting Operations

The cutting of fabrics in garment manufacturing is a precise, efficient process that needs to be equipped with the right machinery for a seamless production. Supervisors who handle cutting need to be aware of different machines that are employed during the preparation and cutting processes. These machines are classified into three main functions: layering, spreading, and cutting.

1. **Layering Machines:** Layering is the piling of fabric plies in anticipation of cutting. Layering precision influences cutting accuracy and material usage. Some techniques involve manual piling, semi-automatic layering, and automatic layering.
    - **Manual Layering:** Involves placing fabric plies by hand, often utilized for fragile fabrics or low-volume production. Though inexpensive, it is labour-intensive and subject to inconsistency.

Fig. 6.2.1: Manual layering

    - **Automatic Layering Machines:** These machines streamline the layering process by uniformly stacking fabric while controlling tension and alignment.

Fig. 6.2.2: Automatic layering machines

Machines Used in Layering

- **Automatic Fabric Layering System**
  - Works by feeding fabric from a roll and placing it in multiple layers with precise alignment.
  - Reduces material wastage and improves cutting efficiency.
  - Equipped with sensors to detect fabric defects or misalignment.
- **Vacuum Suction Layering Table**
  - Uses vacuum pressure to flatten and compress layers for stability.
  - Ensures minimal shifting of fabric during cutting.
  - Commonly used for high-ply cutting.

Fig. 6.2.3: Vacuum suction layering table

2. **Spreading Machines:** Spreading is the methodical placing of fabric layers upon a cutting table prior to the cutting operation. Effective spreading eliminates wrinkles, tension, and distortion, thus making accurate pattern cutting possible.

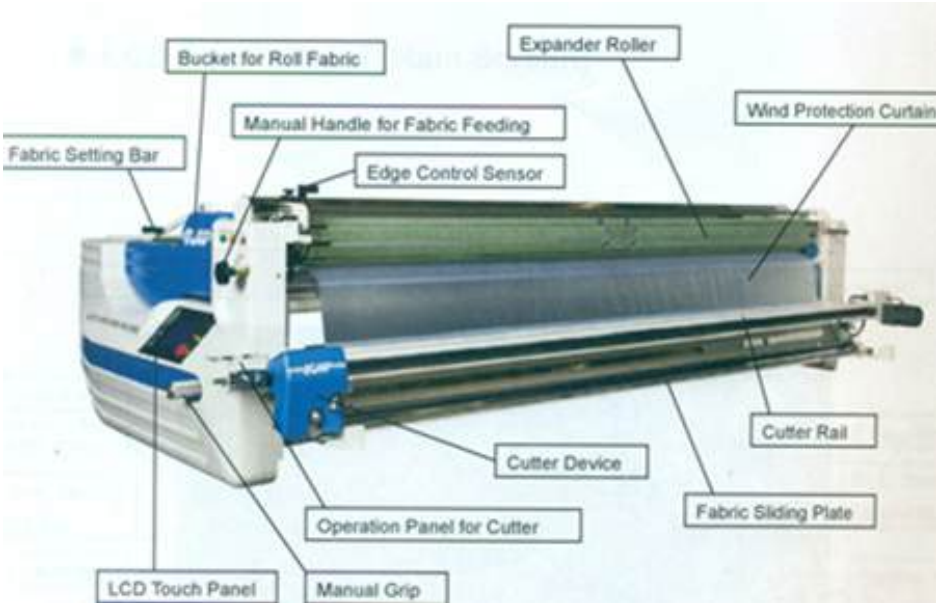


Fig. 6.2.4: Spreading machine parts

Machines Used in Spreading

- **Manual Spreading Table**

Fig. 6.2.5: Manual spreading table

  - Requires operators to pull and arrange fabric manually.
  - Best suited for small production or delicate materials that need careful handling.
- **Automatic Spreading Machine**
  - Equipped with motorized rollers that evenly distribute fabric across the table.
  - Maintains fabric tension and reduces distortion.
  - Some models include edge alignment sensors and defect detection systems.

- Variants include:
  - **End-to-End Spreading Machines:** Lay fabric in a single direction.

  - **Zigzag Spreading Machines:** Lay fabric in a back-and-forth motion for continuous layering.

- **Cradle Feed Spreading Machines**
  - Uses a cradle mechanism to unwind fabric rolls without stretching.
  - Ideal for stretchy or sensitive fabrics like knits.

Fig. 6.2.6: Cradle feed spreading machine

- **Turntable Spreader**
  - Used for tubular or circular-knit fabrics.
  - Spreads fabric in a circular motion, ensuring even tension across the entire width.

Fig. 6.2.7: Turntable spreader

3. **Cutting Machines:** Shears are the mainstay of the cutting department. The selection of cutting machinery is a function of production levels, type of fabric, and degree of accuracy needed.

Manual Cutting Tools

 **Fabric Scissors**	Used for sample making and small-scale cutting.
	Requires skilled labour for precision cutting.
	Best suited for delicate materials or small quantities.
 **Rotary Cutters**	Circular blade with a handle, allowing smooth and precise cuts.
	Suitable for cutting multiple layers of fabric with minimal distortion.
	Ideal for soft and knitted fabrics.

Table. 6.2.1: Manual cutting tools

Mechanical Cutting Machines

 **Straight Knife Cutting Machine**	One of the most common fabric cutting machines.
	Features a vertically moving, straight-edged blade.
	Capable of cutting multiple layers at high speed.
	Takes care of woven and non-stretch fabrics but needs skill to avoid fabric movement.
 **Band Knife Cutting Machine**	Features a continuous looped blade running over pulleys.
	Provides precision cutting, especially for curved patterns.
	Commonly used for cutting smaller, intricate fabric components.
	Best suited for cutting fusible and delicate fabrics.
 **Round Knife Cutting Machine**	Uses a circular rotating blade.
	Suitable for cutting curved patterns and single-ply materials.
	Often used in leather and upholstery industries.

Table. 6.2.2: Mechanical cutting machines

Advanced Cutting Machines

 **Die Cutting Machine**	Uses a steel die to stamp out patterns.
	Common in mass production of uniform shapes, such as collars and cuffs.
	High precision but limited to specific pattern shapes.

 **Water Jet Cutting Machine**	Uses a high-pressure stream of water to cut fabric.
	No heat damage, making it suitable for synthetic fabrics.
	High precision, but requires water-resistant materials for efficiency.
 **Laser Cutting Machine**	Uses a high-powered laser beam to cut fabric.
	Delivers extreme precision and can cut complex shapes.
	Best for synthetic fabrics as the heat seals the edges to prevent fraying.
	Common in technical textiles and high-fashion apparel.
 **Plasma Cutting Machine**	Uses electrically charged gas to cut fabric.
	Rarely used in apparel but valuable for cutting industrial textiles.
 **Ultrasonic Cutting Machine**	Uses ultrasonic vibrations to cut fabric without fraying.
	Ideal for delicate or synthetic fabrics requiring sealed edges.
	Used in medical textiles and high-performance sportswear.

 **Computerized CNC Cutting Machine**	Fully automated cutting system controlled by CAD software.
	Ensures precision and efficiency, reducing material waste.
	Used in high-volume production settings.

Table. 6.2.3: Advanced cutting machines

6.2.2 Markers and Tools Required for Marking in Fabric Cutting

Marking is used to transfer pattern outlines, seam allowances, and construction details to fabric. Selection of marking tools is based on fabric type, production needs, and removal process.

- **Tailor's Chalk:** A widely used marking tool available in various shapes. It provides clear, removable markings but can smudge or fade over time.

Fig. 6.2.8: Tailor's chalk

- **Chalk Pencils:** Offer finer lines for precise markings and are easier to handle than regular chalk. They require frequent sharpening.

Fig. 6.2.9: Chalk pencils

- **Fabric Marking Pens (Water-Soluble or Air-Soluble):** Provide accurate markings that disappear either with air exposure or water. Air-soluble marks fade quickly, while water-soluble ones require washing.

Fig. 6.2.10: Fabric marking pens

- **Wax-Based Markers (Tailor's Crayons):** Create long-lasting marks suitable for heavy fabrics. The marks disappear with heat but may leave stains on delicate fabrics.

Fig. 6.2.11: Tailor's crayons

- **Carbon Paper and Tracing Wheel:** Used to transfer pattern details onto fabric by pressing the design through a carbon-coated sheet. Effective for heavyweight fabrics but may not work well on dark or textured materials.

Fig. 6.2.12: Carbon paper and tracing wheel

- **Soap Slivers:** An eco-friendly alternative that leaves clear marks and washes off completely, but it wears down quickly.

Fig. 6.2.13: Soap slivers

- **Thread Marking (Tacking or Basting Stitches):** A hand-sewn marking technique used in high-end tailoring to ensure precise pattern transfer without damaging fabric. It is time-consuming but highly reliable.

Fig. 6.2.14: Thread marking

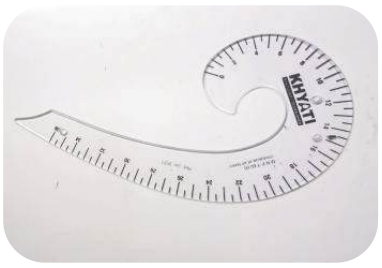
Essential Tools for Marking

Tape Measure

- A flexible tool used to measure fabric, patterns, and garment components.

Ruler (Metal or Transparent Plastic)

- Ensures straight-line markings for seam allowances, grainlines, and hems.



French Curve

- Helps in shaping armholes, necklines, and curved seams accurately.

L-Square and Tailor's Square

- Useful for creating right angles and checking pattern alignments.

Pattern Weights

- Keep fabric and patterns in place during marking to prevent shifting.

Cutting Table with Grid Markings

- A calibrated surface that aids in precise pattern placement and alignment.

Stencils

- Used for marking uniform pocket placements, logos, or other design elements.

Pinning Tools

- Help hold multiple fabric layers together while marking, ensuring alignment.

Perforated Patterns with Pouncing Powder

- A technique used in high-end tailoring where powder is applied through perforated patterns to transfer markings accurately.

Fig. 6.2.15: Tools for marking

6.2.3 Common Equipment Faults and Methods to Rectify Them

Garment manufacturing requires the use of fabric cutting machines and marking tools, but regular usage can result in operational failures. Detection and fixing of such malfunctions early guarantees efficiency, precision, and limited downtime.

- **Blade Dulling in Cutting Machines:** Continuous cutting reduces blade sharpness, leading to uneven or frayed edges. This can be rectified by regularly sharpening or replacing the blade, ensuring proper lubrication, and using the correct blade type for the fabric.
- **Misalignment in Automatic Cutting Machines:** Misalignment causes incorrect cutting, leading to material wastage. It can be fixed by recalibrating the machine, checking software settings, and ensuring fabric is properly aligned before cutting.
- **Overheating in Laser and Ultrasonic Cutting Machines:** Excessive heat may cause material burning or warping. Proper ventilation, regular cooling system checks, and ensuring the correct power settings can prevent overheating issues.
- **Fabric Slippage During Cutting:** Fabric movement results in inaccurate cutting, especially in multi-layered spreading. Using vacuum tables, applying anti-slip underlays, and ensuring proper fabric tensioning can help maintain stability.

- **Motor Malfunctions in Spreading Machines:** A malfunctioning motor can disturb fabric spreading, causing irregular spreading. Periodic maintenance, prompt lubrication, and inspecting for loose wiring or faulty parts avert breakdown.
- **Sensor Errors in Automated Systems:** Faulty sensors will result in cutting and spreading machine misalignment. Constant cleaning, calibration, and replacement of faulty sensors correct detection problems.
- **Excessive Vibrations in Cutting Machines:** Excessive looseness or mismatched machine setups can induce strong vibrations to yield inaccurate cuts. Tightening everything on the machine, inspection for belt tightness, and checking floor support decrease vibrations.
- **Thread Breakage in Thread Marking:** A weak or flawed thread tension results in shattered thread marks. Changing to premium quality thread, calibration of the tension on the machine, and assuring uniform flow of fabrics keep breakage off.
- **Carbon Paper or Marking Pen Fading Too Soon:** Inadequate marking visibility affects accuracy in cutting. Using suitable markers based on fabric type, applying sufficient pressure, and reapplying markings as needed improve visibility.
- **Software Glitches in CAD/CAM Systems:** Digital cutting pattern or marker making software errors can result in production delays. Software updates, correct file types, and routine system diagnostics ensure an uninterrupted flow.

6.2.4 Working with Correct Posture in Fabric Cutting

Precision and efficiency are the cornerstones of fabric cutting in the apparel industry. This intricate process not only requires technical skill but also demands physical endurance and stability. Whether working with hand tools like scissors or advanced machines such as straight knives or laser cutters, fabric cutters often spend prolonged hours in static positions. This repetitive nature, coupled with improper posture, can lead to fatigue, musculoskeletal discomfort, and long-term physical strain.

Maintaining correct posture during fabric cutting is not merely about comfort—it directly impacts productivity, accuracy, and overall well-being. A stable stance, proper alignment, and ergonomic techniques reduce the risk of workplace injuries while enhancing cutting precision. With the apparel industry increasingly recognising the importance of worker health and safety, adhering to proper posture practices has become an essential skill for fabric cutters.

Fig. 6.2.16: Correct posture when fabric cutting

- **Correct Standing Posture:** Back straight, shoulder relaxed, knees slightly bent. Feet shoulder-width apart and weigh evenly to take strain off.
- **Workstation Height:** Apply an adjustable cutting table at the same level as the waist to avoid bending and stretching. Anti-fatigue mats reduce leg and back strain.

- **Seated Positioning:** Sit in a chair with lumbar support, with feet flat on the floor and a 90-degree angle of knees. Position elbows naturally at table level to prevent tension in shoulders.
- **Arm and Wrist Position:** Hold cutting instruments at an easy angle, placing wrists in a natural position. Prevent wrist over-reach and alternate every few strokes to allow hands to rest.
- **Tool Handling:** Shift position when working on large cutting machines to prevent over-reaching. Make stable and controlled movements to achieve accuracy.
- **Movement and Breaks:** Break frequently for short periods to eliminate muscle fatigue. Conduct shoulder, back, and wrist stretches to release tension.
- **Lighting and Visibility:** Provide bright, uniform lighting to reduce eye strain. Proper lighting enables workers to stay focused without leaning inappropriately.
- **Ventilation and Temperature Control:** Ensure a comfortable working environment to avoid fatigue due to excessive heat or humidity. Adequate airflow improves worker concentration.
- **Task Rotation:** Rotate tasks among workers to minimize repetitive strain, increase posture variation, and sustain energy levels during shifts.
- **Ergonomic Training:** Cutting supervisors must conduct posture training and workstation adjustments to improve efficiency, avoid injuries, and enhance long-term well-being.

UNIT 6.3: Quality Control and Record Keeping

Unit Objectives

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

1. Discuss the importance of keeping accurate quality records.
2. Discuss company quality standards and methods to complete records.
3. List of report quality issues to appropriate personnel.
4. Discuss the importance of complying with written instructions and organizational procedures.

6.3.1 Importance of Keeping Accurate Quality Records in Fabric Cutting

Correct quality records are essential to ensuring accuracy, efficiency, and consistency in fabric cutting processes. They assist in detecting defects, process optimization, and adherence to industry standards. These records are utilized by cutting supervisors to monitor material consumption, analyse mistakes, and enhance overall production quality. Proper documentation also ensures accountability, facilitates audits, and helps in continuous process improvement.

- **Defect Tracking and Prevention:** Defect Tracking and Prevention: Defects like poor cutting, misalignment, or fabric flaws are identified using quality records. Analysis of data enables supervisors to initiate corrective actions so that the same issues are avoided in future runs. This minimizes wastage, cuts down on precision in cutting, and adds efficiency to the overall process
- **Standardization and Consistency:** Maintaining detailed records ensures that fabric pieces are cut to the exact dimensions and specifications required. This minimizes variations in garment production and ensures consistency across different batches. Standardized cutting results in better-fitting garments and reduces rejection rates.
- **Material Utilization and Waste Reduction:** Proper documentation helps track fabric consumption and identify areas where material is being wasted. By analyzing cutting patterns and marker efficiency, supervisors can optimize fabric usage and reduce costs. This leads to more sustainable production with minimal raw material loss.
- **Compliance with Industry Standards:** Keeping accurate records ensures that fabric cutting processes adhere to customer requirements and industry regulations. Compliance reduces the risk of order rejections, penalties, and production delays. It also helps in maintaining good relationships with buyers and regulatory bodies.

Fig. 6.3.1: Importance of keeping accurate quality records in fabric cutting

- **Training and Process Improvement:** Review of records enables supervisors to pinpoint inefficiencies in cutting processes and gaps in worker skills. Targeted training programs can be designed based on this information to improve precision and efficiency. Monitoring and improvement on an ongoing basis result in increased productivity and fewer mistakes.
- **Customer Satisfaction and Order Accuracy:** Maintained records help ensure fabric pieces are cut in line with required specifications, thus lowering the potential for mistakes. This translates into fewer customer complaints, decreased return rates, and increased buyer trust. Sustained achievement of quality standards reinforces the reputation of the company in the industry.
- **Audit Readiness and Traceability:** Quality records give a clear history of materials, machine settings, and cutting accuracy. In case of a problem or dispute, the records trace back to the root cause and allow for rapid resolution. They also assist in internal and external audits, allowing business to run smoothly.
- **Performance Evaluation:** Long-term monitoring of cutting quality makes it possible to evaluate worker and machine performance. This information may be utilized to make informed process improvement, equipment upgrade, or training decisions. Identifying best performers based on records can encourage workers and increase overall morale as well.

6.3.2 Company Quality Standards of Fabric Cutting

All companies implement specified quality standards to achieve precision, consistency, and efficiency when cutting fabrics. The standards stipulate acceptable tolerance levels, levels of defects, and best industry practices for the handling of material. Cutting supervisors are responsible for upholding such standards to ensure minimum defects, maximum fabric usage, and high overall production quality.

- **Fabric Cutting Accuracy:** Guidelines for accurate cutting are established by companies, aligning with pattern markings. This minimizes errors and maintains consistency in garment construction.
- **Inspection and Tolerance Levels:** Quality control staff define tolerable levels of variation in dimensions, grain alignment, and edge smoothness. Cutting supervisors have to ensure that these tolerances are met before proceeding to the next stage of production.
- **Defect Identification and Reporting:** Defects like frayed edges, misplaced patterns, and irregular cuts are categorized and documented. Detection and fixation of these problems at an early stage ensures high-quality standards and minimizes rework.

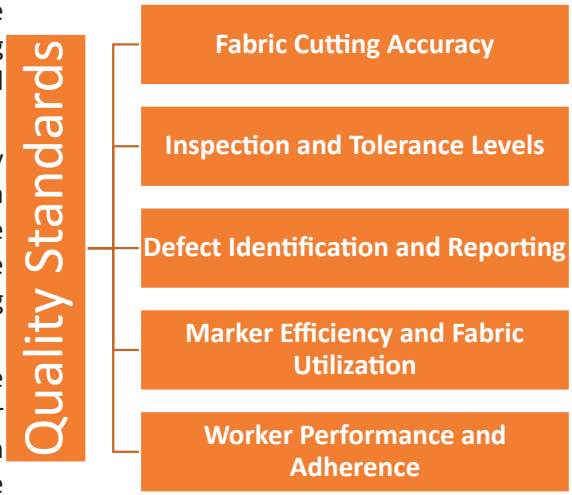


Fig. 6.3.2: Quality standards of fabric cutting

- **Marker Efficiency and Fabric Utilization:** Firms track the consumption of fabric by measuring marker efficiency. Records assist in analysing how much fabric is used compared to wastage, enabling process optimization and cost savings.
- **Worker Performance and Adherence:** Reduced supervisors monitor operator performance and compliance with company policies. Error recording and improvements assist in training, so output is consistent and productivity is improved.

How to Complete Quality Records?

Accurate record-keeping is critical to follow quality performance, detect errors, and verify compliance to customer specifications. Appropriate documentation practices enhance the organization of workflow, accountability, and facilitate process improvements.

1. **Standardized Forms and Electronic Systems:** Predefined forms or electronic tracking systems are used by companies to record quality data. Electronic systems provide real-time updates, with manual logs being used as backup records.
2. **Defect and Rework Logs:** Cutting supervisors keep accurate records of defects, including causes, fabric rolls affected, and corrective actions taken. This prevents repeated problems and aids in quality improvement.
3. **Material Usage Reports:** Fabric use, wastage, and cutting efficiency records are kept to track production expenses. They assist in marker planning optimization and minimizing material wastage.
4. **Audit and Compliance Documentation:** Proper documentation guarantees adherence to industry norms and buyer audits. Defect rates, material consumption, and corrective action documentation give transparency and traceability.
5. **Ongoing Monitoring and Improvement:** Ongoing updating of records enables supervisors to review trends, institute process improvements, and enhance cutting efficiency. Referral to historical data enhances decision-making for long-term quality control.

6.3.3 Reporting quality issues to Appropriate Personnel in Fabric Cutting

Maintaining consistent quality is paramount to ensuring customer satisfaction and brand reputation. Fabric cutting, being one of the most critical stages in garment production, directly impacts the accuracy, fit, and overall quality of the final product. Even minor discrepancies during this phase—such as uneven cuts, misaligned patterns, or fabric defects—can lead to significant wastage, rework, and compromised quality standards.

To uphold precision and minimise errors, it is essential for workers to promptly identify and report any quality issues to the appropriate personnel. Timely reporting not only prevents defective pieces from progressing further down the production line but also enables corrective action, thereby reducing material wastage and production delays. It fosters a culture of accountability and continuous improvement, which is vital for meeting both internal quality benchmarks and customer expectations.

Steps to report quality issues to appropriate personnel in fabric cutting are as follows:

Quality Issue	Details	Appropriate Personnel to Report To	Actions to be taken
Cutting Defects (Misalignment, inaccurate sizing, frayed edges)	Fabric pieces not cut as per measurements, leading to sewing difficulties and garment defects.	Cutting Supervisor, Quality Control Inspector, Maintenance Team (if machine-related)	Inspect and correct cutting methods, recalibrate or repair cutting machines if required.

Quality Issue	Details	Appropriate Personnel to Report To	Actions to be taken
Fabric Defects (Knots, holes, colour variations, weaving issues)	Visible defects in raw fabric affecting overall garment appearance and durability.	Fabric Inspection Team, Purchasing Department	Evaluate defect severity, report to supplier, arrange replacements or compensation.
Marker and Pattern Issues (Incorrect layout, wastage, overlapping cuts)	Poor marker efficiency causing excess fabric wastage or incorrect pattern placement.	Pattern Master, Marker Planner	Review marker placement, adjust layouts, optimize fabric utilization.
Equipment Malfunctions (Blade dullness, misalignment, cutting errors)	Cutting machines not functioning properly, causing inaccurate cuts and production delays.	Maintenance or Engineering Department	Conduct machine repairs, replace blades, and perform routine maintenance.
Safety Concerns (Hazards, improper handling, PPE issues)	Unsafe handling of equipment, risk of injuries, non-compliance with safety guidelines.	Health & Safety Officer, Factory Manager	Implement corrective safety measures, provide PPE, conduct safety training.
Excessive Fabric Waste and Low Marker Efficiency	High wastage during cutting, increasing production costs and inefficiency.	Production Manager, Process Improvement Team	Analyze waste levels, improve marker planning, and optimize cutting techniques.
Non-Compliance with Quality Standards (Incorrect procedures, ignored guidelines)	Workers not following company cutting standards, leading to defects and inconsistencies.	Quality Assurance Manager, Factory Supervisor	Conduct corrective training, enforce compliance with cutting guidelines.
Customer Complaints Regarding Cutting Quality	Reports from buyers about fabric cutting defects affecting final garment quality.	Merchandising Team, Sales Department	Investigate complaints, apply corrective actions, and ensure future compliance.

Table 6.3.1: Steps to report quality issues

6.3.4 Significance of Compliance with Written Procedure and Company

Observance of written procedures and firm protocols is instrumental in ensuring correctness, productivity, and uniformity in fabric-cutting activities. These protocols save material wastage, enhance organizational safety, and guarantee that produced items are adequate for customers' needs. Implementation of standardized methodologies also aids optimal coordination among various teams, advances quality control mechanisms, and discourages expensive faults in production processes.

- **Sustaining Cutting Accuracy and Quality Standards:** Written specifications guarantee that all pieces of fabric are cut to exact dimensions, having proper grain alignment and few defects. Strict compliance avoids inconsistencies that might influence assembling garments and fit. Uniform cutting procedures also minimize variations in fabric sizes, resulting in a more efficient sewing process and reduced production delays.
- **Decreasing Mistakes and Wastage of Material:** Guaranteed cutting procedures assist staff in reducing mistakes like poor pattern alignment, inconsistent cutting, and unnecessary fabric loss. Detailed placement of markers and compliance with optimized sequences of cutting aid in maximizing fabric yield. Decreasing wastage reduces material cost, enhances profitability, and makes manufacturing more environmentally friendly.
- **Maintaining Workplace Safety:** Instructions for safe use of cutting machines, maintenance of blades, and personal protective equipment (PPE) prevent workplace accidents. Adherence to safety guidelines ensures that employees use sharp tools, heavy material, and automated cutting systems properly, minimizing the chances of accidents. A secure working place also results in increased worker morale and less interruption in production because of injuries.
- **Smooth operation of Workflow and Productivity:** Properly documented cutting process brings about seamless communication among cutting crews, pattern makers, and sewn departments. When all share the same guidelines, it will avoid confusion, minimize reworking, and fasten production. Uniform workflows will also assist with improved time allocation, enabling business firms to stay within tight delivery schedules and ensuring consistent output.
- **Meeting Customer Needs and Compliance Standards:** Most customers give precise requirements for cutting accuracy, precision, and tolerance of defects. Keeping to these standards guarantees that cutting fabric is industry compliant and acceptable to the customer. Adherence to written directives avoids mistakes that may result in rejected shipments, rework charges, or tarnishing the firm's reputation. Compliance also facilitates long-term contract maintenance with clients.
- **Facilitating Traceability and Quality Audits:** Accurate documentation of cutting processes enables supervisors to monitor errors, trace defects, and apply corrective actions. Properly kept records ensure transparency in production, allowing for easier identification of the cause of problems and their prevention from occurring again. The records also aid in quality audits, ensuring the company is compliant with internal and external inspection requirements without delay or penalty.

UNIT 6.4: Communication, Responsibility, and Waste Management

Unit Objectives

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

1. Discuss the importance of effective communication with colleagues and supervisors.
2. List of lines of communication, authority, and reporting procedures.
3. Identify limits of self-responsibility and ways to resolve workplace problems.
4. Identify ways to minimize waste and dispose of it safely.

6.4.1 Importance of Effective Communication with Colleagues and Supervisors in Fabric Cutting

Effective communication during fabric cutting processes is crucial for ensuring accuracy, efficiency, and workplace safety. Accurate and precise instructions coupled with coordination of workers, supervisors, and departments serve to curtail errors, avoid wastage of fabric material, and guarantee smooth flow operations. Effective communication also promotes cooperation, enhances the process of resolving problems, as well as guaranteed quality standards adherence.

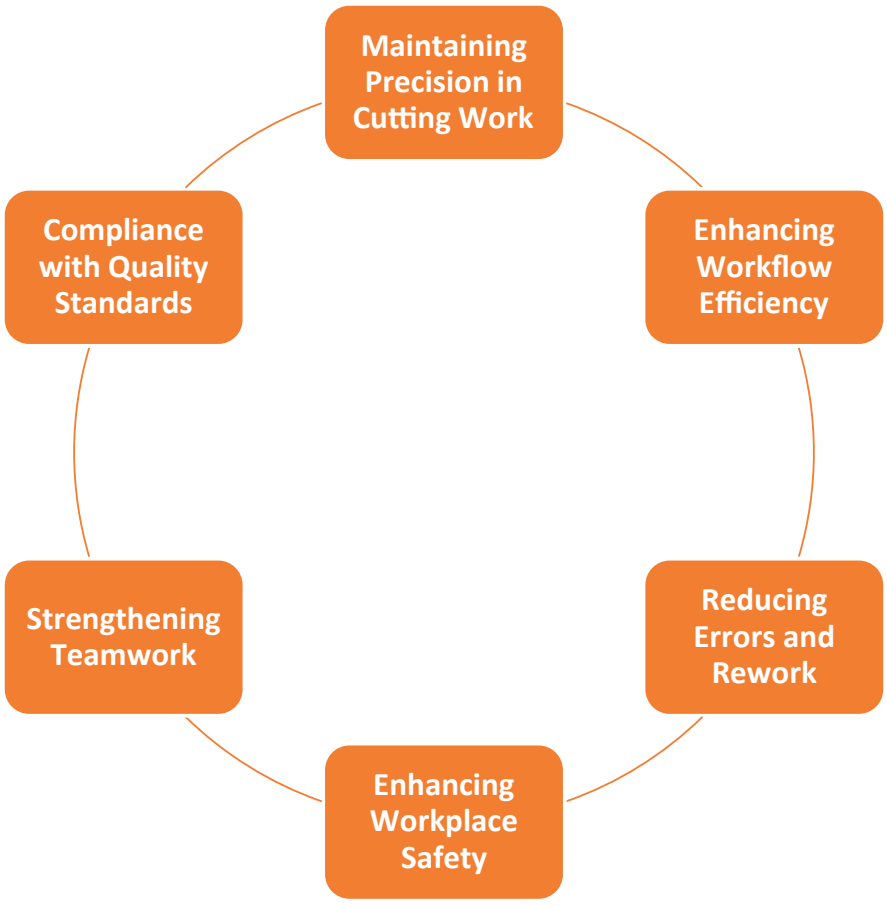


Fig. 6.4.1: Effective communication techniques

- **Maintaining Precision in Cutting Work:** Proper communication enables employees to know pattern details, types of fabrics, and methods of cutting. With clear instructions from supervisors, errors like misplaced cuts, wrong sizes, or fabric flaws are avoided.
- **Enhancing Workflow Efficiency:** Smooth coordination of the cutting teams, pattern makers, and production personnel ensures work continues unhampered. Timely information regarding fabric availability, machine status, or schedule modification avoids disruptions and ensures continuity of work.
- **Reducing Errors and Rework:** Misinterpretation of instructions may result in wrong cutting, producing faulty pieces that have to be reworked or wasted. Open communication enables workers to clear confusion, ask questions, and use the right procedures, minimizing material wastage and cost of production.
- **Enhancing Workplace Safety:** Good communication about machine handling, maintenance schedules, and safety precautions avoids accidents. Employees need to inform supervisors instantly about any danger or malfunctions so that they can maintain a safe working place.
- **Strengthening Teamwork:** Effective teamwork is based on effective communication. Information sharing, feedback, and cooperation among team members result in enhanced efficiency, quicker resolution of issues, and increased job satisfaction.
- **Compliance with Quality Standards:** Supervisors and quality control groups establish precise cutting standards to be in line with customer and industry requirements. Through proper communication, all workers receive clear instructions regarding these requirements and adhere to them, minimizing defects and enhancing product quality overall.

6.4.2 Lines of Communication, Authority, and Reporting Procedures in Fabric Cutting

An organized system of communication and reporting facilitates smooth work flow, avoids errors, and preserves production efficiency. Open communication among workers, supervisors, and managers aids in fast problem-solving, saving fabric waste, and meeting quality requirements.

Communication Level	Details	Purpose
Cutting Operators to Cutting Supervisor	Operators report daily tasks, material issues, and cutting defects to the cutting supervisor. Any concerns about unclear instructions, machine handling, or safety hazards must be communicated immediately.	Ensures smooth operations, prevents cutting mistakes, and addresses safety concerns.
Cutting Supervisor to Production Manager	The supervisor updates the production manager on cutting progress, material shortages, and equipment issues. Delays due to defective fabric or machine malfunctions are escalated for quick decision-making.	Prevents production delays and ensures material availability for continuous workflow.
Cutting Supervisor to Quality Control (QC) Inspector	Any defects such as fabric fraying, inaccurate cuts, or pattern misalignment are reported to the QC inspector. The QC team checks if all fabric pieces meet the required standards.	Reduces fabric defects, maintains quality, and prevents errors from progressing to the next stage.

Communication Level	Details	Purpose
Cutting Supervisor to Maintenance Team	Machine malfunctions, dull blades, or technical faults are reported to the maintenance team for repairs and servicing. Urgent issues are prioritized to avoid work stoppages.	Ensures cutting machines operate at peak efficiency, reducing downtime and improving productivity.
Factory Manager to Merchandising/ Customer Service Team	Major production delays, fabric rejections, or urgent priority orders are reported to the merchandising or customer service team, who then update buyers and suppliers.	Manages client expectations, arranges fabric replacements, and ensures order commitments are met.

Table 6.4.1: Lines of communication, authority, and reporting procedures

6.4.3 Limits of Self-Responsibility and Ways to Resolve Workplace Problems in Fabric Cutting

In a cutting department for fabrics, workers and management need to know the scope of their duties to guarantee efficiency, quality, and minimal delay. As much as operators and supervisors are responsible for doing their work properly, there are problems that need referral to higher authorities or other departments. Understanding when to act independently and when to refer to someone helps guarantee the fixing of workplace issues.

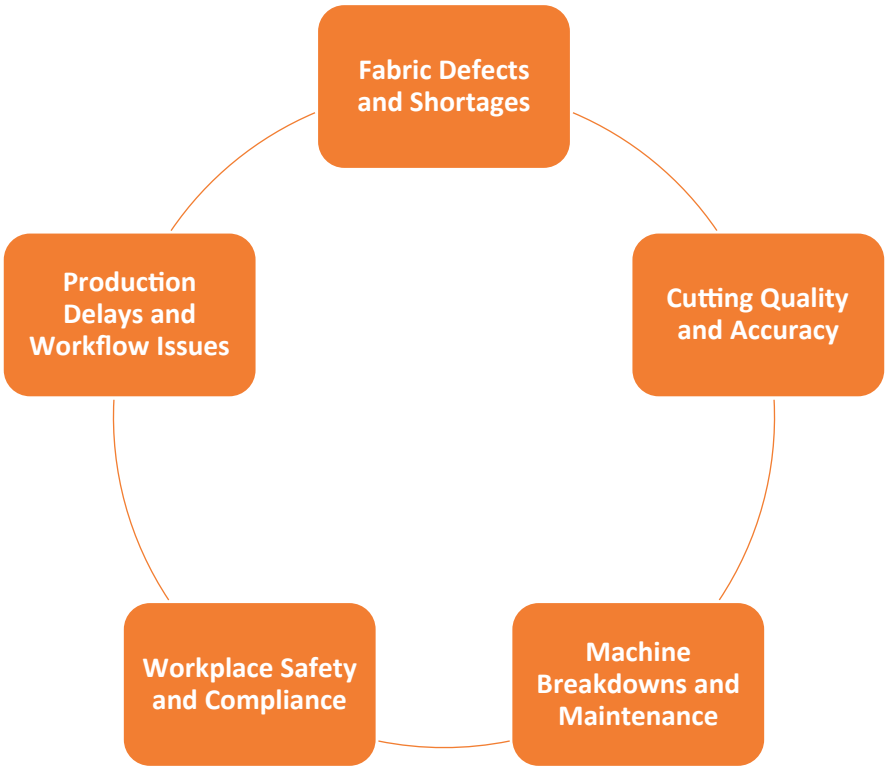


Fig. 6.4.2: Workplace issues

- **Fabric Defects and Shortages:** Operators have to inspect fabric prior to cutting to detect defects like stains, holes, or irregular textures. They cannot, however, approve or reject large lots of defective fabric. In case of major defects or fabric shortages, they have to report the matter to the fabric inspection team or the production manager. Production has to be halted only after due approval or an alternative solution is given.
- **Cutting Quality and Accuracy:** Operators have to stick to the marker layout and cutting instructions provided carefully to get proper fabric piece sizes. They cannot, however, decide independently on repositioning markers or altering patterns. If they identify size problems, improper marker alignment, or any other variation from specifications required, they should report these to the cutting supervisor or pattern maker for rectification.
- **Machine Breakdowns and Maintenance:** Workers can perform basic troubleshooting such as blade sharpening or adjusting minor machine settings. However, they are not responsible for handling complex machine repairs or technical faults. If the cutting machine malfunctions, the issue must be reported to the maintenance team immediately to prevent production downtime. Regular communication with maintenance staff ensures that machines remain in optimal working condition.
- **Workplace Safety and Compliance:** All safety regulations, including the use of protective equipment and proper handling of cutting tools, must be adhered to by employees. They are not, however, tasked with enforcing new safety regulations or deciding on dangerous working conditions. If any safety hazards, including electrical problems, machine dangers, or inadequate ventilation, are observed, workers should report them to the health and safety officer or the cutting supervisor for appropriate action.
- **Production Delays and Workflow Issues:** Cutting operators and supervisors have to stick to schedules and deadlines. If there are delays because of material not being available, incorrect patterns, or order changes, they cannot alter deadlines on their own or shift production priorities. Any workflow interruptions have to be brought to the attention of the production manager, who will communicate with other departments to identify a workable solution.

6.4.4 Ways to Minimize Waste and Dispose of It Safely in Fabric Cutting

Reducing fabric cutting waste is key to cost savings, environmental sustainability, and keeping the working area clean. Waste material reduction and proper treatment of fabrics minimize unnecessary material loss and help ensure conformity with industry and environmental regulations. Good management of wastes enhances productivity while maintaining sustainability in apparel production.

- **Optimizing Marker Efficiency:** Using advanced marker-making software ensures that pattern pieces are arranged in a way that maximizes fabric utilization. By minimizing gaps between pieces, less fabric is wasted. Skilled marker makers can also manually adjust placements for better efficiency.
- **Reusing Fabric Scraps and Offcuts:** Small pieces of leftover fabric may be reused in the production of accessories, sample patches, or reinforcement for garments. Factories can also cooperate with recycling programs to recycle fabric scraps into padding, insulation, or reusable textile products.

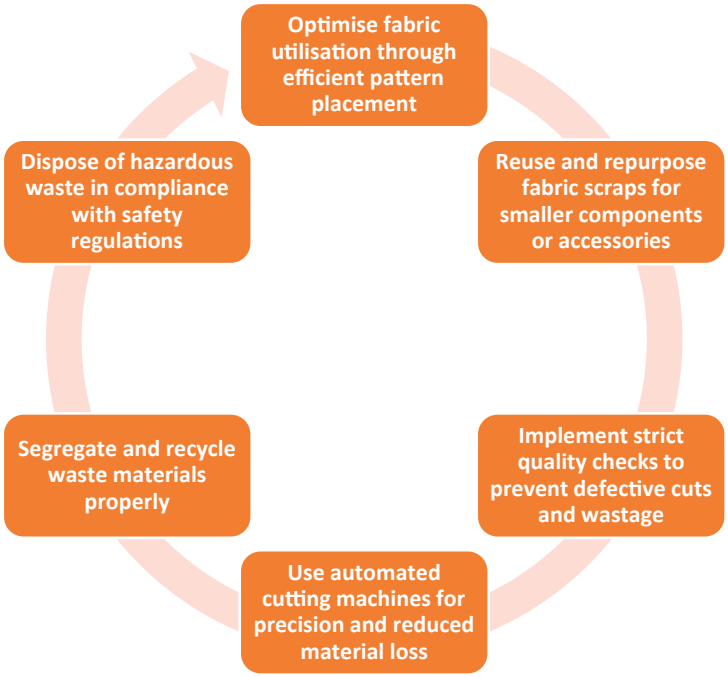


Fig. 6.4.3: Ways to minimize waste and dispose of it safely

- **Minimizing Human and Machine Errors:** Cutting errors caused by improper marker placement, misalignment, or faulty measurements result in waste of fabric. Training cutting operators and employing computerized cutting machines minimize errors and enhance accuracy.
- **Efficient Spreading Methods:** Effective fabric spreading avoids distortions, wrinkles, and tension that cause inaccurate cuts and wastage. Smooth fabric spread, tension-free, and properly aligned reduces defects and material waste.
- **Cutting Equipment Maintenance:** Dull blades, improper cutting tool alignment, or malfunctioning machines can lead to uneven cuts and fabric wastage. Proper maintenance of cutting machines, knives, and other equipment ensures precise cutting and minimizes fabric rejection.
- **Application of Fabric in Layers to Avoid Waste:** Proper layering of fabric prior to cutting ensures that several pieces are cut simultaneously with limited wastage. Spreading machines automate to maintain the fabric's alignment and avoid excess cutting mistakes.
- **Sorting and Segregating Waste Properly:** Fabric waste should be sorted based on type—biodegradable, synthetic, and mixed-material scraps. This allows for easier recycling and proper disposal. Proper segregation also helps in identifying reusable materials.
- **Recycling and Donating Leftover Fabric:** Some fabric scraps can be donated to small-scale tailors, fashion students, or organizations that repurpose waste for craft projects. Factories can also send excess fabric to recycling plants to be converted into new textile products.
- **Implementing Workplace Cleanliness and Safety Measures:** Keeping the cutting floor free from fabric wastes avoids workplace hazards like slips and fire risks. Having designated waste bins and facilitating regular disposal of wastes ensures a safe working area.
- **Compliance with Environmental Laws for Waste Disposal:** Factories are required to comply with environmental regulations of the area in waste disposal. The non-recyclable waste fabric must be disposed of properly, and chemical-treated fabrics must be treated in compliance with safety rules.

Summary

- Safe working practices are essential for cleaning and maintaining equipment to ensure efficiency and safety.
- Various cleaning equipment and substances must be identified and used appropriately for different tasks.
- Cleaning methods should be applied correctly, and maintenance should be conducted as per scheduled guidelines.
- Proper lifting and handling procedures must be followed to prevent injuries when working with materials and tools.
- After use, cleaning equipment should be stored safely in designated places to maintain order and accessibility.
- Machines like scissors, straight knives, band knives, and laser cutting machines are used for cutting, layering, and marking fabrics.
- Different markers and tools are necessary for precise marking during cutting and layering processes.
- Identifying and rectifying common equipment faults is crucial for smooth operation and quality output.
- Maintaining a comfortable working position with correct posture enhances efficiency and prevents strain.
- Accurate record-keeping and adherence to quality standards ensure compliance with company policies and industry regulations.

Exercise

Multiple-choice Question:

1. Why is it important to follow safe working practices when cleaning equipment?
   a. To increase cleaning time
   b. To ensure safety and efficiency
   c. To use more cleaning substances
   d. To avoid storing equipment properly

2. Which of the following is a common cutting tool?
   a. Vacuum cleaner
   b. Band knife
   c. Mop
   d. Iron press

3. What should be done after using cleaning equipment?
   a. Discard it
   b. Leave it anywhere
   c. Store it in a designated place
   d. Clean it only if necessary

4. Why is proper posture important while working?
   a. It prevents strain and enhances efficiency
   b. It makes work slower
   c. It is only required for heavy lifting
   d. It does not impact productivity

5. Why is quality record-keeping essential?
   a. To create unnecessary paperwork
   b. To comply with company policies and standards
   c. To avoid completing reports
   d. To ensure errors go unnoticed

Descriptive Questions:

1. Explain the significance of maintaining safe working practices during equipment cleaning and maintenance.
2. Describe the different types of cleaning equipment and their uses.
3. How can common equipment faults be identified and rectified?
4. Discuss the importance of proper posture while working with cutting and layering tools.
5. Why is accurate record-keeping essential for quality control in an organization?

Notes

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

https://youtu.be/S-AlK2sYgXA?si=bUcCAtGmZyWG2mtZ

Maintain and Store Cleaning Equipment

https://youtu.be/Q9lHNBh73wc?si=mzfoVvAdZe8h43oG

Full Automatic Fabric Spreading Machine

https://youtu.be/G_r5SvYGbmg?si=Twi4p4K8a3BwubDi

Success Mantra for Effective Team Building

Skill India
कौशल भारत-कुशल भारत

सत्यमेव जयते
GOVERNMENT OF INDIA
MINISTRY OF SKILL DEVELOPMENT
& ENTREPRENEURSHIP

N·S·D·C
RE>IMAGINE FUTURE

7. Adhere to Industry, Regulatory, and Organizational Standards and Embrace Environmentally Sustainable Practices

APPAREL MADE-UPS HOME FURNISHING
SECTOR SKILL COUNCIL

AMH/N0621

Key Learning Outcomes

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

1. Uphold ethical and value-based governance to benefit both individuals and the organization.
2. Follow punctuality, attendance, and customer-specific requirements in the work process.
3. Comply with country-specific apparel regulations and report any deviations.
4. Understand and follow organizational reporting procedures and limits of personal responsibility.
5. Clarify doubts on policies and procedures and support team members in enforcing organizational guidelines.
6. Ensure compliance with legal, regulatory, and ethical requirements within work practices.
7. Follow sustainable consumption practices and contribute to environmentally friendly processes.
8. Handle materials, equipment, and software safely to maintain a clean, hazard-free workspace.
9. Perform routine maintenance, report unsafe equipment, and manage work interruptions effectively.
10. Maintain and back up digital design files for future reference and request software upgrades as needed.

UNIT 7.1: Ethical Practices, Compliance, and Governance

Unit Objectives

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

1. Discuss the importance of an ethical and value-based approach to governance and its benefits to self and the organization.
2. Explain the follow legal, regulatory, and ethical requirements specific to the apparel industry.
3. Identify procedures to follow if legal, regulatory, and ethical requirements are not met.
4. Interpret country/customer-specific regulations and customer-specific requirements mandated in the apparel sector.
5. List of organizational policies and procedures within self-authority and report any deviations to regulatory requirements.

7.1.1 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. 7.1.1: 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 their reputation due to unethical activities.

- **Fosters Ethical Leadership:** Ethical governance standards seek to expect leaders to serve as role models, exhibiting values like 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 dispute in a fair manner, maintains openness in 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 not only enhances the organization's reputation but also 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. 7.1.2: Benefits to self and the organization

7.1.2 Legal, Regulatory, and Ethical Requirements to the Apparel Industry

Legal obligations keep clothing companies within the ambit of national and global laws. These are labour laws, workplace safety acts, and trade policies. Adherence prevents legal conflicts, fines, and factory shutdowns.

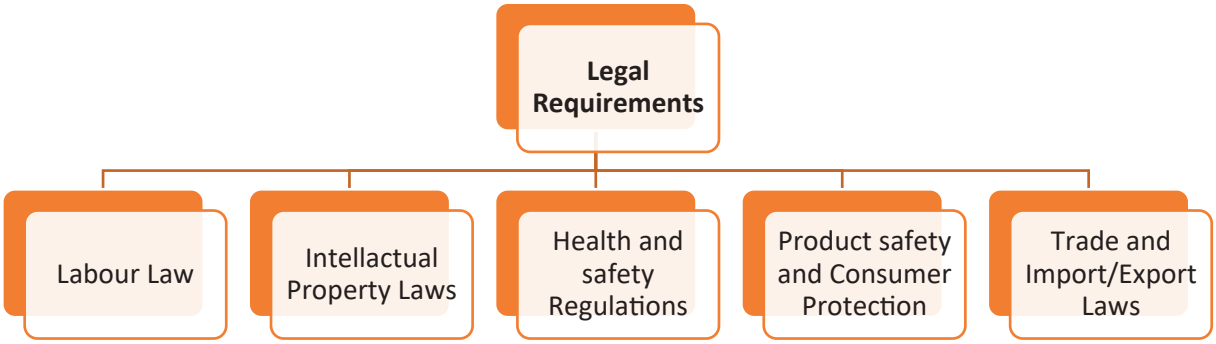


Fig. 7.1.3: Legal requirements to the apparel industry

- **Labour Laws:** Govern wages, working hours, and employment rights to protect workers from exploitation. Examples include the Fair Labour Standards Act (FLSA) and ILO conventions.
- **Health and Safety Regulations:** Laws like OSHA and ISO 45001 ensure proper workplace safety, fire prevention, and protection from occupational hazards.
- **Product Safety and Consumer Protection:** Regulations such as CPSIA and OEKO-TEX ensure garments are free from harmful substances and safe for consumers.
- **Trade and Import/Export Laws:** Policies like GSP (Generalized System of Preferences) and AGOA regulate duties, tariffs, and market access for apparel exports.
- **Intellectual Property Laws:** Protects apparel designs, logos, and brand identity from counterfeiting and unauthorized use.

Regulatory Requirements in the Apparel Industry

Regulatory requirements are geared towards industry-based norms that factories need to adhere to in order to provide quality, safety, and sustainability. Regulatory agencies regulate these standards for ethical and environmental accountability.

Fig. 7.1.4: Regulatory requirements in the apparel industry

- **Environmental Regulations:** Initiatives like EU REACH and ZDHC restrict harmful chemicals in textile production and promote eco-friendly processes.
- **Ethical Sourcing Compliance:** Certifications like Better Cotton Initiative (BCI) and Fair Trade Certified ensure responsible sourcing of materials.
- **Social Compliance Audits:** Standards like SA8000 and WRAP ensure safe working conditions, fair wages, and labour rights.

- **Labelling and Packaging Regulations:** Laws require accurate labelling of fabric content, care instructions, and country of origin to prevent misleading consumers.

Ethical Requirements in the Apparel Industry

Ethical demands guarantee that companies maintain equitable labour practices, social responsibility, and sustainability. Being ethical enhances brand reputation and customer trust.

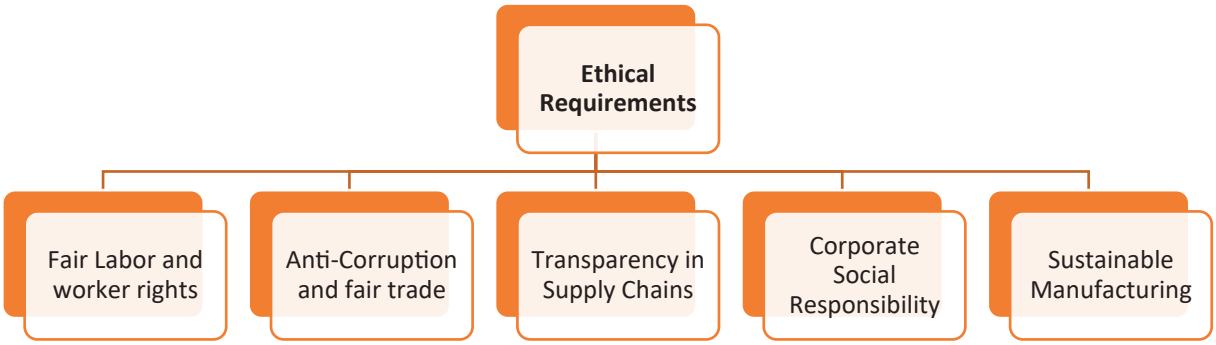


Fig. 7.1.5: Ethical requirements in the apparel industry

- **Fair Labour and Worker Rights:** Prevents child labour, forced labour, and exploitation. Laws like the U.K. Modern Slavery Act and ILO Forced Labour Convention enforce ethical employment.
- **Transparency in Supply Chains:** Brands must disclose sourcing practices and ensure suppliers meet ethical standards to prevent labour abuse.
- **Corporate Social Responsibility (CSR):** Encourages companies to engage in sustainable practices, fair wages, and community development programs.
- **Sustainable Manufacturing:** Reducing waste, conserving resources, and adopting eco-friendly production methods align with global environmental goals.
- **Anti-Corruption and Fair Trade:** Ensures ethical business dealings, preventing bribery, unfair competition, and exploitation of workers in developing countries.

7.1.3 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. There should be explicit procedures within organizations to deal with non-compliance and ensure proper remedial action is taken.

1. **Internal Investigation and Assessment:** The initial step is to carry out a proper internal investigation to establish the level of non-compliance. This entails checking records, auditing, and taking statements from employees or stakeholders to ascertain the cause of the problem.
2. **Immediate Corrective Steps:** Immediately on 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 the

protection of the environment. Prompt reporting can help avoid penalties and also show that the firm is interested in being 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 both the employees and management are aware of their roles and adhere to proper procedures in the future.
5. **Adopting Stricter Compliance Mechanisms:** To avoid repeat offenses, corporations must adopt more stringent compliance monitoring systems, including third-party audits, frequent inspections, and grievance reporting. This 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 to be guilty of wilful non-compliance, disciplinary actions ought to 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 need to revise internal policies to be consonant 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 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 again the confidence of stakeholders, customers, and the regulatory authorities.

7.1.4 Country-Specific and Customer-Specific Requirements in the Apparel Sector

The fashion industry has to adhere to a multifaceted array of country-specific and customer-specific rules and regulations to meet legal, ethical, and quality requirements. These regulations differ geographically and cover aspects like product safety, labour laws, environmental sustainability, and trade policies. Furthermore, international brands and retailers also have their own quality, ethical, and sustainability standards that they enforce on suppliers to ensure consistency and brand image.

- **Labour and Workplace Safety Laws:** Various nations have certain labour regulations to safeguard the rights of employees, salaries, and work conditions. For instance, the U.S. has the Fair Labour Standards Act (FLSA) that dictates minimum wage and overtime pay, and India has the Factories Act that oversees the health and safety of workers. Brands operating across various countries have to ensure their suppliers adhere to local labour laws to escape legal and reputational consequences.
- **Product Safety and Consumer Protection Legislation:** Every nation has laws to make apparel products safe for consumers. The U.S. has the Consumer Product Safety Improvement Act (CPSIA), which requires lead and phthalate testing in kids' clothing, while the EU has the General Product Safety Regulation (GPSR), which makes clothing safe from harmful chemicals. Failure to comply can lead to product recalls, penalties, or import prohibition.
- **Sustainability and Environmental Regulations:** Most nations have rigorous environmental legislation to regulate pollution caused by textile manufacturing. The EU REACH law limits toxic chemicals in garments, while the Textile Industry Emission Standards in China address wastewater treatment. Brands typically insist on suppliers adhering to international sustainability programs such as ZDHC (Zero Discharge of Hazardous Chemicals) and OEKO-TEX certification to satisfy consumer demand for green products.

- **Trade and Customs Compliance:** Apparel imports and exports need to be in line with country-specific trade agreements, tariffs, and documentation requirements. For example, the African Growth and Opportunity Act (AGOA) offers duty-free entry of African textiles into the U.S., while the Generalized System of Preferences (GSP) provides trade preference for developing countries exporting apparel to the EU. Non-compliance with trade rules can result in delays in shipments, fines, or rejection from the market.
- **Customer-Specific Quality and Ethical Standards:** Global apparel brands have their own quality control, ethical sourcing, and sustainability requirements for suppliers. Retailers like H&M, Nike, and Adidas mandate compliance with ethical sourcing programs such as Better Cotton Initiative (BCI) and Fair Trade Certified. They also require adherence to social audits like WRAP (Worldwide Responsible Accredited Production) and SA8000 to ensure fair wages and safe working conditions.
- **Labelling and Packaging Requirements:** Different markets have unique labelling laws specifying fabric content, country of origin, care instructions, and safety warnings. The Federal Trade Commission (FTC) in the U.S. requires clear fiber content labelling, while the EU Textile Regulation (1007/2011) mandates standardized garment labelling in multiple languages. Non-compliance can lead to fines, product rejections, or bans in certain regions.

7.1.5 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 and are required to report any variations to the proper authorities in order to be in compliance and maintain operational integrity.

Policies and Procedures Within Self-Authority

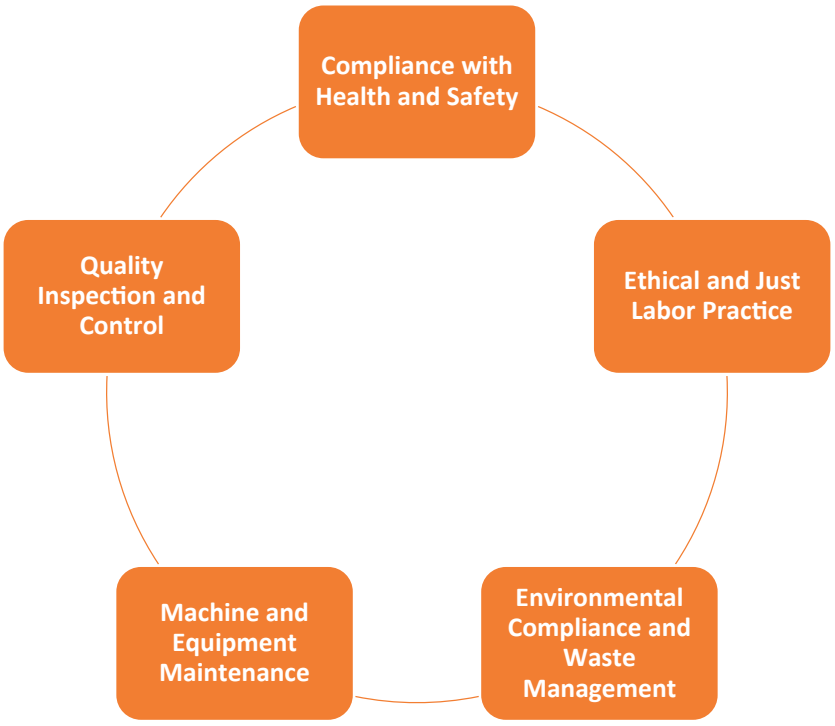


Fig. 7.1.6: Policies and procedures within self-authority

- **Compliance with Health and Safety:** Workers are held accountable for adherence to workplace safety procedures, the use of protective gear, and ensuring a safe working environment. They can report hazards and implement corrective measures instantly, like halting machinery during an emergency.
- **Quality Inspection and Control:** Production workers and inspectors have to make sure 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 in the workplace according to ethical standards, obey fair labour practices, and make sure that there is no discrimination, harassment, or exploitation at the workplace. Supervisors can deal with minor disputes and forward major complaints to HR.
- **Environmental Compliance and Waste Management:** Employees are required to adhere to waste disposal policy, recycle resources where possible, and reduce the impact on the environment. Failure in adhering to sustainability policy, for instance, excessive wastage of fabrics, should be recognized and communicated.
- **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. 7.1.7: Reporting deviations from regulatory requirements

UNIT 7.2: Workplace Responsibility, Efficiency, and Environmental Sustainability

Unit Objectives

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

1. Discuss the importance of punctuality, attendance, and personal responsibility in workplace performance.
2. List of support to supervisors and team members in enforcing organizational considerations.
3. Illustrate the work functions in accordance with organizational standards, greening solutions, policies, and regulations.
4. Build participate in improving organizational performance and support environmentally friendly processes.
5. Apply sustainable consumption practices in daily work activities.

7.2.1 Importance of Personal Responsibility in Workplace Performance

Punctuality, consistent attendance, and a good sense of personal responsibility are all necessary for maintaining workplace efficiency, professionalism, and teamwork. They lead to a productive work culture, assist in achieving organizational objectives, and promote a culture of dependability and discipline.

Fig. 7.2.1: Importance of personal responsibility in workplace performance

- **Punctuality Guarantees Productivity and Efficiency:** Being on time enables workers to begin their work as planned, avoiding breakdowns in workflow. It guarantees fulfilment of production lines, meetings, and deadlines without any postponements. Constant punctuality also exhibits professionalism and responsibility, affirming an employee's dependability within the company.

- **Regular Attendance Ensures Workflow Consistency:** Recurrent absenteeism can have a negative influence on 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.
- **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 as well as others in the organization.
- **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 that there is 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.
- **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 workers who are committed and responsible, and they are the best candidates for leadership positions and long-term employment.

7.2.2 Support to Supervisors and Team Members in Enforcing Organizational Considerations

In any organisation, the effectiveness of operations is heavily reliant 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, maintain 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 policies related to attendance, safety, and quality control. 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 immediately report hazards to supervisors. Active participation in safety drills ensures readiness in case of emergencies.

Support Area	Description
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 larger 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 properly 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 7.2.1: Methods of enforcing organizational considerations

7.2.3 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. This ensures quality production, environmental responsibility, and legal compliance while maintaining workplace efficiency.

Fig. 7.2.2: Importance of meeting organizational standards

- **Working in Accordance with Organizational Norms for Work Processes:** Workers are required to follow organizational standards for aspects of 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.
- **Installing Greening Measures for Sustainability:** The fashion industry creates a lot of waste, so sustainable methods are crucial. Reducing wastage of materials is achieved through optimized fabric markers, recycling of textile cuttings, and energy-saving machinery. Water and chemical management during dyeing and finishing also help in minimizing environmental footprint. Workers contribute to sustainability through adopting green practices like waste segregation and low consumption of non-renewable resources.
- **Maintaining Compliance with Company Policies:** Company policies on employee attendance, workplace ethics, handling machines, and safety protocols must be followed by work functions. Workers are required to practice safety procedures, employ personal protective gear (PPE), and maintain workplace discipline. Ethical sourcing, fair compensation, and non-discrimination policies also guarantee a fair and responsible work environment.
- **Maintaining Compliance with Industry Regulations and the Law:** Fashion businesses are required to adhere to national and global laws, including labour legislation, occupational health and safety (OHS) codes, and environmental laws. 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.
- **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 maintain adherence to both organizational and regulatory requirements.

7.2.4 Improving and Supporting Organizational Performance and Environmentally Friendly Processes

Workers have an important role to play in building organizational performance and driving sustainable practices in the apparel sector. By engaging directly in efficiency gains and adopting eco-friendly processes, they 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 so as to ensure uniformity and not lose much on production.
- **Building Team Work and Skills:** Collaboration is key to productivity. Employees must take an active role 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, the reduction of 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 the use of 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, assist in training 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 the use of organic, recycled, or biodegradable materials in production also aligns with sustainability goals. Waste reduction practices such as upcycling fabric scraps further enhance environmental responsibility.
- **Complying with Environmental Regulations and Safety Standard:** 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 any environmental 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.

7.2.5 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 work done daily. It is the responsibility of employees to minimize 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 the optimal utilization of fabric 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, for example, reuse of treated water, where possible, and reducing excess water consumption.

3. **Reduction of Chemical and Hazardous Waste:** Employees ought to properly manage dyes, adhesives, and other chemicals by adhering to safe practices and utilizing only the amounts needed. Safe 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 in ensuring 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. Employees involved in procurement or material handling 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 on a regular basis guarantees they function optimally, minimizing unnecessary resource use. Properly maintained equipment lasts longer, diminishing the demand for constant replacement and lowering environmental waste.

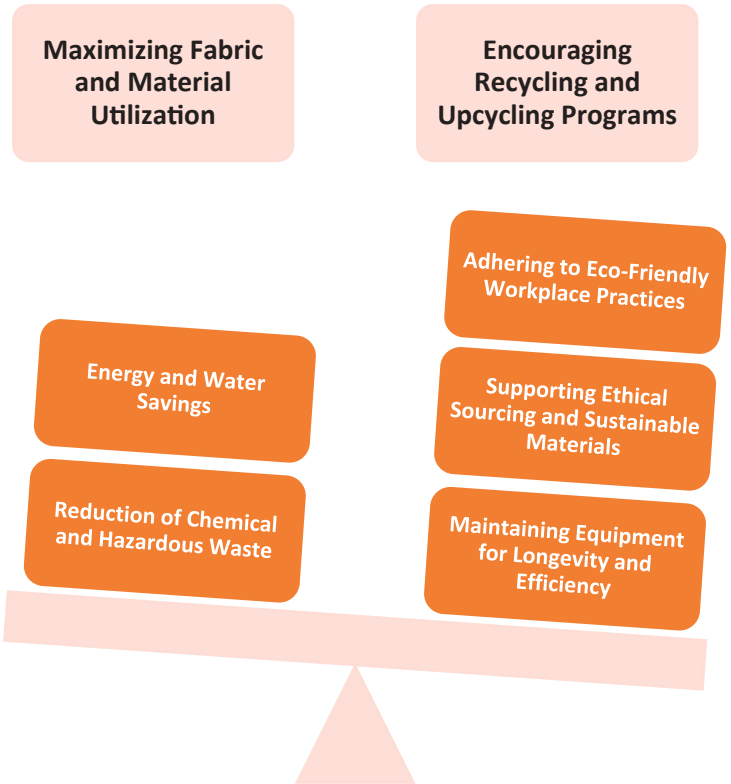


Fig. 7.2.3: Implementation of sustainable consumption practices in daily work

UNIT 7.3: Safe Handling, Maintenance, and Documentation

Unit Objectives

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

1. Analyse handle materials, equipment, computers, and software safely to maintain a clean and hazard-free workspace.
2. Select routine maintenance and cleaning tasks while effectively dealing with work interruptions.
3. Explain unsafe equipment and other dangerous occurrences to concerned personnel.
4. List of appropriate cleaning equipment and methods for the work to be carried out.
5. Modify system or software upgrades when necessary and maintain backup files for digital design work.
6. Discuss the soft copies of design work for future reference.

7.3.1 Maintaining a Clean and Hazard-Free Workspace

Maintaining a safe and organized workspace in the apparel industry requires proper handling of materials, machinery, and digital tools. Following safety protocols and cleanliness practices reduces workplace hazards, enhances productivity, and ensures compliance with industry standards.

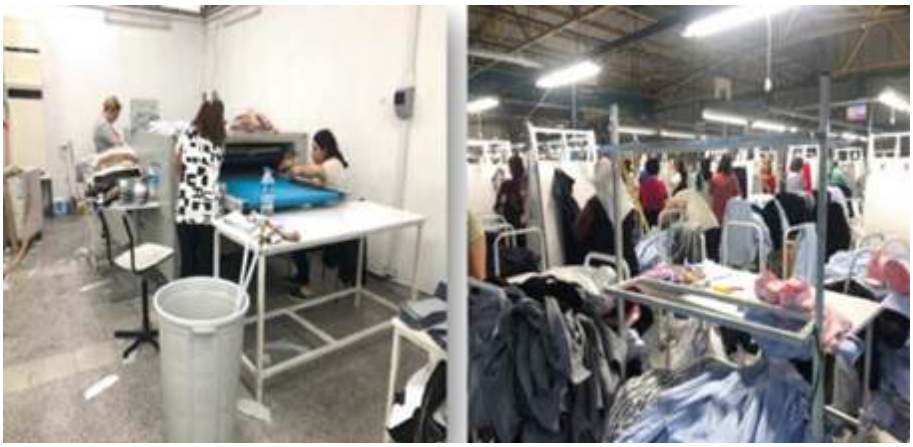


Fig. 7.3.1: Workplaces must follow safety protocols and cleanliness practices

- **Safe Handling and Storage of Materials:** Fabrics, trim, and accessories must be kept in assigned places to avoid damage, contamination, or tripping. Heavy rolls should be handled with the assistance of lifting devices or manpower to prevent injuries. Hazardous chemicals like adhesives and dyes must be stored in well-labelled containers and kept out of heat sources.
- **Safe Use and Maintenance of Equipment:** Equipment such as fabric cutters, sewing machines, and pressing devices has to be operated in line with manufacturer instructions. Routine maintenance like oiling and cleaning keeps them from breaking down and guarantees long life. Staff should always switch off and disconnect equipment when not being used to prevent electrical shock.
- **Keeping Workstations Clean and Organized:** A neat working area minimizes the probability of accidents. Labourers must dispose of threads, fabric clippings, and packing materials regularly. End-of-shift cleaning of tools and surfaces maintains efficiency and hygiene. Waste segregation and recycling routines should also be observed.

Fig. 7.3.2: Workstations must be kept clean and organized

- **Safety in Operating Computers and Computer Programmes:** Staff working with digital equipment for pattern making, inventory maintenance, or quality management must observe cybersecurity procedures, utilize ergonomic arrangements, and conduct system updates on a regular basis. Refraining from installing unauthorized software and saving vital information avoids security threats and operational downtime.
- **Adhering to Workplace Safety Guidelines:** Wearing correct personal protective gear (PPE) like gloves, masks, and safety goggles reduces risks during working with sharp objects, chemicals, or heavy objects. Means of escape at all times are made available and must be educated to fire-fighting and first aid.

Fig. 7.3.3: Personal protective gear

7.3.2 Routine Maintenance and Cleaning Tasks

Regular maintenance and cleaning in the fashion industry allow machines to function efficiently, working areas to stay tidy, and product quality to be sustained. Production timetables, rush orders, and machine breakdowns may, however, interfere with these activities. A well-defined approach ensures the balancing of maintenance tasks while efficiently managing work disruptions.

Fig. 7.3.4: Regular cleaning of workstation is important

- **Establishing a Routine Cleaning and Maintenance Schedule:** Assigning specific times for cleaning and equipment checks prevents neglect. Machines should be serviced during shift changes, breaks, or low-production periods to minimize disruptions. Routine schedules also help in keeping track of maintenance needs.
- **Conducting Daily, Weekly, and Monthly Maintenance Activities:** Daily activities involve cleaning fabric lint, dusting surfaces, and verifying machine alignment. Weekly activities can include lubricating machine components, tightening loose screws, and checking emergency stop functions. Monthly thorough cleaning involves checking motor functions, replacing old parts, and calibrating cutting tools.
- **Keeping Cleaning Tools and Supplies Readily Available:** Having designated storage areas for brooms, vacuum cleaners, compressed air dusters, and cleaning solutions ensures that workers can quickly access them when needed. A well-stocked cleaning station saves time and minimizes work interruptions.
- **Fixing Equipment Malfunctions on Time:** If a machine malfunctions during maintenance, employees must inform technicians instantly while reallocating tasks to other running machines. Having a backup system in the form of spare machines or alternative workstations avoids production downtime.
- **Training Workers to Perform Basic Troubleshooting:** Employees should be trained to handle minor maintenance tasks, such as clearing jammed fabric, replacing needles, or adjusting machine tension, without waiting for a technician. This allows for quick resolutions and keeps production running smoothly.
- **Practicing a Clean-As-You-Go Policy:** Issuing instructions to employees to clean fabric pieces, thread cuttings, and spills instantly avoids mess and minimizes the need for extended clean-up times. Periodic emptying of trash cans and keeping walkways clear improves safety in the workplace.
- **Balancing Maintenance and Work Interruptions:** When urgent production tasks arise, maintenance should be temporarily paused, and resources redirected to meet deadlines. Once the immediate work interruption is handled, the cleaning or servicing task should resume as soon as possible.
- **Using Digital Tracking for Maintenance Schedules:** Companies can use software to log machine servicing, track past maintenance activities, and set reminders for upcoming tasks. Automated tracking helps in prioritizing tasks without disrupting workflow.

- **Maintaining Communication Between Departments:** Production and maintenance teams should coordinate closely to plan maintenance around production schedules. Clear communication ensures that maintenance does not interfere with critical deadlines.
- **Inspecting Work Areas After Cleaning and Maintenance:** After completing cleaning or servicing, a quick inspection ensures that tools are properly stored, machines are in working order, and workstations are free of hazards before resuming operations.

7.3.3 Reporting Unsafe Equipment and Other Dangerous Occurrences to Concerned Personnel

Reporting hazardous incidents and unsafe machinery in the garment industry is important to ensure workplace safety and accident prevention. Workers should be trained to identify possible hazards and report them to the concerned staff to initiate correctives in a timely manner.

Fig. 7.3.5: Way to report unsafe equipment and other dangerous occurrences to concerned personnel

- **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.
- **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 take actions to report them.
- **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 so that they are resolved in time.

- **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.
- **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.
- **Preventing Accidents Through Proactive Measures:** Employees should not attempt to operate or repair unsafe equipment unless they are trained to do so. 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.
- **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.

7.3.4 Appropriate Cleaning Equipment and Methods for the Work to Be Carried Out

Adequate cleaning in the clothing sector guarantees a clean, hygienic, and effective working environment. Utilization of the correct cleaning tools and techniques assists in maintaining equipment, avoiding contamination, and prolonging the life of tools and work surfaces. Following is a list of basic cleaning tools and their respective techniques.

- **Vacuum Cleaner:** Used to remove dust, lint, and fabric particles from sewing machines, cutting tables, and factory floors. Regular vacuuming helps prevent dust build-up, which can affect machine performance and air quality.

Fig. 7.3.6: Vacuum cleaner

- **Compressed Air Blower:** Suited for blowing away dust and thread shreds from delicate machine components, e.g., bobbin cases, needle bars, and motors. It avoids lint build-up that might cause overheating and malfunctioning.

Fig. 7.3.7: Compressed air blower

- **Lint Roller and Brushes:** Used to eliminate dust and fabric debris from work areas, clothing, and cutting tables. Assists in keeping areas clean in pattern-making and stitching.

Fig. 7.3.8: Lint roller and brushes

- **Microfiber Cloth and Dusting Wipes:** Used for cleaning tables, machines, and electronic devices to clean dust and fingerprints without leaving behind streaks or residues. Microfiber cloths catch dust well without requiring much cleaning chemicals.

Fig. 7.3.9: Microfiber cloth and dusting wipes

- **Degreaser and Mild Detergents:** Used on greasy machine components, conveyor belts, and metal surfaces to remove grease and stains. Keeps moving parts running smoothly and working without too much build-up.

Fig. 7.3.10: Degreaser and mild detergents

- **Disinfectant Sprays and Antibacterial Wipes:** Used to sanitize common workstations, hand tools, and high-contact areas to eliminate the transmission of germs and uphold hygiene standards. Critical in quality control and packaging facilities.

Fig. 7.3.11: Disinfectant sprays and antibacterial wipes

- **Mops and Floor Scrubbers:** Essential for cleaning fabric scraps, spilled liquids, and dust from production floors. Using a damp mop with mild detergent ensures a slip-free and debris-free work environment.

Fig. 7.3.12: Mops and floor scrubber

- **Waste Bins and Segregation Bags:** Used for collecting fabric waste, paper scraps, and hazardous materials separately. Colour-coded bins help in efficient waste management and proper disposal of different types of waste.

Fig. 7.3.13: Waste bins and segregation bags

- **Cleaning Method Based on Surface Type:** Hard floors need to be mopped with wet mops, whereas carpets are best vacuumed. Glass surfaces need to be wiped with streak-free sprays, and equipment needs to be wiped with dry or slightly moistened cloths to avoid electrical hazards.

Fig. 7.3.14: Streak-free sprays

- **Scheduled Deep Cleaning and Daily Maintenance:** Daily cleaning includes dusting, wiping, and vacuuming, while deep cleaning tasks, such as machine oiling, part replacements, and disinfection of workstations, should be scheduled weekly or monthly for optimal maintenance.

Fig. 7.3.15: Machine oiling

7.3.5 Modifying System and Maintaining Backup Files When Necessary

In the apparel industry, computer tools are important in pattern making, marker planning, and production control. Keeping software up to date and having backups prevents workflow interruptions, data loss, and system crashes. Effective management of computer tools enhances efficiency, accuracy, and security in garment manufacturing.

Fig. 7.3.16: Computer systems must be regularly updated

- **Regular Software Updates and System Upgrades:** Maintaining up-to-date design and manufacturing software guarantees compatibility with the new features, security updates, and performance updates. CAD and CAM software updates like Gerber, Lectra, or Optitex should be updated according to manufacturer guidelines to avoid system hiccups and ensure peak performance.

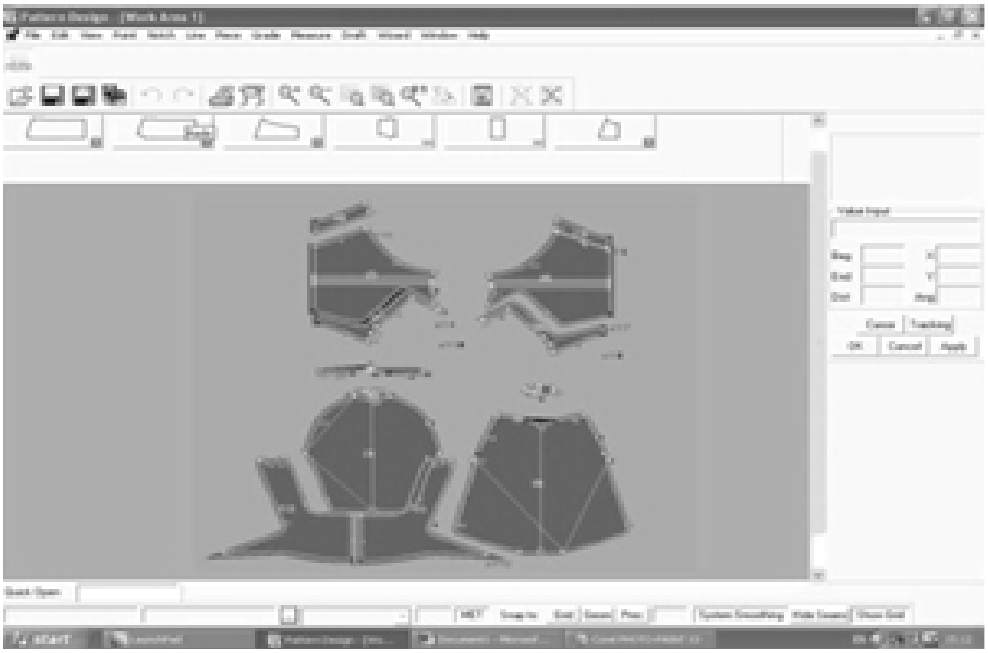


Fig. 7.3.17: Gerber software

Fig. 7.3.18: Lectra software

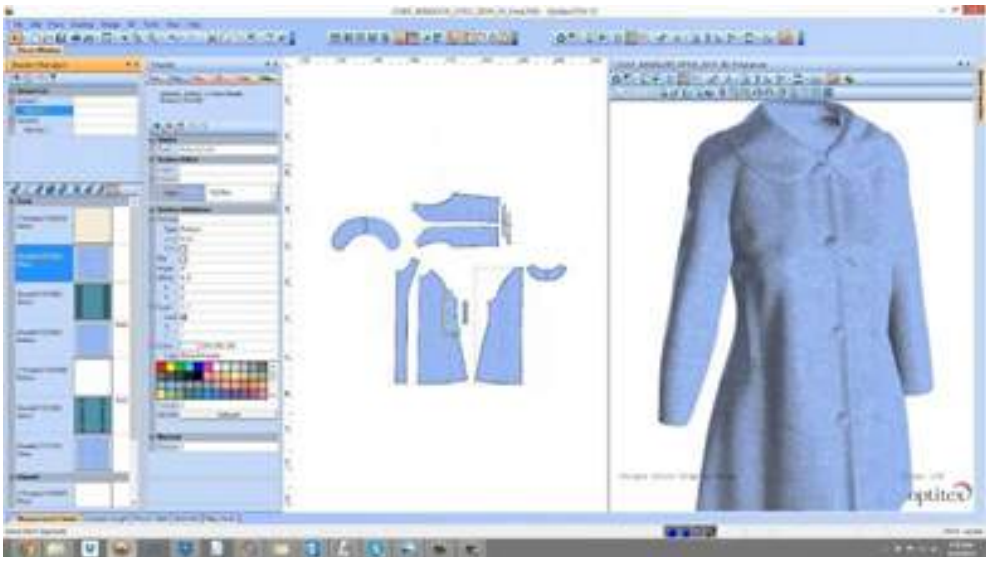


Fig. 7.3.19: Optitex software

- **Testing Updates Before Full Implementation:** Prior to upgrading, installing updates on a test system avoids compatibility problems with current files and hardware. IT staff should check that all features, such as grading, marker effectiveness, and automated cutting, function properly before installing updates on all workstations.
- **Maintaining Backup Files for Digital Design Work:** Regular backups of pattern files, customer specifications, and production layouts prevent data loss due to accidental deletion, power failures, or system crashes. Backups should be created daily or weekly, depending on project volume.
- **Using Cloud Storage and External Hard Drives:** Cloud storage solutions like Google Drive, Dropbox, or OneDrive ensure remote access and protection from local hardware failures. Additionally, keeping external hard drives or network-attached storage (NAS) as physical backups adds another layer of security.

Fig. 7.3.20: Google Drive, Dropbox, or OneDrive cloud storage

- **Version Control for Digital Files:** Different versions of design files are kept to trace changes and undo them in case of errors. Version control systems must be employed by teams so that more than one user may not overwrite significant changes.
- **Securing Digital Data Against Cyber Threats:** Firewalls, antivirus programs, and restricted access to critical files protect against malware and unauthorized access. Using strong passwords and two-factor authentication (2FA) adds an extra layer of security for sensitive production data.
- **Training Employees on System Upgrades and Backup Procedures:** Staff that operates digital design software must receive training in safe updating of the software, the saving of backup versions, and recovering lost files. There must be proper documentation of data and file naming guidelines to avoid data loss and misinterpretation.

7.3.6 Soft Copies of Design Work for Future Reference

In the apparel industry, keeping soft copies of design work is important for efficiency, consistency, and long-term business success. Electronic storage of patterns, specifications, and design iterations makes it easy to make quick changes, repeat orders, and reference history for future projects. Efficient organization and secure storage of soft copies facilitate production, minimize errors, and facilitate collaboration between teams.

Fig. 7.3.21: Soft copies of designs must always be stored in the system

- **Maintaining Design Consistency and Quality:** Soft copies promote consistency over numerous runs of production, where each batch will meet the same standard of design. Digital storage minimizes the potential for loss or destruction of hard copies of patterns, with the designer being able to access exact files at will.

- **Enabling Quick Revisions and Changes:** Design modifications, adjustment of size, and style revamps can easily be achieved without having to create patterns from the ground up. CAD programs like Gerber, Lectra, or Optitex enable designers to modify electronic patterns effectively and save time and resources.
- **Allowing Collaboration among Teams:** Soft copies allow smooth sharing of designs across departments, suppliers, and clients. Files can be viewed remotely, facilitating real-time feedback and less chance of error in communication. Cloud-based systems further enhance collaboration by offering centralized access to up-to-date files.
- **Improving Production Planning and Reorders:** When an old design needs to be reproduced, soft copies ensure that all necessary details, such as measurements, fabric choices, and technical specifications, are readily available. This speeds up the production process and ensures accuracy in reorders.
- **Organizing Files for Easy Retrieval:** Organized file directories and correct naming conventions assist in classifying designs according to season, client, style, or type of fabric. Folders, metadata tags, and version control software avoid confusion and make it easier to search for them in the future.
- **Maintaining Data Security and Backup Management:** Soft copies must be backed up across several platforms, such as local servers, external hard drives, and cloud storage, in order to avoid data loss. Password protection and limited access guarantee that the sensitive design files are safe.

Summary

- Ethical and value-based governance benefits both individuals and organizations by fostering trust and integrity.
- The apparel industry follows strict legal, regulatory, and ethical guidelines to ensure compliance and accountability.
- Failure to meet legal and ethical standards requires specific corrective procedures to mitigate risks.
- Regulations vary by country and customer requirements, making it essential to interpret and adhere to them properly.
- Organizations have policies to ensure compliance, and deviations must be reported for corrective actions.
- Workplace efficiency improves with punctuality, attendance, and personal responsibility, leading to better performance.
- Supporting supervisors and team members helps maintain organizational standards and ensures smooth operations.
- Work functions should align with company policies, greening initiatives, and regulatory requirements.
- Environmentally friendly practices and sustainable consumption in daily tasks contribute to long-term sustainability.
- Safe handling, maintenance, and documentation ensure hazard-free workspaces, proper equipment care, and secure digital records.

Exercise

Multiple-choice Question:

1. What is the key benefit of an ethical and value-based approach to governance?
   a. Increased legal issues
   b. Improved trust and integrity
   c. Reduced employee productivity
   d. Higher operational costs

2. What should be done if legal, regulatory, or ethical requirements are not met?
   a. Ignore the issue
   b. Report and follow corrective procedures
   c. Reduce production output
   d. Change company policies arbitrarily

3. Why is punctuality important in the workplace?
   a. It helps maintain efficiency and productivity
   b. It allows employees to take longer breaks
   c. It reduces the need for supervision
   d. It increases personal workload

4. What is a key factor in improving environmental sustainability at work?
   a. Using excessive resources
   b. Avoiding regulatory policies
   c. Implementing sustainable consumption practices
   d. Ignoring company guidelines

5. Why is routine maintenance of equipment necessary?
   a. To increase workplace hazards
   b. To prolong equipment lifespan and maintain safety
   c. To create more work interruptions
   d. To reduce the need for workplace hygiene

Descriptive Questions:

1. Explain the significance of ethical governance and how it benefits an organization.
2. Describe the procedures to follow when an organization fails to meet legal and regulatory standards.
3. How can employees contribute to workplace efficiency through punctuality and personal responsibility?
4. Discuss the importance of sustainable consumption practices in a work environment.
5. Explain the role of routine maintenance and cleaning in ensuring a safe and productive workspace.

Notes

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

https://youtu.be/ltW7KVYJ1go?si=IXuIgxZKE8u6OSC3

Business Ethics

https://youtu.be/gzIip3Puf_I?si=UnmRPTue1KwHQSSs

Examples of Personal Responsibility

https://youtu.be/qOM4Qxjx1b8?si=K9-SjpiQeS6ntq2j

Routine Maintenance

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. 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

9. Annexure

Module No.	Unit No.	Topic Name	Page No	Link for QR Code (s)	QR code (s)
Module 1: Introduc-tion and Orien-ta-tion to Cut-ting Super vi-sor- (Fab-ric)	Unit 1.1: Role and Scope of a Cutting Su-pervisor in the Appar-el Industry	1.1.1 Over-view of the Ap-parel In-dustry in In-dia	20	https://youtu.be/p-yQPrH91nM?si=ejxG-IN9xfhH2UW1	Indian textile industry
		1.1.2 Size of the Indian Ap-parel In-dustry	20	https://youtu.be/dSn7iz-bF-N8?si=Rtd7D9RFYMoWM0mC	Introduction to Apparel Industry
		1.1.3 Scope and Growth Drivers of the Apparel Indus-try in India	20	https://youtu.be/VKa_20K0YQM?si=kqYYxJ8Yi-pnguLPp	Indian Textile Sector
Module 2: Orga-nize the process of cutting	Unit 2.1: Fab-ric, Gar-ment Types, and Accesso-ries	2.1.1 Types of Garments, Made-Ups, and Home Furnishing	47	https://youtu.be/CW7pNhOJXFg?si=m-D2LdYNmT-koH8dKG	Different Types of Garments
		2.1.2 Types of Woven, Knit, Uphol-stery Fabrics	47	https://youtu.be/_p5Uj-CLK0R0?si=CkHwg6cnGg-MyPN9L	Types Of Knit Fabric
	Unit 2.2 : Cut-ting Tools, Oper-ations, and Produc-tion Planning	2.2.1 Op-era-tion and Handling of Cutting Tools	47	https://youtu.be/DdtfyENJ6dY?-si=qoPQbG1-r4X6torNh	Modern Cutting Tools

Module No.	Unit No.	Topic Name	Page No	Link for QR Code (s)	QR code (s)
Module 3: Prepare for the process-es of cutting	Unit 3.1: Fab-ric Iden-tifica-tion, Layer-ing, and Spread-ing Tech-niques	3.1.2 Check-ing Fabric Faults Prior to Cutting	74	https://youtu.be/_CIw_aTIC5U?si=CdjoaTL_hyxoTqY6	Automatic Fabric Spreading and Fabric Cutting machine
	Unit 3.2: Pat-tern Mark-ing, Cutting, and Quality Checks	3.2.1 Pattern and Mark-er Working Mechanism	74	https://youtu.be/8kKbYdc0jik-?si=MnNzbIpEycjFtGHE	Cutting Methods
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