DRAFT STUDY MATERIAL

INLINE CHECKER

(Qualification Pack: Ref. ID .AMH/0102)
Sector: Apparel, Made-UPS & Home Furnishing

(Class XII)

PSS CENTRAL INSTITUTE OF VOCATIONAL EDUCATION
(A constituent unit of NCERT, under MOE, Government of India)
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Preface

Vocational Education is a dynamic and evolving field, and ensuring that every student has access to quality learning materials is of paramount importance. The journey of the PSS Central Institute of Vocational Education (PSSCIVE) toward producing comprehensive and inclusive study material is rigorous and time-consuming, requiring thorough research, expert consultation, and publication by the National Council of Educational Research and Training (NCERT). However, the absence of finalized study material should not impede the educational progress of our students. In response to this necessity, we present the draft study material, a provisional yet comprehensive guide, designed to bridge the gap between teaching and learning, until the official version of the study material is made available by the NCERT. The draft study material provides a structured and accessible set of materials for teachers and students to utilize in the interim period. The content is aligned with the prescribed curriculum to ensure that students remain on track with their learning objectives.

The contents of the modules are curated to provide continuity in education and maintain the momentum of teaching-learning in vocational education. It encompasses essential concepts and skills aligned with the curriculum and educational standards. We extend our gratitude to the academicians, vocational educators, subject matter experts, industry experts, academic consultants, and all other people who contributed their expertise and insights to the creation of the draft study material.

Teachers are encouraged to use the draft modules of the study material as a guide and supplement their teaching with additional resources and activities that cater to their students' unique learning styles and needs. Collaboration and feedback are vital; therefore, we welcome suggestions for improvement, especially by the teachers, in improving upon the content of the study material.

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Module 1	Introduction to Body Measurements and Analysis of Garment Components

Module Overview

In the apparel or garment industry an In-line checker has a very important role. An In-line checker is directly associated in maintaining the quality standard of an industry. The primary responsibilities of an in-line checker is to identify the faults related to fabrics, cut components and garment parts through visual inspection.

An In-line Checker who endures good eyesight and has an eye for detail, color vision and basic math skills can save a lot for their industry in terms of money and as well as market reputation. Market reputation or ranking can be achieved only with the quality management of any unit.

For any garment manufacturing unit, quality management is a challenging but crucial process. Only through effective quality control strategies, necessary quality level can be achieved. In-line process inspection is very important part of an effective quality control strategy.

High-quality clothing must meet predetermined specifications, including the required fit and appearance. When it comes to the quality of clothing, the fit of the clothing is the most important aspect. It is essential to ensure that the garment produced meets the required fit.

Most of the garment manufacturers confirm standard body measurements and these standard body measurements are based on anthropometric measurements. They are used in the entire process of clothing design and production. Standard body measurements are important because they enable manufacturers to make clothes according to their customer preferences. Such standards can predict the number of proportions required for each size, thereby improving the production of the clothing manufacturing industry, economically control of material and finally accurate production planning.

Learning Outcomes
After completing this module, you will be able to: • List and describe body measurements and garment sizes • Demonstrate the ability to sort, bundle and label different garment components
Module Structure

Session-1	Introduction to body measurements and garment sizes
Session-2	Mechanism of bundling, sorting and labelling of garment components

Session: 1 Introduction to Body Measurements and Garment Sizes Role of Measurements

In the clothing production process, basic patterns are developed from the standard body measurements. These basic patterns are used as per the design requirement for developing the production patterns for each size. The final production of the garments is carried out once the pattern is prepared for pattern grading, marker planning, cutting, and other processes.

Developing body measurement standards is an important step to the entire apparel manufacturing process. Without these measurements, flaws in the patterns will lead to problems down the line. Manufacturers may lose significant amount of fabric and cost. This will then damage their business credibility.

Correct body measurements give a better fitting of garments to the human body. Hence, it is important for a pattern maker to have better knowledge of body anatomy as well as the correct procedure for taking body measurements.

In today's fashion era, the clothing must be beautiful and it must provide a perfect fit. However, a good fitted garment must provide comfort and confidence to the wearer along with being visually pleasing to the eyes of the observers and the wearer. To achieve the aim, correct measurements are necessary.

For obtaining best results in garment construction one should have knowledge about standard measurements and individual variations or anthropometry. Human body structure varies from one individual to another. Anthropometry is a scientific study of measurements of human body. It is important for an in-line checker to have adequate knowledge about correct methods of taking and recording body measurements, equipment required for it and other important points to be considered in taking the measurements.

TYPES OF BODY MEASUREMENTS

Body measurements refer to measuring of body parts, there are various measuring techniques like direct method or tape measure method, anthropometry and body scanning etc. Where measurements are taken manually with the use of a measuring tape are called direct method, whereas in body scanning techniques measurements can be recorded accurately and rapidly for designing garments. Body scanning technique gives an opportunity for manufacturers and retailers to learn more about their customers.

Before knowing the types of measurements, it is important to understand the following acronyms used to identify the various body parts:

1. **CB-**"Center back" refers to the center of the garment back or body.

2. **CF-**"Center front" refers to the center of the garment front or body.

3. **HPS-**"High point of shoulder" or "highest shoulder point" refers to the highest point of shoulder on either side of neck.

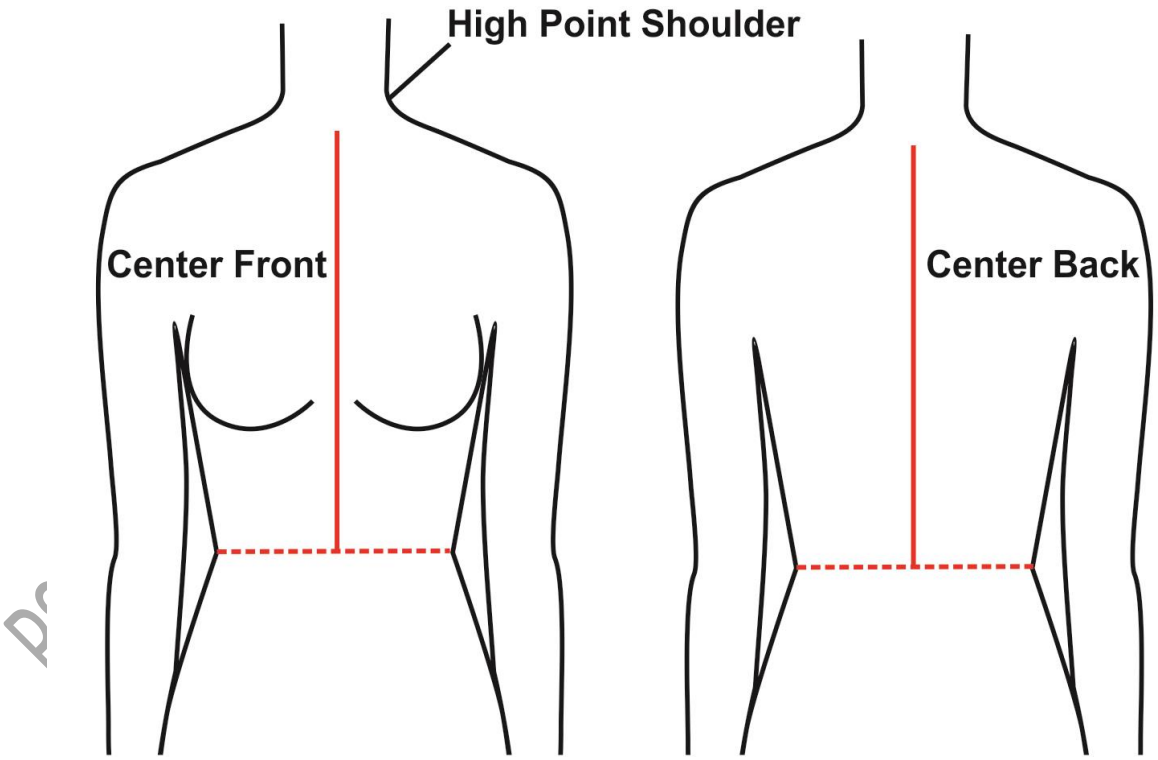


Fig.:1.1- Body landmarks for measurement

A. Basic classification of Body Measurements

There are three types of measurements taken on a body, which are as follows:

- Length wise / Vertical measurements,
- Width wise / Horizontal measurements
- Circumference measurements.

1. Length measurements are taken vertically along the body. These include full length of garment, shoulder to waist length, length of sleeve etc.
2. Width measurements are taken across the body from one side to another. These include across shoulder, across back etc.
3. Circumference measurements are taken around the body. These include round bust, round waist, round hip, round neck, round sleeve, round knee, trouser hem etc.

Another way of categorizing body measurements is based on their applicability. According to this classification body measurements can be considered as primary and secondary.

B. Primary measurements

Primary measurements are of the highest importance, decide the whole fit of the garment and secondary measurements are less critical for fit or have a negligible impact on the fit of the garment.

Primary measurements include

1. Full bust/ chest
2. Full hip
3. Across shoulder
4. HPS to apex
5. CB neck to waist
6. CF neck to hip length
7. High hip
8. Waist
9. Total rise
10. Thigh

11. In-seam

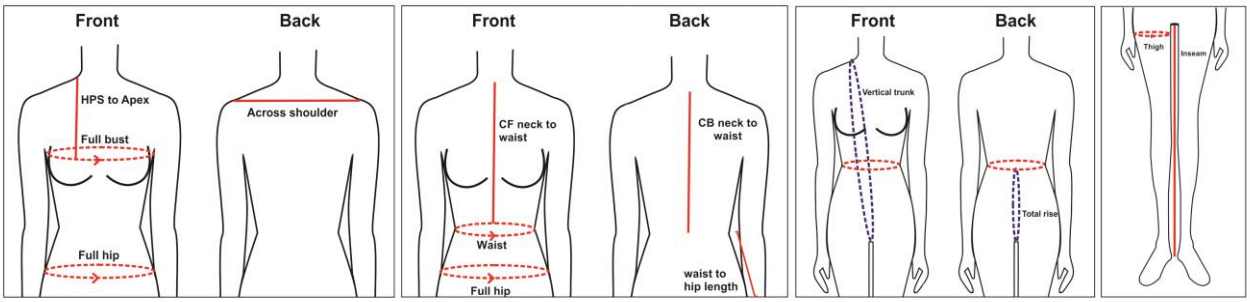


Fig.:1.2– Primary Measurements

C. Secondary measurements

Secondary measurements are important for pattern making and even more important for grading pattern. These measurements vary from one garment to another. Secondary measurements include:

1 Under bust

2 Apex to apex

3 Front bust

4 Apex to under bust

5 Cup width

6 Cup depth

7 Neck base

8 Shoulder length

9 Arm length

10 Bicep circumference

11 Elbow circumference

12 Forearm circumference

13 Wrist circumference

14 Knee circumference

15 Calf circumference

16 Ankle circumference

17 Out seam

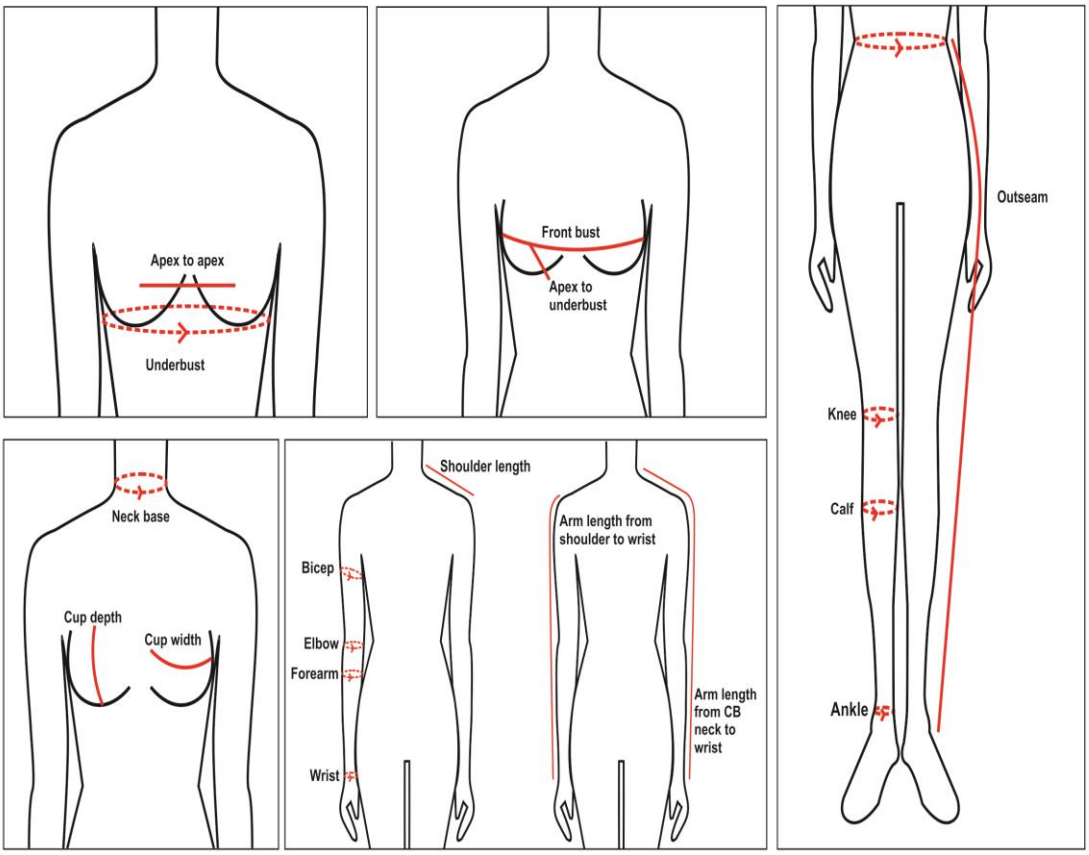


Fig.:1.3– Secondary Measurements

BODY LANDMARKS

Before taking body measurements one must have knowledge of parts of body which guides the checker to take accurate measurements. These areas are called body landmarks.

In other words, body landmarks are the points located on the body which guide on the starting and the ending points for taking the measurements. It is important to know the various body landmarks used for taking measurements as given in Fig. below. These include:

- Bodice is the upper part of body till waistline.
- Landmarks such as waist, bust, highest shoulder point and pivot point for bodice measurements.
- Landmarks such as waist level and hip level for skirt measurement.
- Landmarks such as lower shoulder point, upper round arm and lower round arm for sleeve measurements.

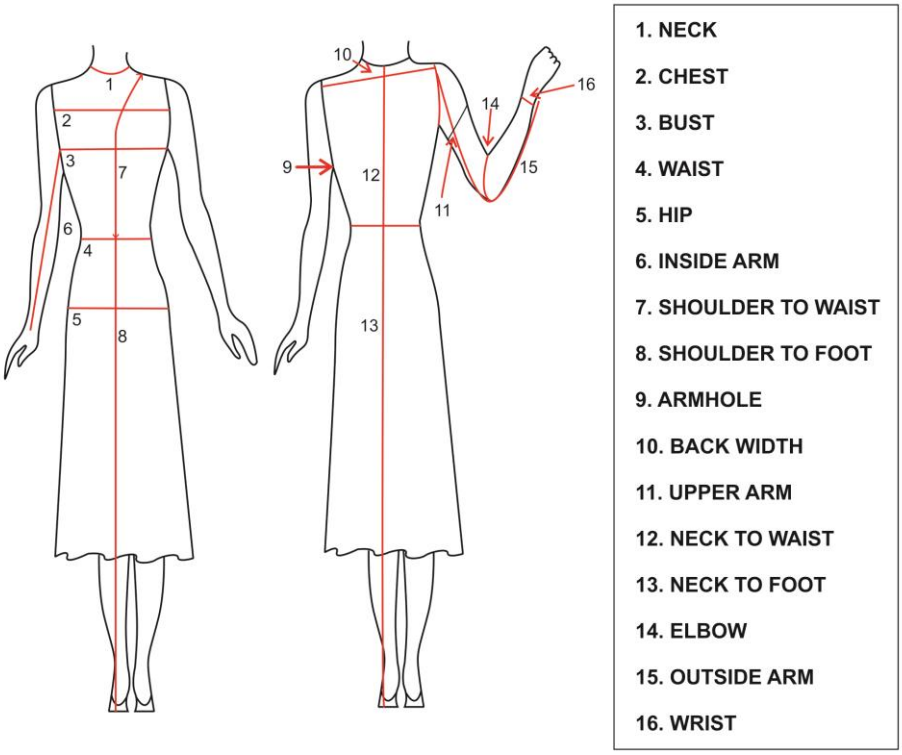


Fig.:1.4 - Body Landmarks

CORRECT SEQUENCE OF TAKING BODY MEASUREMENTS

It is essential to take body measurements in a particular sequence. Taking measurements randomly, that is, one length and then one width and then back to a length again is not correct. The correct sequence of taking body measurement is as follows :

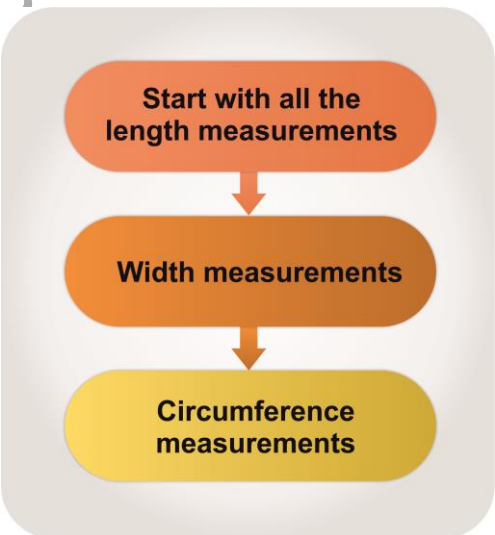


Fig.:1.5 -Correct sequence of taking body measurements

Sometimes circumference measurements are also taken along with width measurements depending on the type of garment or design requirements.

Measurement requirements according to the upper or lower garments

A. Body measurements required for making bodice

1) Shoulder slope From the base of the neck to the shoulder bone along the middle of the shoulder (A to B, Fig-1.11 (a)).
2) Front waist length From the base of the neck to waist line through the fullest part of the bust (A to C, Fig-1.11(a)).
3) Pivot point or apex From the base of the neck to the tip of the bust.(A to D, Fig-1.11(a)).
4) Bust Measurement is taken across the fullest part of the chest/bust (i.e level D,Fig-1.11(a)) by raising the measuring tape to a level slightly below the shoulder blades at the back.
5) Waist Measurement is taken tightly around the waist with the tape straight(i.e. level C , Fig-1.11(a))
6) Neck Neck measurements can be taken, by keeping the tape around the neck slightly above the collar front and along the base of the neck at the back.
7) Distance between pivot points Distance between the two bust/chest points
8) Across back measurement Across the back between armholes about 3″ below the base of the neck(P to Q, Fig-1.11 (b)).
9) Back waist length From the base of the neck at the centre back position to the waistline(R to X, Fig-1.11 (b)).
10) Armscye depth From the base of the neck at the center of the back to a point directly below it and in level with the bottom of the armscye (R to T, Fig-1.11 (b)).

11)	**Upper arm circumference** Around the fullest part of the arm for Sleeve measurements
12)	**Lower arm** Around the arm at the desired level corresponding to the lower edge of the sleeve.
13)	**Elbow circumference** Around the arm at the elbow (G, Fig-1.11(a)).
14)	**Wrist** Around the wrist (H, Fig-1.11 (a)).
15)	**Sleeve length** For short sleeves, the length is from point B to F. For elbow length sleeve, measurement is taken from the top of the arm to the elbow point (B to G in Fig-1.11(a)). For full length, the elbow has to bend slightly and wrist passing measurement is from the top of the arm to the back of the the tape over the elbow point (B to H, Fig-1.11 (a)).

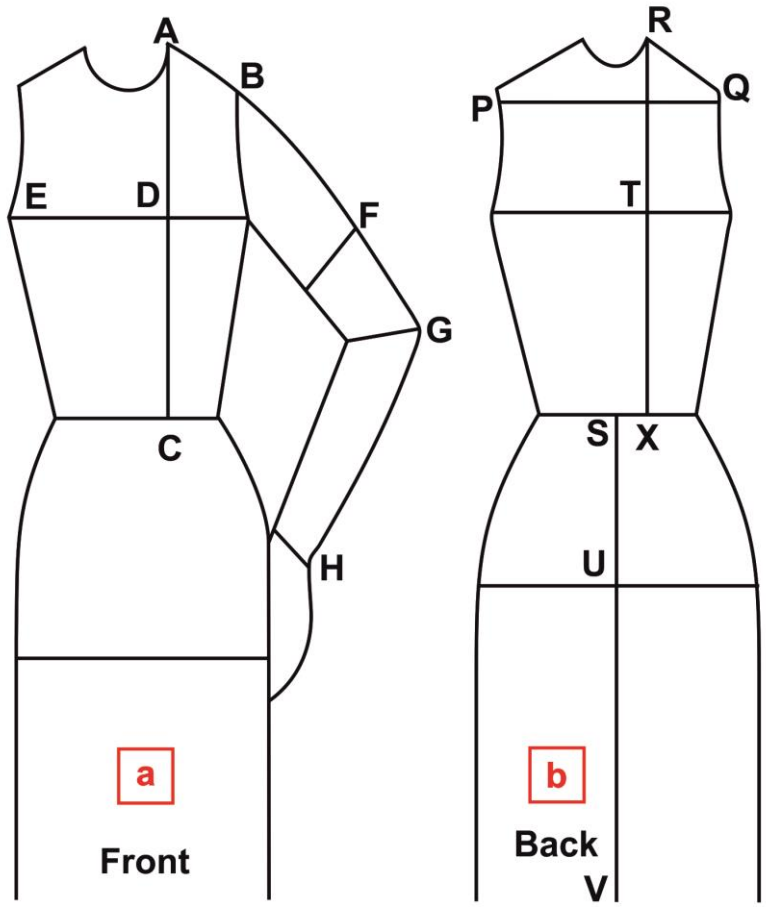


Fig.:1.6 - Body measurements

B. Body measurements required for making skirt

1. Waist	Tightly around the waist with the tape in a horizontal manner and parallel to the floor.
2. Hip	Around the fullest part of the hip horizontally (7–9″ from waist approximately).
3. Waist to hip	From the waist at the center of the back to the fullest part of the hip (S to U, Fig-1.6 (b)).
4. Skirt length	Measurement is taken at the center of the back from the waist to length of the skirt as required (S to V, Fig-1.6(b)).

PRECAUTIONS WHILE TAKING BODY MEASUREMENTS

1. Person giving the measurements should stand straight with hands down, in a natural pose and a well fitted foundation garment should be worn.
2. Measurements should be taken in the appropriate order and with a definite sequence.
3. A good quality and flexible measuring tape should be used for taking the body measurements.
4. Another person is required to take measurements.
5. Basic lines of the body are to be taken into consideration while measuring body parts.
6. The accuracy of several measurements depends on waistline location so body landmarks are very important to follow.
7. Measuring tape should be kept parallel to the ground while taking horizontal measurements without keeping it too tight or loose with the body.
8. Girth measurements like across back/front, bust, waist, hip, etc. should be taken tightly, since ease allowance is incorporated in the draft.
9. The amount of ease required varies with the type of fabric used. More ease is needed for woven fabrics than knits.

INTRODUCTION TO GARMENT SIZE

Garment size refers to sizes used for garments which are sold off-the-shelf in stores. Hence, a method used to develop a set of sizes which are applicable to a specific target population is called a sizing system.

Origin of sizing systems

The basic concept of sizing systems was first developed in early 19th century for producing military uniforms during American Civil War. Gradually, due to urbanization, these standard sizes were also used for mass production of men's work wear for the newly created administrative jobs. By the late 19th century, ready-to-wear women's garments were also possible with the introduction of separate blouses and skirts which could provide comfort, fit and easy alteration. As a result, middle-class working women could add variety to their wardrobe at a comparatively lower cost.

Most of the existing sizing systems categorize Fig. types as per their height and difference between round hip and round bust measurement (drop value). But, still there were some variations in key dimensions used for different garments in different systems. As a result, international size labeling system was developed by International Organization for Standardization (ISO) for greater uniformity. Countries like Britain, Japan, Hungary, South Korea etc. have revised their sizing systems based on ISO system.

Key elements of sizing system

An efficient sizing system has following key elements:

- Principles of human body proportions
- Body measurements of large number of population are collected and analyzed (anthropometric study).
- Segregating population into homogeneous size groups with similar physique using key body dimensions.
- All belonging to a particular size group should fit into a same garment.
- Large percentage of population should be accommodated in as fewer sizes as possible. Usually, accommodation rate is 65-85% depending on the garment type.

Hence, an optimum sizing system takes into account the body proportions and dimensions to systematically provide correct and well-fitting sizes for the target population. However, lack of consistency across different systems, lead to widespread dissatisfaction among the customers with respect to right selection of size.

a) Size labelling

Size label plays a very important role while selecting apparels during buying.

These labels are either numeric like 6, 8, 10, 12, 14 etc. or these are alphabetic such as S (small), M (medium), L (large), XL (extra-large) etc. Hence, there two types of size labeling:

- **Numbered size labeling:** This size labeling has numeric or numbered sizes such as 6, 8, 10, 12, 14 etc. and the most commonly used method for moderate to expensive men's wear, women's wear and children's wear.

S. No.	Sizes categories	Correlation with the body measurement
1.	Infants' sizes (0-18 months)	Height and weight
2.	Toddlers' sizes (18 months – 3 years)	Height and weight
3.	Children's sizes (3-6 years)	Height and weight
4.	Girls' sizes (7-14 years)	Height, weight, waist and hip
5.	Boys' sizes (7-14 years)	Height, weight, chest and waist
6.	Women's wear sizes	Bust, waist and hip
7.	Menswear jacket sizes	Chest and height
8.	Menswear pant sizes	Waist and inseam or inside leg
9.	Menswear shirt sizes	Neck and sleeve length

Table-1 : Body measurements correlating to different size categories

- **Lettered size labelling:** This is a more recent development for comparatively loose fit garments or stretch garments made from knit fabrics. Also known as alpha sizes, lettered sizes are expressed as S for small, M for medium, L for large and XL for extra-large. Besides, there can be larger sizes like XXL or XXXL and smaller such as XS (extra small). However, there is lack of consistency in sizes from brand to brand and also would not be applicable internationally as average small person in United States would be larger than the average small person in Asia.

Thus, it is important to have effective sizing system and also to communicate the right information related to size and fit to the customer. This will simplify the garment selection and lead to greater customer satisfaction.

b) International sizing systems

Different sizing systems developed from time to time to fulfill the customer's desire for accurate fit and comfort in clothing. These sizing systems are based on key attributes such as gender, age, body type, height, weight and body measurements. It is a very complex process as there are wide variations in human body proportions and dimensions.

The three major sizing systems include U.S. sizing system, British (U.K.) sizing system and European or continental sizing system. When these three sizes are compared, size 2 of United States is equivalent to size 4 of United Kingdom and size 32 of European Union. Most other countries are using variations of these three systems.

- **U.S. sizing system**

The National Bureau of Standards (presently known as National Institute of Standards and Technology-NIST), published first voluntary standards for U.S. apparel sizing (men, women and children) in mid-20th century. These were reviewed and updated by ASTM International (American Society for Testing and Materials). Men's sizes were simpler to derive and were quite successful. However, in case of women, multiple size categories have to be developed due to greater variation in body shape. These categories include missy, petite, junior, tall and women's or plus size (Table).

Attributes	Size category				
	Missy	**Petite**	**Junior**	**Tall**	**Women's or plus size**
Specific features	Most common high-volume size category	Have shorter inside leg& sleeve length, shorter crotch	For short women with higher busts and fairly straight bodies	Have smaller market with limited styles, pants have longer crotch	Growing market, For larger women sometimes with lower bust lines
Average height (feetand inches) / Body structure	5' 6"	4'11"-5'3"	Growing body with couple of inches shorter than full adult height	Above 5'7"	For average or shorter height
Lettered sizes	XS, S, M, L, XL	XS, S, M, L, XL	XS, S, M, L, XL	XS, S, M, L, XL	1X, 2X, 3X, 4X
Numbered sizes	2, 4, 6....18, 20	2P, 4P, 6P....18P, 20P	1, 3, 5.....13, 15	4T, 6T, 8T.....18T, 20T	14W, 16W, 18W.....26W, 28W
Difference between girth measurements in inches (bust, waist & hip)	1" for size 2-10, 1½" for size 12-16 & 2" for size 18, 20	Same as for missy but all girth measurements for petite are ½" smaller than for	1" for size 1-9, 1½" for size 11-15	1" for size 4T-10T, 1½" for size 12T,14T & 2" for size 16T-20T	2" for all sizes

		missy			
Difference between bust and hip measurement	2”	2”	3 ½”	2”	2 ½”
Difference between hip and waist measurement in inches	10”	10” (same as for missy)	10.5” (1/2” more than missy)	10” (same as for missy)	10” (same as for missy)

Table: U.S. Sizing System

c) European sizing system

European sizing system is based on body dimensions and uses metric system for measuring i.e., measurements are taken in centimeters. For each garment type, primary dimension is defined and used for size designation. These primary dimensions are chest girth for men and bust girth for women in upper garments such as t-shirts, shirts/blouses, jackets, cardigans, sweaters etc. For lower garments such as skirts, trousers, shorts etc., waist girth is the primary dimension. The single measurement might not be sufficient in selecting the right garment size in most of the cases. As a result, one or two secondary dimensions like height, hip girth, inside leg etc. are added to the label.

The system further designates the size labels not as average body dimensions but as the range of body dimensions such as height 172-180 centimeters instead of just height 176 centimeters showing a step of 8 centimeters in each range.

In men’s sizes, size range for upper garments would be 82-86 for chest girth 84, 86-90 for chest girth 88 and so on. Similarly, for lower garments, size range would be 70-74 for waist girth 72, 74-78 for waist girth 76 and so on. Both these ranges show a step of 4 centimeters for each size. For women’s garments also, size range usually shows a step of 4 centimeters. However, this step will increase to 5 centimeters in case of hip girth and 6 centimeters for bust and waist girth when developing larger sizes.

European sizing system also defines the sizes as pictograms(Fig.:1.7) so that these can be easily understood and overcome the language barrier. Pictogram is a pictorial representation of the body dimensions used for a particular size.

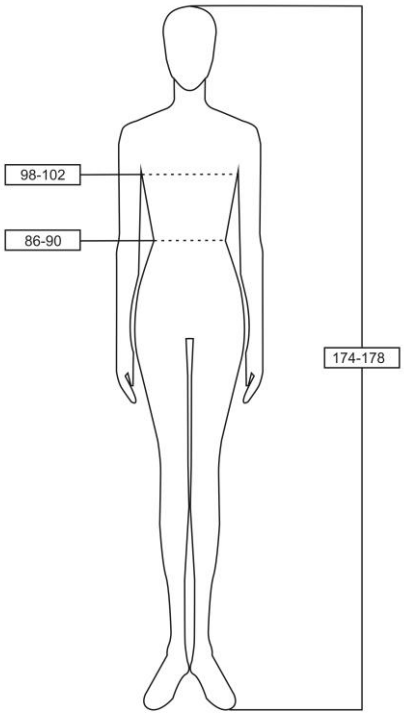


Fig.:1.7- Pictogram size labeling

The customer who is familiar of his/her body measurements can very easily get an idea whether the garment will fit him/her or not. Also this type of representation of sizes would be more appropriate for international trade.

However, it is seen that different countries under European Union follow various sizing standards. The various methods for deriving standards are as follows:

- Italy, dress size= bust girth/2.
- France, dress size = (bust girth/2) – 4.
- Germany, dress size = (bust girth/2) – 6.

Thus, it is evident that the same set of body measurements will designate a different size in different countries.

- British sizing system

Britain, though part of European Union, follow its own standards for sizing system. Its measurement system is based on inches instead of centimeters. Men's sizes are same as that of United States. Women's sizes are defined in only terms of bust and hip measurements, other measurements are not

taken into consideration. Also, the ranges of sizes are limited as compared to other sizing system, hence rarely used by the manufacturers.

d) National sizing standards

Standardization of sizes depends completely on the body type of people studied in anthropometric studies. Indian body type has characteristics different from U.S and / or Fig.: 1.7

U.K. body types, hence, adaptations of U.S. and U.K. size charts which suits Indian body type is being under various researches in India. Most of the brands operating in India use such adaptations according to their interpretations.

India, so far does not have any consistent sizing system for its varied population. Both international and domestic brands operating in the country are mostly using U.S. or U.K. sizes for developing garments. Few brands have developed their own size charts based on the target population they are following it under the commonly used terminology like:

- XS (Extra Small)
- S (Small)
- L (Large)
- M (Medium)
- L (Large)
- XL (Extra Large) and so on.

CROSS-CHECKING GARMENT MEASUREMENTS WITH STANDARD SIZE CHARTS

It is important to maintain consistency in garment sizes as per the company's sizing standards. Accuracy of measurements is very critical for obtaining a good fit in a garment and analyzing the revisions required. It must be ensured that the different garments with same style and size should measure same or within accepted tolerances. Otherwise, the garment would be rejected or sent for alteration. The specification sheet includes all the information related to how and where to measure as well as measurement of different sizes. The garment measurement techniques specified in the specification sheet acts as a guide for accurate measuring of each and every part of the garment.

Preparation for measuring garments

In every garment manufacturing unit, garment measurement checking is an important activity which is performed by the quality control team. An in-line checker must be familiar with the use of different tools. The basic preparations required for measuring garments include:

- A table with a standard height and smooth surface is required to measure the garment. The width of the table should be adequate according to the type of garment, asthe garment does not hang from the sides while measuring.
- A good quality measuring tape and a ruler.
- Basic tools like masking tape, tailor's chalk or chalk pencil, straight pins, clear grid ruler, L-square etc.
- A specification sheet showing standard sizes
- Document for recording measurements and comments.

Guidelines for taking measures from a garment

All the departments in the manufacturing unit such as design department, sewing department, quality assurance department should follow the same standardized system and terminology for measuring. This will ensure correct communication and consistency across all departments. The essential guidelines or key points are discussed below:

a) The garment to be measured is picked up from the top and gently shaken to remove any folds.

b) Lay the garment on the clean and smooth surface in a natural relaxed position with front side up.

c) The garment is gently patted with hand to remove any folds, wrinkles or creases without any stretch or pull.

d) All the fasteners like buttons, hooks, snaps, zipper etc. should be closed before taking measurements.

e) Garments without fasteners such as bathrobe should be overlapped as specified in specification sheet.

f) Vents in a garment should be smoothened and pinned together for accuracy.

g) Slits in a garment should lie flat with edges together.

h) Knit garments should be folded, not hung on hangers for storage to avoid distorting.

i) Points of measure i.e., the starting and end point should be clear and concise.

j) Make sure that the measuring tape lies flat against the garment while measuring. Avoid pulling it tightly or letting it loose as it might cause discrepancies in measurements.

k) In order to maintain consistency, first front side of garment is measured and then it's back.

l) Begin measuring from the top of the garment gradually moving down.

m) Openings like waistline, neckline, round bottom etc. should be measured from inside edge.

n) For upper garments such as ladies top's only one sleeve is measured and in case of lower garments such as pants, only one leg is measured.

o) For measuring curved seams, measuring tape should be used in a standing position on its edge, and moved carefully along the curve without stretching or straightening it.

p) Squared or drop measurements such as armhole drop, neckline drop or shoulder drop can be measured used L-Square or a quilting ruler.

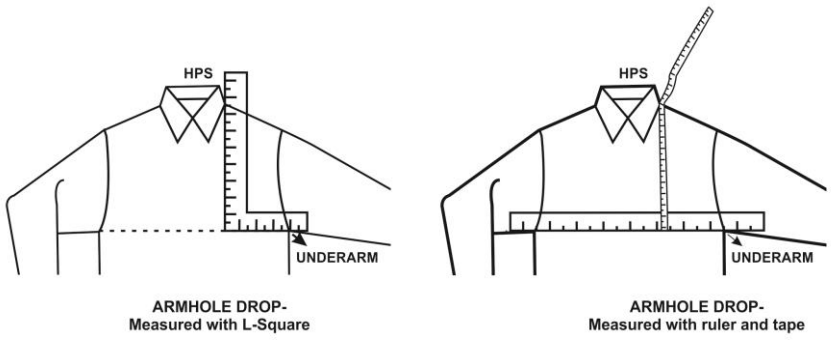


Fig.:1.8- Armhole drop measurement

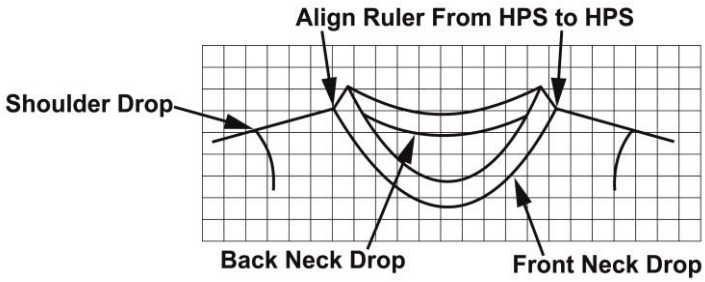


Fig.:1.9–Front neck, back neck and shoulder drop measurements

q) For elasticized openings in woven and ribbed openings in knits such as cuff, neckline etc. should be measured both relaxed and extended form. Extended form should be fully stretched to the extent that a seam does not open.

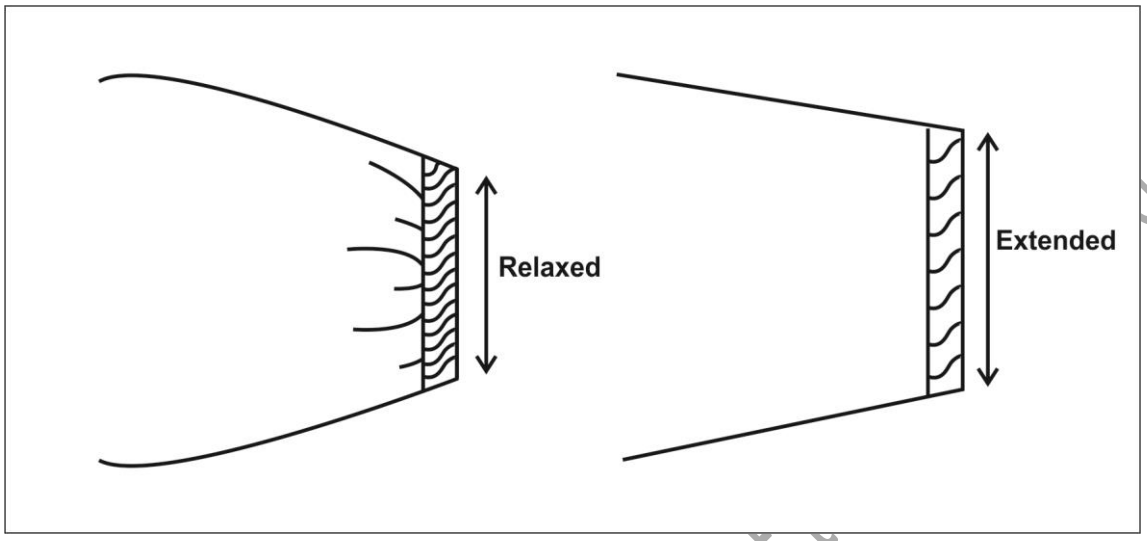
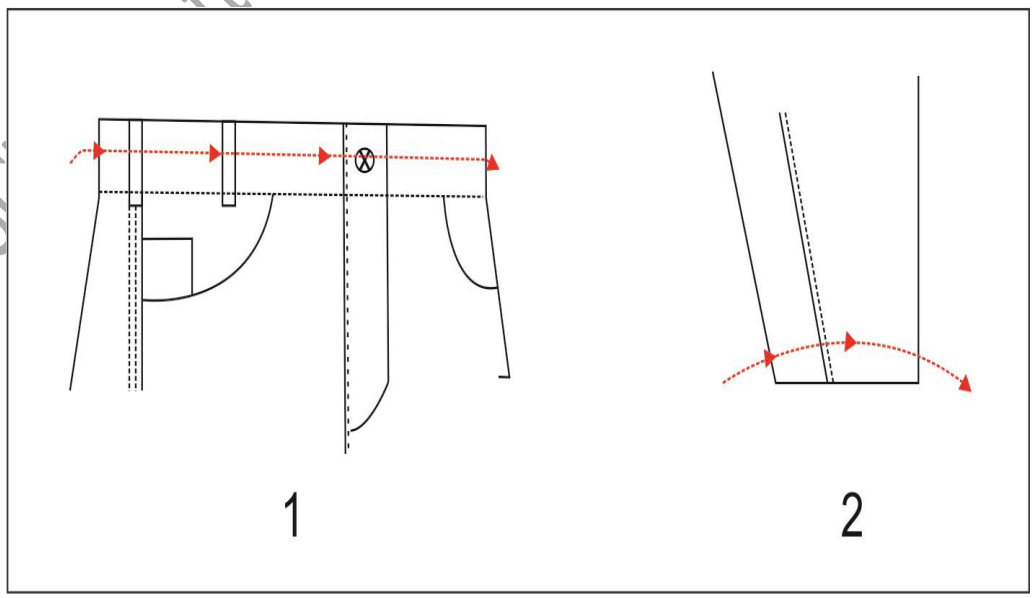


Fig.:1.10-Relaxed and Extended Measurements

r) Circumference measurements are taken across the front from side to side and doubled for total round measurement.

Circumference Measurements

- For woven, circumference measurement is a full measurement whereas, for knits, it is a half measurement.
- If the garment has thick seams at the edges like side seams, it is rolled towards front or back before taking circumference measurement.



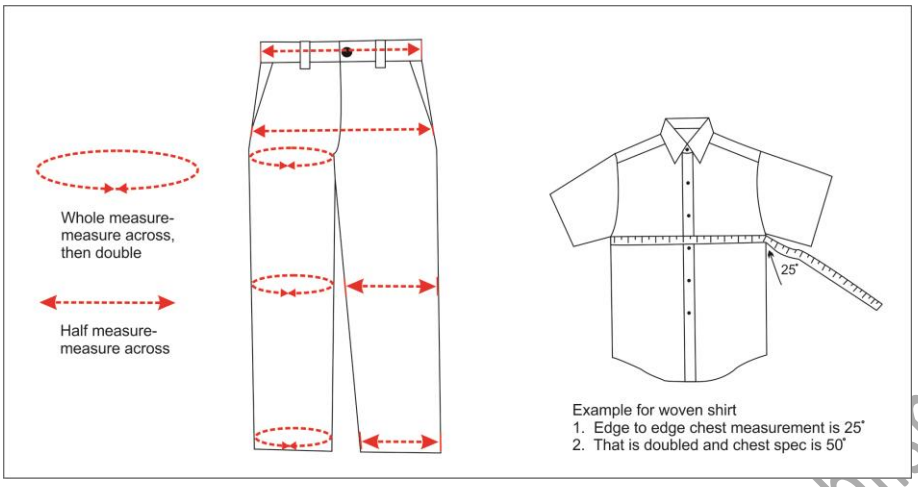


Fig.:1.11- Circumference Measurements

s) Roll seams to avoid bulk at edges

- All measurements can be taken from the front side of garment unless there is some specific back detail.
- All measurements should be taken to the nearest 1/8 inch.
- Garment should be sent for alteration or rejected if the measurements are not within the mentioned tolerances (Tolerance is the slight deviation from the standard measurements, either plus or minus, which is acceptable).
- The variation in measurements are recorded and reported to the supervisor.

STEP BY STEP PROCESS OF MEASURING A SHIRT

To understand measurement of a garment, and for accurate quality control, in-line checker must measure different areas of a shirt as explained below:

a. Collar

Measure between the two points where the collar attaches to the collar band. Once the collar is buttoned up, there should be room for at least one finger to fit it in there with neck.

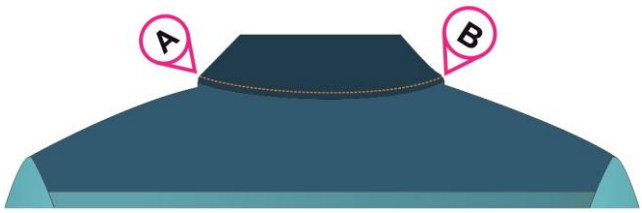


Fig.:1.12 – Collar measurement

b. Chest

Button up the shirt and lay it down on a flat surface. Measure from one armhole to the other, where the sleeve attaches to the body. Double the result (inches) for final chest size.

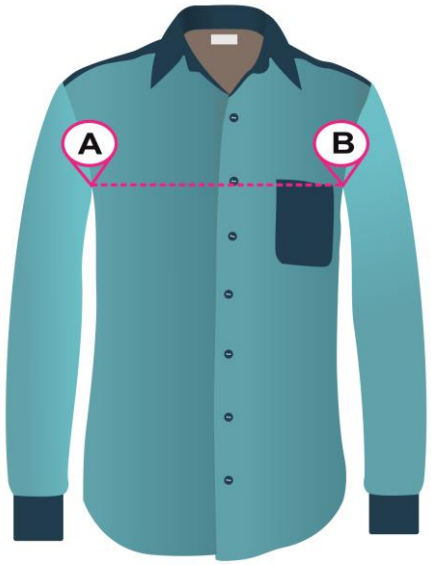


Fig.:1.13 – Chest measurement

c. Waist

Measure 8" down from the armpit, straight across. Find out the widest part of the waist and measure from one end to the other. Double the result (inches) for final waist size.

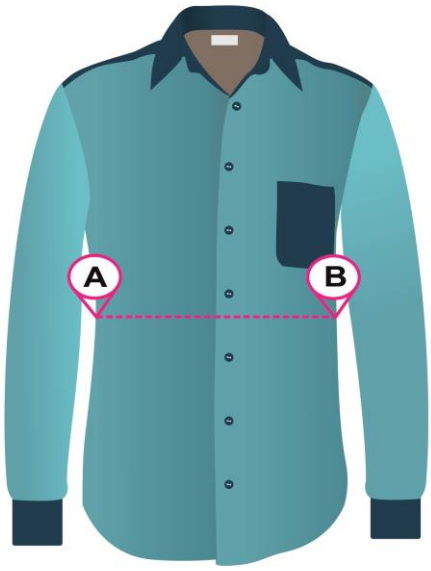


Fig.:1.14 – Waist measurement

d. Hip

Measure the width of the shirt at the bottom of the side seams. Double the result (inches) for final hip size.

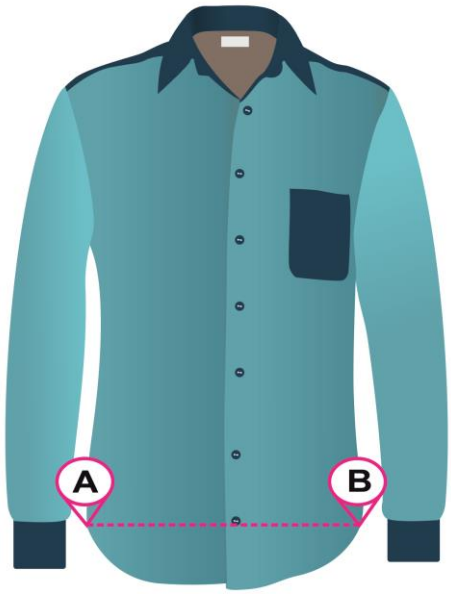


Fig.:1.15– Hip measurement

e. Shirt-length

Measure from base of neck at collar point to preferred shirt length.

Fig.:1.16 – Shirt-lengthmeasurement

f. Sleeve length

Measure from highest sleeve cap point to the edge of the cuff.

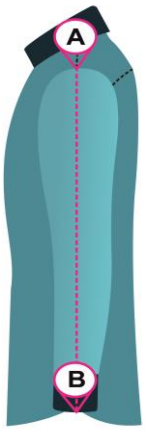


Fig.:1.17– Sleeve lengthmeasurement

g. Shoulder width

Measure from one shoulder point to the corresponding point on the opposite shoulder.

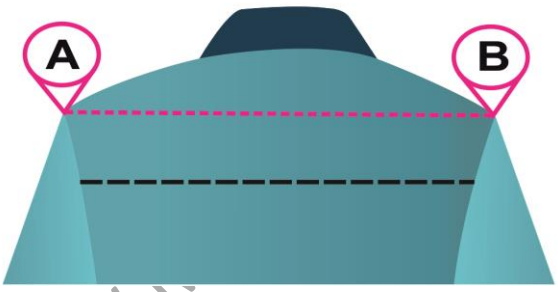


Fig.:1.18– Shoulder widthmeasurement

h. Bicep

Measure the widest part around bicep, measure 6" down from the tip of the shoulder.Double the measurement to arrive at bicep size.

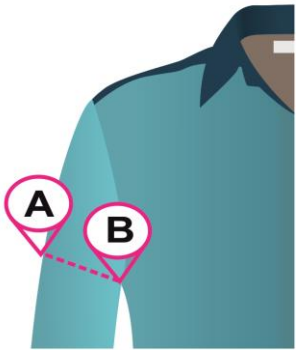


Fig.:1.19– Bicepmeasurement

i. Cuff

Flatten the cuff. Measure from over the button right up to the button hole.

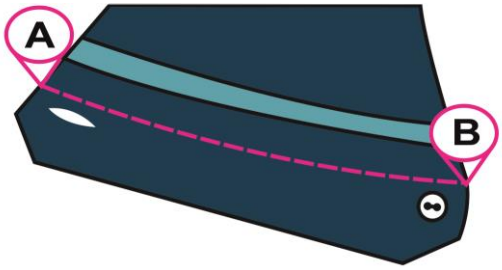


Fig.:1.20– Cuffmeasurement

j. Short sleeve length

The length measured from the shoulder tip to the end of the short-sleeve.

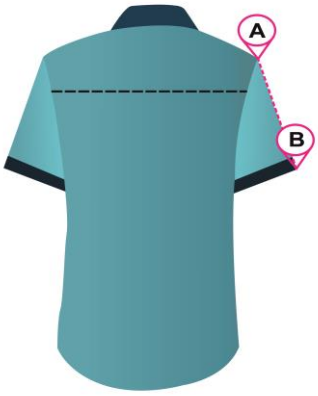


Fig.:1.21–Short sleeve lengthmeasurement

k. Shoulder yoke

The height of the shoulder panel measured vertically at the center-back

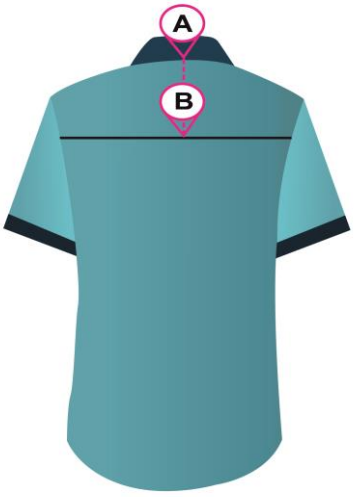


Fig.:1.22– Shoulder yokemeasurement

1. Second button placement

Raising or lowering the first button on the shirt placket to change the spacing between the collar and the first button.

Fig.:1.23– Second button placementmeasurement

CORRECTIONS IN A GARMENT

After measuring garments for quality in-line checker categorizes them into different categorizes based on the deviation of quality measures from standards. Garment correction can be done to meet AQL (Accepted quality level) in the garments produced. Rectification and alterations are possible with appropriate in-line checking. Knowledge about identification and rectification of faults as explained in Class11 (Unit-3, Session-3) plays a very important role while correcting garments.

While most of the defects while stitching or assembling of a garment can be rectified, these can also be completely avoided to save time and cost of production. To avoid such alterations, test fit garments made in a similar way with an inexpensive material to check for initial deviations from requisite quality. An in-line checker must check these test fit garment

samples with utmost precision and accuracy. Perfect test fit garments result in lower chances of deviations from tolerance levels in garments produced.

Activities

ACTIVITY 1: Take measurements of a dress form for a plain sleeve top as shown below.

Materials required:

1. Writing material along with ruler
2. Dress form of any size
3. Inch tape or measuring tape

Procedure:

1. Identify the body landmarks for the dress form
2. Identify length, width and circumference measurements required for the design
3. Take all length measurements- Sleeve length, front length, back length
4. Take all width measurements- Across shoulder, across back
5. Take all circumference measurements- Round chest, round waist, round hip, round neck, arms eye, round upper arm, elbow circumference, wrist circumference
6. Record all the measurements and recheck the measurements once all the measurements are recorded.

ACTIVITY 2: Take measurements of a formal shirt.

Materials required:

1. Writing material along with ruler
2. A formal shirt

3. Inch tape or measuring tape

Procedure:

1. Lay the shirt flat on the table
2. With the help of the measuring tape measure the shirt as explained in the session.
3. Record all the measurements.

Check Your Progress

A. Fill in the blanks with appropriate words:

1. _____is a scientific study of measurements of human body.
2. _____measurements refer to measuring the parts of body of the wearer.
3. _____ refers to the center of the garment back or body.
4. _____measurements are taken across the body from one side to another.
5. Sizing systems are based on key attributes such as gender, age, _____, height, _____and_____.

B. Answer briefly the questions that follow:

1. What are the points to be considered while taking measurements?
2. What are body landmarks? Why is it important to identify them?
3. Enlist primary and secondary body measurements.
4. Write down the ways to cross check Garments Measurements?
5. How to measure the shirt parts? Explain with diagram.

Session: 2 Mechanism of Bundling, Sorting and Labelling of Garment Components

Garment production starts with the cutting process. In this process, fabric is cut into components like, shapes or patterns of different garment parts, i.e. front, back, sleeve, collar shapes etc.. Prior to cutting, cutting department is issued with a job card/sheet from planning department that includes total quantity of garment pieces to be cut, size ratio of the garments and colour-wise size break up. Garment component arecut and separated based on size and colour ratio. Separated garment components are numbered to ensure that while stitching all components from same layer are stitched together.

In sorting all component of a garment placed together. Sorting is done size wise and colourwise(when multiple colours are cut in a single lay).

A certain number of pieces with all the components are tied together. This process is known as bundling. Each bundle is labeled with the following information:

i. Bundle number,
ii. Style name,
iii. Size number
iv. Quantity of pieces

with this information these bundles are sent to production line for stitching.

SORTING OF DIFFERENT COMPONENTS OF GARMENTS ACCORDING TO SIZES

Once the garment parts are cut, they are sorted according to the production system. These parts are sorted based on the size and colour. To sort these parts and cut components the production system is identified.

In mass apparel production different types of production systems are commonly used. Each system requires an appropriate management philosophy, material handling methods, floor layout, and employees training. Firms may combine or adapt these systems to meet their specific production needs. Industries may use only one system, a combination of systems for one product line, or different systems for different product lines in the same plant.

We have already learnt some of these production systems namely progressive bundle system, unit production system and modular production in Class11.

After identifying the production system the cut parts and components are sorted as follows:

1. Progressive Bundle System

In this system bundles of garment parts consist of garment parts required to complete a specific operation or garment component. For example, an operation bundle for pocket setting might include shirt fronts and pockets that are to be attached. Some firms operate with a standard bundle size, while other firms vary bundle sizes according to cutting orders, fabric shading, size of the pieces in the bundle, and the operation that is to be completed.

Bundles are assembled in the cutting room where cut parts are matched up with corresponding parts and bundle tickets. Bundles of cut parts are transported to the sewing department and given to the operator scheduled to complete the operation. One operator is expected to perform the same operation on all the pieces in the bundle, re-tie the bundle, process coupon, and set it aside until it is picked up and moved tothe next operation.

2. Unit Production System

A unit production system uses an overhead transporter system to move garment components from one work station to next for assembly. All the parts for a single garment are moved by means of a hanging carrier that travels along an overhead conveyor. The overhead rail system consists of the main conveyor and accumulating rails for each work station. Carriers are moved along the main conveyor and switched to an accumulating rail at the work station where an operation is to be performed. Most unit production systems are linked to a computer control center that routes and tracks production and provides up-to-the-minute data for management decisions. Operations are performed at individual workstations. The end result is a cost-efficient product, processed from pieces to completion.

3. Modular Production System

A modular production system operates as a Pull System, includes an empowered work team, equipment, and work to be executed. Teams may be used to perform all the operations or a certain portion of the assembly operations depending on the organization of the module and processes required. With a team-based system, operators are given the responsibility for operating their module to meet goals for through input and quality. Team members develop an interdependency to improve the process and accomplish their goals.

BUNDLING AND LABELING OF DIFFERENT COMPONENT OF GARMENTS ACCORDING TO SIZES

A. Bundling

Bundling is the process of dis-assembling the stacked cut pieces and re-assembling them in production lots grouped by garment unit, colour, and number of garments. Manufacturers use a variety of bundling methods depending upon their requirements. Following are some types of bundling systems and methods:

a) Bundling Methods

i) Item bundling– all pieces that comprise a garment are bundled together.

ii) Group bundling –about 10 to 20 garments are put together in a bundle and given to a single operator or team to sew.

b) Bundle System

i) Progressive bundling - Each worker receives a bundle of unstitched garments and performs a single operation on each garment in the bundle. Other operator sew other parts of the garment, which are then assembled into the finished garment in the final phase.

ii) Unit production system– Individual garment pieces are delivered to sewing operators using a computerised, fully mechanized "assembly line" that runs throughout the manufacturing processes. Using a UPS computer monitoring system, a manufacturer can fully track the production of a garment.

iii) Team based bundling – In this system 8 – 10 operators are grouped to make a team. If a single-piece hand-off is used, machines are arranged in a very tight configuration. As soon as an operation is completed the part is handed to the next operator for processing. There is usually only one garment component between each operation or small bundle of up to ten pieces of work between operators. In case of small bundle, an operator will complete the operation on the entire bundle and carry the bundle to the next operation.

B. Labeling

a) Sorting and ticketing

Cut pieces are sorted according to size. Afterwards all the components according to size of an individual garment are brought together and ticketed.

Ticketing is very important as sometimes lot to lot shade variations are observed within a lot.It is the process of marking of cut components for shade matching precision, and sequence identification. The workers secure one end of the stack and puts on the ticket using ticket gun as he flips over the cut parts.

Fig.:1.24 – Ticketing gun

The ticket contains the size, bundle number and piece number. Ticketing serves as important means to track the parts of the garment in the assembly line from start to the end.

b) Cut panel checking

The ticketed panels are now sent to the checking area for inspection of an individual piece for any objectionable faults. Panels may have faults like wrong grain line, inappropriate size, incorrect shape and any fabric defects like holes cuts shade variations etc., are removed from the cut lay. An in-line checker inspects al the cut panels for such defects. The rejected pieces are sent back and equal number of fresh panels are separately cut, replaced in the set and re-ticketed with the same number as the rejected ones. Other mend able faults are marked with an alteration stickers and passed on. These will be spotted out during garment finishing or washing.

a) Bundling

The checked components of style and in one size are clubbed and bundled using ties. The size of the bundle depends upon the requirement of the production unit. Each bundle contains pieces of same style and same size only.

TYPES OF LABELS USED IN BUNDLING PROCESS

i. Size Label

Size label defines a specific set of measurements of the human body. Size labels are indicated as S, M, L, XL, where S for small, M for medium, L for large and XL for extra-large. Sizes label with pattern code tagged on the bundles to identify and make sewing process easier.

Fig.:1.25 – Size Labels

ii. Composition Label

Composition label indicates the fabrication and composition percentage of any garments. It indicates the fabrication such as, Cotton, denim, Polyester etc. and composition percentage (95% Cotton 5% Spandex, 100% Cotton etc.) have followed during its manufacturing.

Fig.:1.26 – Composition Labels

iii. Batch Mark Label

A label that indicates which sewing line or batch had made the particular garment. Few garment manufacturers add batch label for their internal quality inspection process. This helps manufacturers to identify the fault of a particular line or the checkers for the rectification of the fault. This label is normally attached at side-seam prior to finishing operation.

PRESERVING QUALITY WHILE STORING CUT COMPONENTS IN SPECIFIED MANNER

The essential preparatory activities for sewing are bundling, shade separation, indicating the face side of the fabrics and work ticketing.

Bundling system is accompanied with work tickets. It gives fundamental information about the work such as the style number, the size of the garment, the number of garments in the bundle and the date issued. Work tickets are usually created on site once the outcome of cutting is known.

Storage, stacking and handling practices of cut components are as follows:

- Cut components should be stacked in the form of work tickets on dry, flat and firm surface.
- Work tickets should not impose any undue stresses on walls or other structures.
- Stacks should be separated according to design pattern, size, length and labeled, placed in neat and orderly piles.
- Plies of cut components should be arranged so as to allow a minimum 800 mm wide passageway in between for inspection and removal.
- There should be proper planning of the layout for stacking and storage of different work tickets and components with proper access for the trolleys to carry the work tickets from store to sewing unit.
- While planning layout, the requirements of various work tickets and cut components of different stages of sewing should be considered.
- Work tickets which are likely to be affected by dustand soil shall be stored by adopting suitable measures.
- Work tickets should be stored in cool, dry and well ventilated places, ensuring its storage without contact to ground.
- Avoid the exposure to moisture and heat, and always keep them away from direct sun.
- Work tickets subject to loss of quality through moisture shall be kept within impermeable wrapping, if not used within a reasonable period.
- Storage for more than two months, the stack should be kept completely enclosed by a waterproofing polyethylene membrane which should close on top of the stack.
- In receiving and storing work tickets, consideration shall be given to the sequence of removal from the store to the assembly positions.
- work ticketsshould be protected from any oil spillages; hands of the workers should be free of any oily substance.
- If possible separate compartments should be built up for each size, grade and type of work tickets.

- When different sizes, grades and types are to be stacked in one place due to shortage of space, the bigger size should be stacked in the lower portion of the stacks.
- While shifting, handling and stacking work tickets, care should be taken that the cut components are not dragged one over the other as it may cause damage to their surface.
- The cut components should be lifted and carried preferably flat avoiding damage to corners or sides.
- The stacks shall be stored away from electric generators, electric motors, switchgears and other such electrical equipment.
- Contamination of the work tickets with vegetable and mineral oil, grease, organic solvents, acid and their fumes, alkalis, dust and grit should be prevented.
- The manner of storage should facilitate removal and use of lots in the same order in which they are received.
- Label shelves for quick identification. Proper identification by markings, tags etc. should be used for work tickets delivered to the sewing unit and stored in racks.
- At the end of each work shift, dusting of store room should be done

Activities

ACTIVITY 1- Collect different types of labels from various clothes in your wardrobe. Identify composition, batch and size label.

Materials required:

1. Writing material
2. Different garments
3. Adhesive

Procedure

1. Lay the garment flat on the table
2. Identify the labels on the garments. Categorize them as composition, batch and size labels.
3. Cut and paste the labels in your practical file.

Check Your Progress

A. Fill in the blanks with appropriate words:

1. are likely to be affected by dust and soil should be stored by adopting suitable measures
2. In production different types of production systems are commonly used.
3. all pieces that comprise a garment are bundled together
4. is very important as sometimes bolt to bolt shade variations are observed within a lot.
5. A label that indicates a sewing line or batch had made the particular garment is known_____.

B. Answer The Following Questions Briefly:

1. Explain briefly different production systems
2. Write short notes explaining about different types of labels
3. Explain the process of bundling
4. How can we preserve the quality while storing cut components in specified manner?

Module 2 Garment Quality and Inspection

Module Overview

It is important to maintain quality in every industry or business. Quality is an important aspect when it comes to sales and brand name among customers and associated companies. Sustaining high level of quality ensures better export business both at national and global level. Export business holds the prestige of the country, therefore it is very important to set quality control standards very high.

Apparel quality control is testing and inspection of clothing products from raw material sourcing to finished products. These should match best standards, meet the intended design and exact specifications. It is essential for all garment manufacturers to maintain good quality in everything they produce to increase sales and to build trust among customers.

Management of garment quality is an important task of quality department so it is necessary for quality department to understand its organisational structure. The understanding of organisational structure and specification of quality department is vital for smooth process.

This chapter deals with the importance of garment quality control, the organisational structure of a quality department and about the inspection process in sewing floor.

Learning Outcomes
After completing this module, you will be able to: • Describe and demonstrate quality check in garments • To understand organisation structure and specification of quality department • To perform and understand Garments inspection
Module Structure
Session-1 Quality check in garments
Session-2 Organisational structure and specification of quality control department
Session-3 Garment inspection

Session 1: Quality Check in Garments

Textile manufacturers and suppliers use the product quality specifications outlined by buyers. Failure to meet these specified standards will lead to the rejection of finished garments. Therefore, it is important to understand the terminology, importance and process of quality check.

TERMINOLOGY

Inspection – An organised method of measuring, evaluating and examining the products characteristics against specified requirements.

Testing – A method of determining and examining the ability and characteristics of a product by physical, chemical, mechanical or environmental conditions.

Specifications – A characteristic of the product that meets either buyer or consumer requirements. Specifications differ from buyer to buyer and from product to product.

Standards – A set of process and procedures documented with all required technical specifications to be applied as a rule to ensure that the product fit its application and purpose.

Rejection -A non-conforming product that fails to meet specifications, standards and requirements.

Quality Control – It is a problem-solving process which functions with the objective of getting a 'Zero–Defect' product.

Quality Assurance – It works with the principle of preventive problem management. It focuses on maintaining a specific level of quality with attention to each stage of the process of production.

Quality system – It explains about the organizational structure, model, procedures, process of business and develops specifications for performance to implement quality management.

Quality plan – A set of several documents that explains quality practices and standards of a particular product to measure its quality objectives.

Quality Policy – It is brief statement that outlines strategic directions of a company and provides framework organisation's quality objectives.

Quality evaluation - Systematic method of examination to regulate the extent to which a product is able to meet the specified requirements.

Quality loop - Conceptual model of the interrelated activities that affect the quality during the various phases from the identification of needs to the assessment of their satisfaction.

Quality Management – It is the method of implementing and monitoring quality systems. Quality management determines executing quality planning, assurance, quality control and quality improvement.

Quality Management System- It is a system which is used to design, manufacture and deliver products or services to meet customer requirements in accordance with company policy.

Total quality management – A management approach that is continuous and eliminate errors to build long term success and customer satisfaction.

IMPORTANCE OF QUALITY CHECK IN GARMENTS

Quality has always been the prime factor for every consumer and therefore it becomes crucial for manufacturers to maintain quality throughout every process of manufacturing garments. The quality has to be maintained on arrival of raw materials where the fabrics should be thoroughly checked, at the mid process one should spot out the mistakes in production line for immediate corrective action and finally at the finishing level where the finished products should be checked to ensure that the final garments meets buyer specifications.

High quality can be achieved by following the points listed below:

1. Create quality awareness among company workers about maintaining right quality.
2. Selection, utilization and proper maintenance of equipment for production process.
3. Communication of expected quality to workers and providing training for their performance.
4. Availability of proper and sufficient check points for quality control.
5. Informing workers about corrective measures such as 4r's
    a. Replacement of underperforming suppliers and equipment
    b. Repair nonfunctioning equipment
    c. Retrain workers of non-performance
    d. Reward workers with high performance

The characteristics of a good quality product or garment are listed below:

- Product meeting standards
- Quality conformance to needs and regulations
- Products free from faults and defects
- Design Quality
- Value addition of product
- Reliable and dependable

- End product application
- Consumer satisfaction

DEPARTMENT-WISE QUALITY CHECK PROCESS AND ITS IMPORTANCE

Garment industry needs to possess quality check points at every stage as it is important for the industry to maintain a high level of quality of the products they produce. A garment requires to be checked for quality at every stage, starting from raw material to finished product. Therefore, every industry performs department wise quality checks. Following are the department wise quality checks performed in a garment manufacturing unit:

1. Fabric Store

Fabrics should be inspected thoroughly before moving to cutting department for any defects. All incoming materials should be inspected for defects using relevant tools such as measuring tape, digital cameras, defect stickers, color swatch, barcode scanner etc.

2. Trims and Accessories

Trims and accessories are as important as fabrics. These should be inspected against quality and standards for example size, colour, design etc.

3. Cutting Room

Cutting room inspection must be done with care and deep observation as it involves checking of marker, cut components and bundling. It is essential to look closely if it a printed fabric because defects like misprint, print overlapping, incorrect direction during placement of cut components etc. can occur.

4. Sewing Department

To produce high value garments, inspection is to be carried for partially stitched garments randomly to check whether they are free of any defects. After thorough inspection, the pieces are sent to the next section or department. The garment can be checked for defects by any of the following inspection methods:

- In-line inspection
- Roaming Inspection
- Traffic light Inspection
- End of line inspection

5. Finishing Department

Garment pieces are to be packed and delivered without defects and faults. Therefore, all defective pieces must be corrected after initial finishing inspection, final finishing inspection and internal audit.

It is very important for an in-line checker to understand the quality check list of a garment industry in detail. Approved sample or standard sample must be looked closely for details as it helps to understand specifications. It should always be considered before beginning bulk production of garments.

Following is an example of garment quality checklist:

Sample Quality Check List

S. No.	Checkpoints	Remarks and status
Order details / style details		
1	PO sheet	
2	Production PDM/ Bulk PDM	
3	Approved sampling	
4	Approved trim Cards	
5	Body fabric	
6	Trims	
7	Pocketing fabric	
8	Draw string	
Approved label		
9	Main or Heat seal Label	
10	Size label	
11	Care Label	
12	Cargo Pocket label	
Approved trims		
13	Fusible interlining	
14	Sewing thread	
15	Buttons, Zippers, Velcro	

Embellishments		
16	Embroidery	
17	Prints	
Finishing trims or Approved Ticketing		
18	Size Stripe	
19	Bill board	
20	Hang teg	
21	Marketing tag	
22	Hanger	
Wash verification report		
23	Approved wash standard	
24	Shade band	
25	Abrasion	
26	Tint	
27	Hand feel	
Lab test report		
28	Button pull Test report	
29	Button torque test report	
30	Garments test report	
31	In-house lab test report	
Finishing, Packing, Folding		
32	Ironing	
33	Folding and packing	
34	Method of folding	
35	Polybag	
36	Top defects	

Activities

ACTIVITY 1: Create a booklet/scrapbook of in-line inspection sheets of garment.

Materials required:

1.Books and magazines for pictures

2. A-4 size sheets

2. Paper cutting scissors

3. Adhesive

Procedure:

1. Look out for pictures of garment in-line inspection sheets from relevant sources.
2. Collect the pictures of in-line inspection.
3. Cut the pictures neatly with the help of paper cutting scissors.
4. Paste the pictures on A-4 size sheets.
5. Explain the working of given inspection method.
6. Compile all the sheets and make it in the form of a booklet.

Check Your Progress

A. Fill in the Blanks:

1. _____ is a problem-solving process which functions with the objective of getting a 'Zero–Defect' product.
2. Apparel quality control is testing and inspection of clothing products from _____ to _____.
3. The method of implementing and monitoring quality systems is called _____.
4. _____ is an organised method of measuring, evaluating and examining the products characteristics against specified requirements.
5. A non-conforming product that fails to meet specifications or standards and requirements is categorized under _____.

B. Short answer questions:

1. List the characteristics of a good quality product or garment.
2. What is the importance of quality check in garments?
3. Write down the garment inspection methods used in the sewing department.

Session 2: Organisational Structure and Specification of Quality Control Department

In any business, the organisational structure helps to communicate better and grow profitably as it clearly defines the hierarchy and reporting relations for quality achievement of a company. Also, the specifications for product quality helps to measure and analyse the finished products which are ready for shipment.

ORGANISATIONAL STRUCTURE OF QUALITY DEPARTMENT

The quality department of a garment manufacturing unit is divided into two sections namely quality assurance and quality control.

The organisational chart for quality assurance section is as follows:

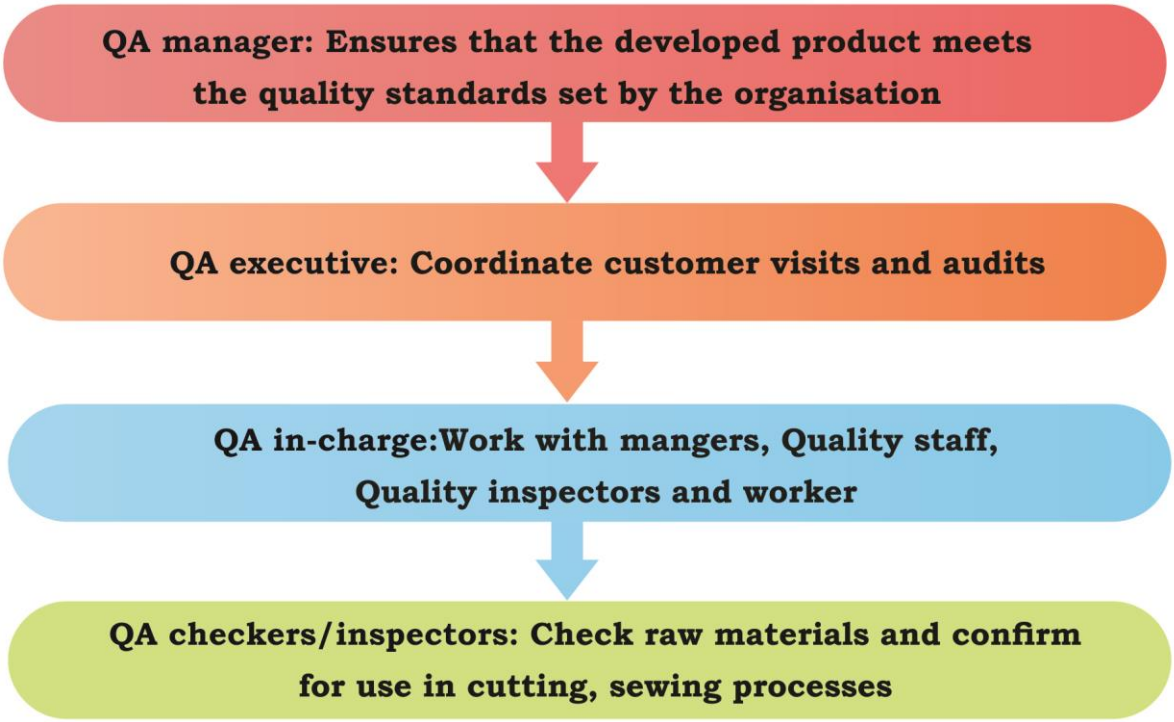


Fig.:2.1 –Organisational structure of QA section

Similarly, the organisational structure of quality control section is as follows

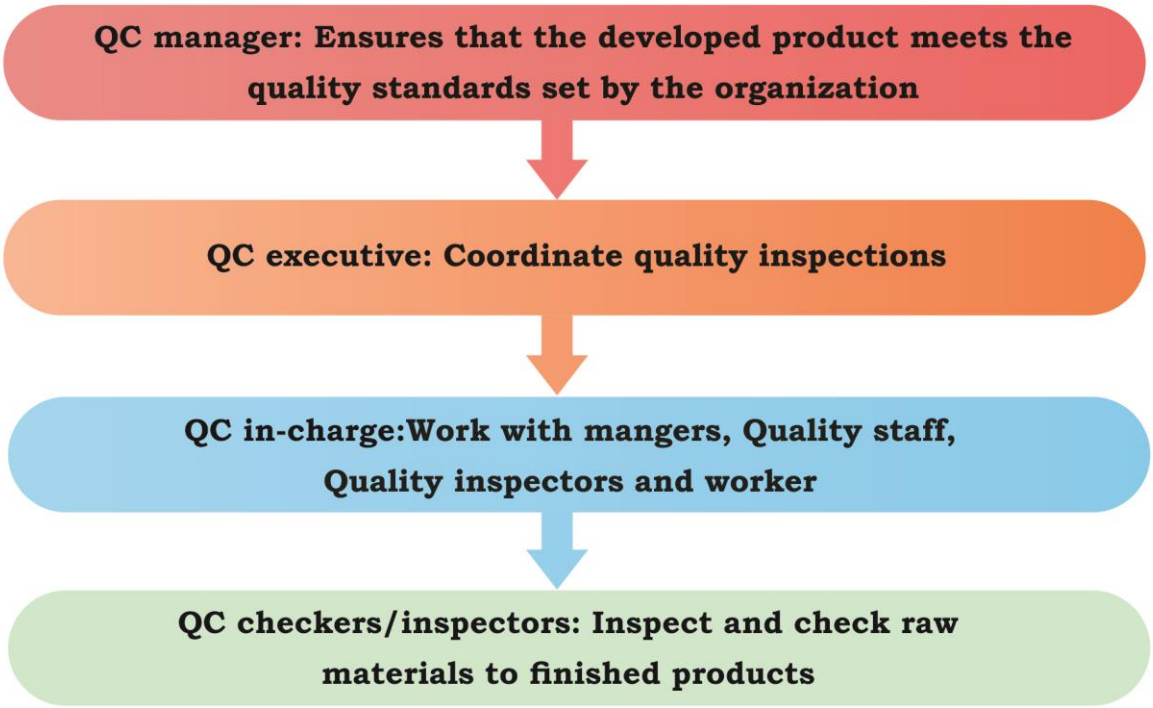


Fig.:2.2 –Organisational structure of QC section

An in-line checker is a part of quality control team in the quality department. He is responsible for all the in-line inspection activities.

SPECIFICATIONS OF QUALITY DEPARTMENT

The term "spec" refers to a collection of processes that must be met by a product. The product's attributes satisfy either the buyer's or the consumer's needs. Specifications vary from one buyer to another from one product to another. Minimum and tolerance are the two aspects of specifications. Tolerance denotes a "range of acceptable values," whereas minimum denotes "low acceptable levels."

SPECIFICATION SHEET

Specification sheet, also known as “spec-sheet” is a very important document which contains the details of all mandatory elements and is required to manufacture any garment or any other stitched product. It consists of all the important data regarding its style, size, design placement, raw material used etc. Specification sheet is prepared by the designer after the buyer approves the design or if the buyer sends his requirements for the design. Also, the buyer may send specification sheet to be followed for the development of the apparel or any stitched product of his designs. These specifications are to be followed for the production.

After the preparation and approval of the specification sheet, the first prototype sample is made to understand the construction, fit, desired look, embroidery and trims specified in the spec sheet. In essence, the style specification sheet is the "blueprint" for sample development and garment production, because it contains all mandatory elements which are required to manufacture it.

Sample spec sheet of women's maxi dress and men's shirts are shown below.

DATE	20/10/2019	SEASON	Ss18
TYPE		WOMEN'S MAXI DRESS	
FABRICATION		100% POLYESTER	

STYLE	NCSS 1807	TRIMS	CONCEALED ZIPPER
DESCRIPTION	MAXI DRESS WITH FRENCH DART AND SIDE PANEL WAIST		

MEASUREMENTS	FRONT	BACK
HSP TO BOTTOM HEM	43"	44"
CENTER FRONT AND CENTER BACK	39"	42"
ACROSS CHEST	18"	18 1/2"
ACROSS SHOULDER	14"	8"
SHOULDER WIDTH	2 1/2"	2 1/2"
BOTTOM HEM	25 1/2"	27"
DART LENGTH	8"	10"
LENGTH BETWEEN DART & SIDE SEAM	5"	4"
DART ON SIDE SEAM FROM ARMHOLE	4 1/2"	1 1/2"
NECK WIDTH	7 1/2"	7 1/2"
NECK LENGTH	12"	9"
ARMHOLE LENGTH	8 1/2"	8 1/2"
ZIPPER LENGTH		18 1/2"
SLIT OPENING		8"
BACK PANEL WIDTH AT BOTTOM HEM		13 1/2"
BACK PANEL WIDTH AT ACROSS SHOULDER		8"
BOTTOM HEM WIDTH	1/2"	1/2"

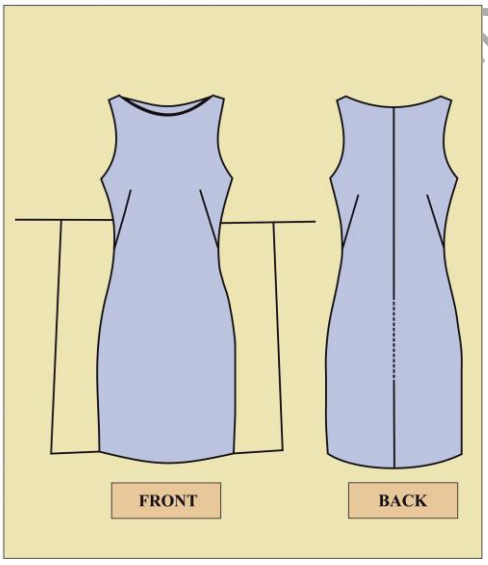


Fig.:2.3 – Sample spec sheet of women's maxi dress

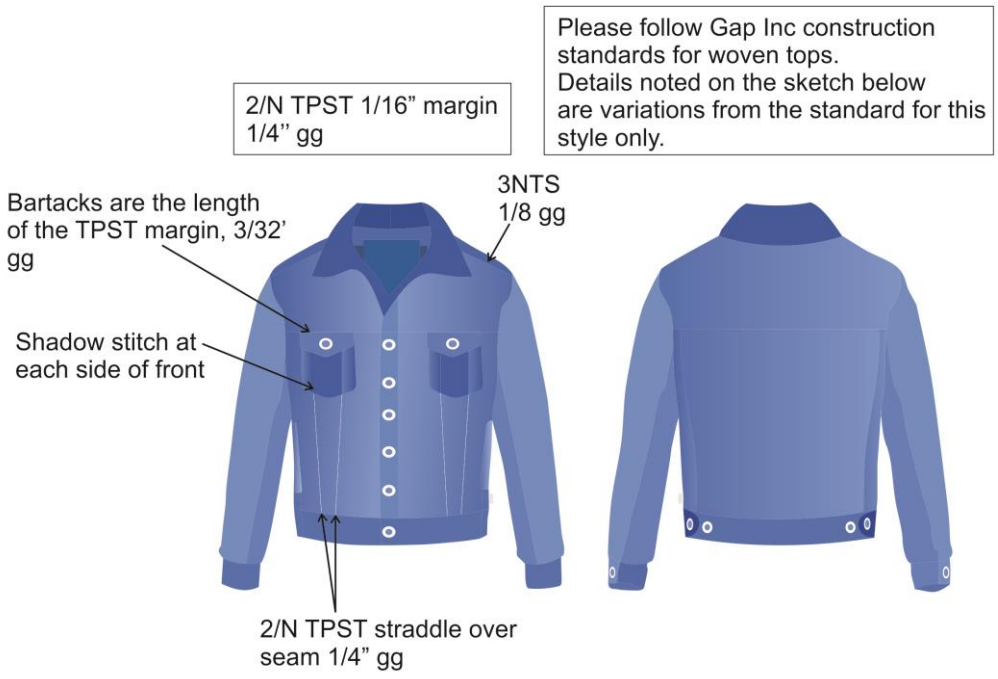


Fig.:2.4 – Sample spec sheet of men's shirt

A spec sheets acts as the basis of garment inspection. An in-line checker uses the specification sheet to check and inspect at all stages of garment production.

Trim Cards

Trim cards includes the trims and accessories approved by buyer used as guide during sourcing. During garment production, the trim cards are used by supervisors which includes industry name and address. It also contains information like fabric swatches, trim colour and style, code number, labels, stitching threads, buttons, zippers, laces etc. Trims are fixed on the card with item name and code. It is used in various departments i.e store section, sewing department, finishing department during in-line production process. The main purpose is to check whether correct accessories are fixed up or not because during inspection.

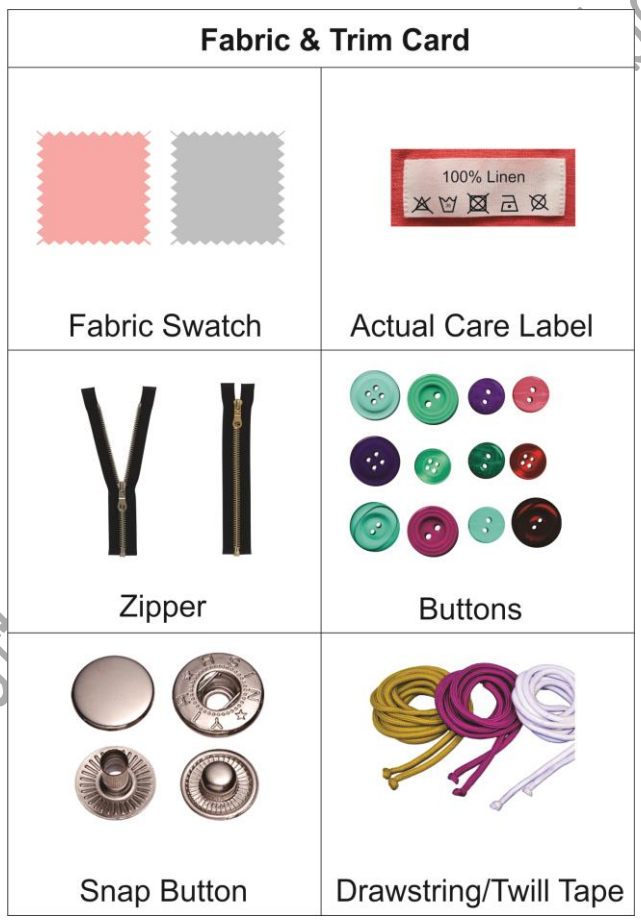


Fig.:2.5 – Fabric and Trim card

Swatch Cards

In garment production unit, fabric swatches are attached to a card called swatch card to get quick overview of the fabric or material samples. Swatch cards are used by manufacturers and designers typically in the size of 8½" x 11" inches that commonly kept in a ring binder file.

Types of Swatches

1. Stack books – It exhibit large number of swatches ordered one over the other to show different patterns, designs and shades. These are bound together and edges are pinked to avoid fraying of fabrics. In the stack booklet, details of each fabric are marked on reverse side of the sample and is used to confirm the fabrics from buyer.

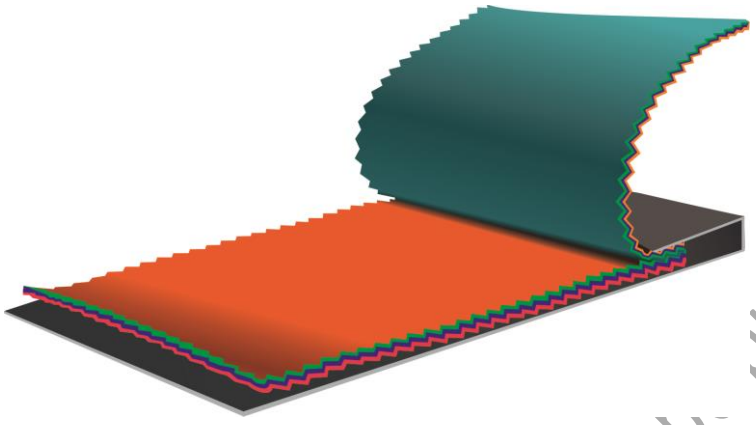


Fig.:2.6 – Stack books

2. Small Swatch cards – These are quite easy to carry and less expensive. One can quickly compare between samples swatches but it's difficult to visualise the design of large sample.

Fig.:2.7 – Small Swatch Cards

3. Fan decks - These are of traditional kind, hold many different fabric swatches of small size and spread out. These cards are very easy to carry, swatches are cut into strips fixed on long paper stock, die cut cards and punched. Similarly, remaining cards are created for deck, assembled the cards and kept in fan deck to be sent for buyer.

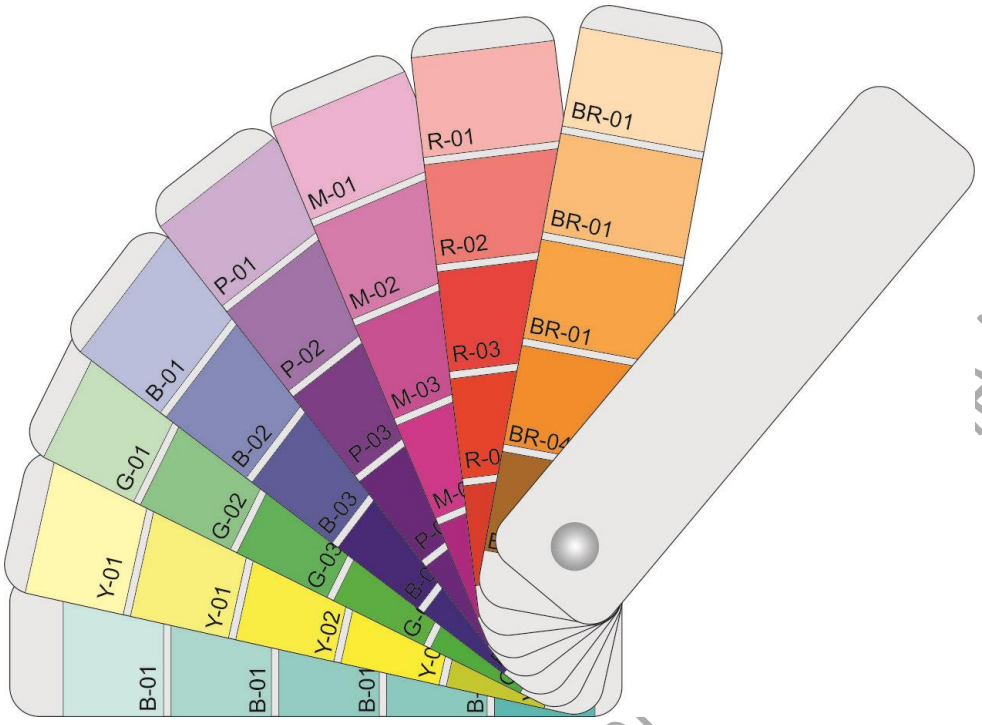


Fig.:2.8 – Fan Decks

4. Memos – These are very popular among manufacturer, sample maker and customers which can be manufactured using less material and time. These contain comparatively bigger swatches of material.

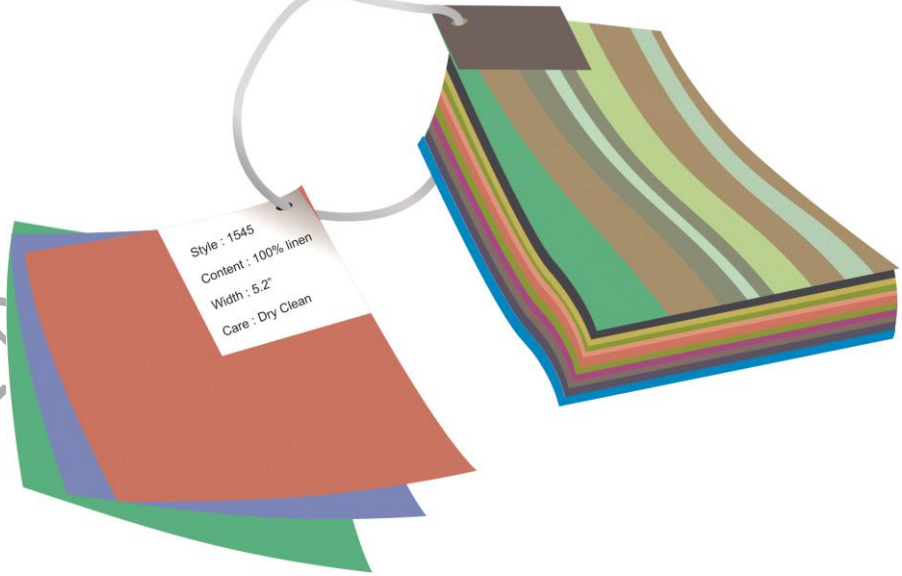


Fig.:2.9 – Memos

An in-line checker used both trim and swatch cards as standard while inspection.

Activities

ACTIVITY -1 : Prepare a swatch card of different shades of fabric.

Material Required:

1. 10-15 fabric swatches (any one series of shade)
2. Cardboard sheet
3. Scissors
4. Adhesive
5. Writing material

Procedure:

1. Select any one colour ad fabric for swatch card.
2. Collect fabrics of shades and tints of the selected colour.
3. Cut the swatches neatly and uniformly.
4. Paste the swatches on a cardboard from light to dark shade.
5. Number and name each swatch in the shade card.

Check Your Progress

1. Fill in the Blanks:

1. Garment spec communicates the information in better way to produce quality garment called _____ of the garment.
2. Trim cards includes the _____ and _____approved by buyer used as guide during sourcing.

2. Write True/False:

1. Swatch cards includes the trims & accessories approved by buyer.
2. Quality inspector doesn't checks the sample at every stage for the approval.
3. Swatch card get quick overview about the fabric or material samples.

3. Short answer Questions

1. Define Quality Control.
2. Enlist type of swatches.
3. Draw the flow chart of organisational structure of quality department.
4. What do you understand by Spec sheet?

Session 3: Garment Inspection

The objective of garment inspection is to visually review the garments for conformity and appearance against buyer's instruction or sample. Appropriate quality products are produced only if one completes the entire garment inspection loop. The quality of a garment should be analysed at right time with correct sequence. In-line inspection plays a major role in minimising the defects. The purpose and process of in-line inspection is discussed below.

GARMENTINSPECTION LOOP

Inspection in the apparel industry is done to control defects and maintain quality. The garment examination can be done visually to review the basic raw materials like fabrics, sewing threads, trims, etc. Also, the partially finished components or completely finished garments are identified for the faults against standards and specifications.

For effective and successful inspection, the entire inspection loop system includes

I. Detection of any defect
II. Informing the defects to concerned authority
III. Identification of the causes of defects
IV. Making correction of defects

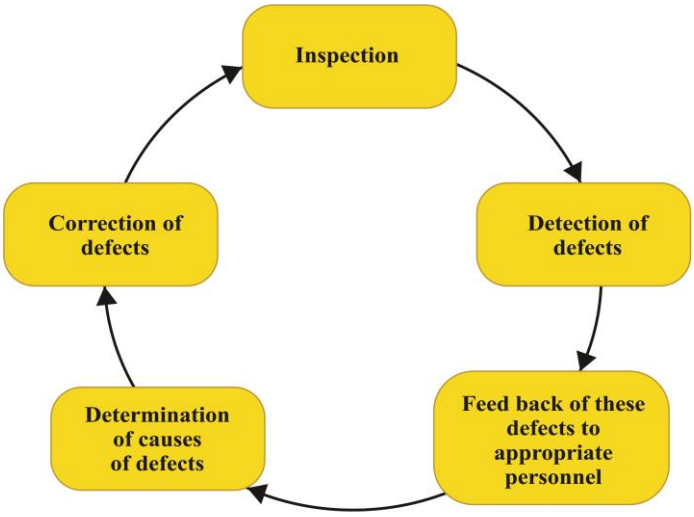


Fig.:2.10 – Garments inspection loop

PURPOSE OF IN-LINE GARMENT INSPECTION

1. To detect the faults or mistakes before completion of garment production process.
2. Early fault detection reduces time and cost.
3. Reduce garment rejection during end of inline checking.
4. Defects identified at initial level will help in making quick corrective actions.

IN-LINE QUALITY INSPECTION IN THE GARMENT INDUSTRY

In-line inspection is necessary to check the quality for partially stitched garments before the end process. During in-line inspection, the sewing operations are not 100% completed but in process. In-line inspection is called as roaming or roving quality checking.

The buyer quality assurance representatives visits during the production process either in the initial days of production or before the end. The buyer QA representative review the line and indicates the mistakes those are not accepted at quality level and provides feedback for corrective actions.

IN-LINE INSPECTION QUALITY CONTROL CHECKLIST FOR GARMENTS

The manufacturers should control garment quality during the production process as per the standard expected by buyer. The following is the check list for general inspection of goods:

- Design and style are as per the approved report
- Labelling is made in proper positions
- Measurements are as per the size chart
- Fabric is free from errors and faults
- Trims and accessories used as per specifications
- Placement of prints and embroideries are made in proper locations
- Seam type, Seam lines, thread type and stitches per inch are correct
- Trims and accessories like buttons and zippers are secured properly at right place
- No shade differences found in garments
- Garments are ironed and packed properly as per the requirements

SEWING FLOOR INSPECTION

In-process inspection is very important for quality garments in which quality checking process starts from manufacturing of garments till shipment. In-process inspection is done to minimize the defects in final inspection as well as identify the defects in the primary or preliminary stage because the sewing operators are responsible for increasing the percentage of defects. This process also reduces repair cost, time duration and increases customer satisfaction. To maintain perfect quality level against specifications or tolerance, the buyer specification helps the in-line checker to identify and reduce the defects during various stages of production and inspection process. The inspection is carried in various sections namely, fabric spreading, pattern and marker making, cutting section, sewing section and finishing section.

Following are the key quality checks at different stages of in-line checking:

Fabric Spreading Inspection

- Quantity of garments and number of plies
- Fabric width and alignment check
- Nature of the fabric, design and ply direction
- Maintenance of uniform spread tension
- Splicing

Pattern and marker Inspection

- Pattern size and components of all sizes
- Pattern placement and grainlines
- Pattern alignment and marking
- Marker length and width
- Marker efficiency

Fabric Cutting

- Amount of fuzzy and frayed edges that based on cutting tools and fabric construction
- Ply to fly fusion
- Pattern precision from top to bottom layer
- Notches and drills in optimum size

Fabric Sewing

- Type of needle and sewing thread
- Shade of sewing thread and fastness properties
- Seam type and stitch size

- Even seam
- Oil or dirty stains
- Seam defects
- Assembly defects
- Garment measurement fit to correct dimensions
- Positioning of interlining and fusing
- Fixing or finishing with trims and labels
- Trimming of thread ends

Ironing or Finishing

- Temperature maintenance during ironing
- Ironing faults due to burn, melt, shrinkage, creases and spots or stains
- Garment stretch due to ironing
- Garment folding and crease free
- Placement of Buttons / zippers
- Broken buttons / chains
- Functions of closures
- Fatigue, Pull and Stretch test
- Metal free
- Packing methods
- Materials used for packing
- Price tag and barcodes
- Labeling and conformance of legal requirements
- Packing material and adhesive quality
- Units in poly bag, poly bag sealing method
- Packing quantity
- Carton packing and assortment

IN-LINE INSPECTION REPORT

An in-line inspection report is an official statement of in-line inspection as performed by the in-line checker. For every in-line inspection the defects or

perfections are reported in a set format as per the organisation, such report is called in-line inspection report. This report acts as an evidence of the in-line inspection. This report is sent to the buyer for approval. Corrective decisions for defects are taken based on the overall in-line inspection report, for example, if the inspection report reflects defects within the AQL level then the production is continued with few rectifications whereas if the report reflects defects beyond the AQL level then the inspected lot is rejected. The buyer makes the decision of approval or rejection of the inspected lot based on the inspection report.

Every organisation follows either buyer's format for inspection report or their internal format for the report. More or less all of the in-line inspection reports includes following points:

1. Name of the company
2. Buyer's name
3. Style number/ name
4. Purchase order number/ details
5. Date of inspection
6. Total production quantity
7. Inspected quantity
8. Points of inspection
9. AQL for inspection or tolerance levels
10. Points allotted as per identified defects
11. Images to support defect justification
12. Inspection conclusion
13. Remarks by the inspector
14. Signature of the in-line checker/inspector

BUYER'S NAME

SUPPLIER: **FACTORY:**

Order Qty: **Cutting:** **Sewing:** **Finishing:** **Packed:** **Checked:**

FABRIC	OK	NOT OK	PRODUCTION	OK	NOT OK		OK	NOT OK		OK	NOT OK		OK	NOT OK
Woven			Pattern			Pocket			Trimming			Labels		
Knit			Thread			Button/Button Hole			Belt			Retail Packaging		
Sweater			Stitch			Snap Button			Pressing			Transport Marking		
Interfacing			Seams			Zipper			Washing			Price Tags		
Lining			Neck Shape			Waist band/Loop			Stain			Nickel Test		
Sequence			Shoulder/Shape			Bartake			Sport/Dirt			Needle Detector		
Print			Sleeve/Cuff			Velcro			Knitting			Broken Needle Record		
Embroidery			Hem			Elastic			Linking			Barcode		
Wash Test			Pull Test			Shade			Contrast					

Does the production correspond to the approved counter sample? Yes: No:

COMMENTS	CRITICAL	MAJOR	MINOR
Total			

Fig.:2.11 – Sample of in-line inspection report

An in-line inspection report also serves as a document for final inspection, as it gives an overview of in-line defects which makes it easy for the final inspector to check whether the rectifications of defects were made while final finishing of the garment.

In-line inspection reports are maintained by the quality department of any organization. These are reported to the merchandising department and further to the buyer.

Activities

Activity -1: Identify and collect pictures of four sewing defects and paste below:

Material Required:

1. Samples for identification
2. Camera
3. Scissors
4. Adhesive

Procedure:

1. Analyse the sewn samples for identification of various sewing defects.
2. Click pictures of the defects.
3. Print and paste the pictures on A4 size sheets.
4. Label the defects.
5. Submit the same in your class.

Check Your Progress

A. Fill in the blanks:

1. _____ inspection is done to detect the faults or mistakes before completion of garment production process.
2. In-line inspection is called as _____or r_____ quality checking.
3. An _____ is an official statement of in-line inspection as performed by the in-line checker.

B. Short answer Questions:

1. Difference between testing and inspection
2. Explain in brief about Garment inspection loop
3. What do you understand by “Roving Quality Checking”
4. Enlist the sections in which inspection is carried out

Module 3	Classification of Defects and Reporting

Module Overview

In all garment sectors, an in-line checker analyses items in their early stages rather than examining them at the end to protect product quality by decreasing the likelihood of faults. An in-line checker looks for handling, stitching, or machine defects in the partially stitched pattern pieces. In industries, many technologies are used for in-line inspection during clothes sewing operations to avoid defects or faults from occurring from the start. Early defect detection can save money and time in the event of any adjustments or waste. Finally, in-line checking will increase productivity while reducing the effort of the final inspection inspectors.

Production of apparel involves occurrence of various defects or faults. These faults may be related to the raw material or defects that occur during handling of the material while production. Inspection plays an important role in identification of such defects. An in-line checker must have knowledge of various defects and their rectification. He must also be able to examine and inspect all the material for any defects.

Learning Outcomes

After completing this module, you will be able to:

- List and describe common factors affecting garment quality
- Classify, explain and rectify garment defects
- List and inspect garments as per visual checking procedure
- Report problems to concerned authority

Module Structure

Session-1	Common factors affecting garment quality
Session-2	Classification and rectification of defects
Session-3	Inspection of garments as per visual checking procedures
Session-4	Reporting problems to concerned authority

Session 1: Common Factors Affecting Garment Quality Introduction

Producing quality garments is an important aim of any garment manufacturing industry. A good quality garment not only attracts the customers but also helps build company position in the industry. The quality department plays an important role in maintaining persistent quality of the garments produced. In-line inspection is an effective way of controlling quality. Early identification and rectification of defects is possible through in-line checking procedures.

Quality of a garment is a result of various factors. These factors can related to the properties of the raw materials or to the operations performed while garment manufacturing.

FACTORS AFFECTING GARMENT QUALITY

The main key factors that affect the garments quality are as follows:

1. Fabric Quality

The quality of fabric plays a major role in maintenance of garment quality. Fabric should be free of any defects.

Fabric quality is usually to see the way fabric feels, handles, looks, and to see how it drapes in the finished garment. A high-quality fabric results in a high quality garment.

The quality of a garment depends on various factors such as the type of fiber, yarn, weave or fabric construction method, fabric finishes etc. The common and major factors that influence fabric quality are as follows:

- ✓ Durability
- ✓ Aesthetics
- ✓ Comfort and
- ✓ Garment maintenance

The factors that influence fabric quality is classified into internal and external factors. The internal factors that influence fabric quality are fiber type, fiber blend, fiber fineness, yarn quality, fabric density, fabric thickness and fabric structure. Similarly, the external factors that influence fabric quality includes thermal and moisture properties, air permeability, heat

retention, heat conduction, Fire proofing, moisture absorbency, waterproofing, water repellency etc. Also the effect of fabric and human body interaction should be considered as a key factor for better performance.

It is important to select a quality fabric to produce a quality garment. Once an appropriate base fabric is identified, it is important to ascertain that the garment won't come apart when worn or washed. This may seem severe, but one can see seams come apart with a simple tug and cloth that shreds under minimal pressure. Most companies have now implemented minimum fabric performance standards as a standard method for selecting materials.

The fabric performance standard describes the fabric's durability when constructed into a garment; it specifies any changes to the fabric that occur after washing or dry cleaning, as well as how durable the fabric and seams will be during wear.

The fabric should also be aesthetically appealing with no dying or weaving defects. This also includes the feel and the comfort level of the fabric.

For assessing fabric quality, fabric checking and inspection is performed by either the fabric checker and/or in-line checker. The fabric checking should include the following points:

- Seam Strength: This test method is used to check the seam strength of fabric on the fabric samples which are sewn together by using appropriate seams.
- Tear strength: The test measures the tensile strength, fiber bonding, and fiber interlocks of the yarns, as well as their resistance to tearing.
- Abrasion and piling: These two tests determine how much a fabric's surface wear is. Pilling, fuzzing, colour change, and fiber breaking are unsightly on a garment, and the tests establish a minimal threshold of rub before the appearance of the fabric surface changes.
- Stability to washing and dry-cleaning: Following the clothing care label, these tests verify the fabric's relaxation after laundering. Because fabric can both spread out and shrink, a tolerance of 3% in width and length for woven textiles and 5% for knitted materials is usually acceptable.
- Colour fastness: colour fastness, especially with dark or deep hues, can be a major issue. During the washing process, the cloth is attached to a multi-fiber strip containing bands of acetate, cotton, nylon, polyester, acrylic, and wool to assess dye fastness. Other tests, such as wet and dry rubs, look for colour loss and stains when the garment is worn; if the amount of dye coming off the fabric is excessive, it could rub off into the wearer's other garments.

2. Quality of accessories

Accessories and trimmings are an extremely important part of a garment. Appropriate procedures for trimming and inspection of accessories must be followed to achieve the desired quality of clothing and apparel.

The accessories like hangers, closures, interlinings, sewing threads, elastic should be generally verified for dimensions, size, strength and colour. The in-line checker has to check for weather the correct accessories are used according to required specifications.

The key factors that influence quality of accessories and trims are as follows:

- ✓ Aesthetics – The placement of trims and accessories on garments enhances garment appeal and look. The aesthetic is all about the attractiveness and beauty of a garment. The trims and accessories used in a garment should contribute to enhance the overall appeal of the garment. Here checker must check that the accessories and trimmings are used according to the fabric strength, color and quality.

- ✓ Performance – Selection and application of trims and accessories should be compatible with other materials and should provide better performance.

  The overall performance refers back to the utility, durability and sturdiness of the accessories and trimmings used. The accessories used must be in line with the specifications. If the accessories are used for aesthetic purpose only then they should contribute enhancing the overall look of the garment. If the accessories used are for functional purpose, then they should be properly functioning to avoid any disturbance. Zippers must be checked for clean movement; the quality of fasteners should be checked the quality of display accessories like hanger should also be checked in line with the garment.

3. Quality of Cutting

Garment Cutting requires utmost care as the mistakes after garment cutting cannot be rectified. Garment cutting is a totally vital system for production of garments. A garment may be rejected if the wrong cutting process is being followed. As a result, a few factors must take into account earlier than cutting which facilitates to decrease the possibility of garment rejection.

The key factors that influence garment cutting are as follows:

- Fabric spreading - Spreading process refers to smoothened the fabric and to spread along the lengths of table in layers. The length of the layer is defined by marker. The layers of fabric are matched along the edges

for equal length. The final product of the spreading process is called a lay. During the cutting process each lay must consist one type of fabric.

- Marker making- A marker is basically fabric pattern cutting layout. It is the placement of pattern pieces on fabric in a mindful manner that the fabric consumption gives minimum wastage or no wastage at all. The planning of marker is to define the average consumption of fabric and this affects the overall cost of a garment and fabric.
- Fabric cutting machines: The fabric cutting machines can be manual or controlled through computerised system as well. There are different types of machines like the straight knife, round knife, band knife and die cutters. The cutting method used to cut lay is generally mechanical since scissors cannot cut through multiple layers with precision.
- Cutting accuracy: In-line checker must check the machine's for cutting accuracy. After pattern cutting the accuracy of pattern must be checked according to specifications.

4. Quality and selection of Machines

The quality of a garment is affected by the type and quality of the machine chosen for the stitching of parts and panels to construct the garment. It is important to choose the right machine to avoid any defective garment while stitching. The quality of machines on the other hand is considered to be the heart of garment manufacturing units. The important factors that affect or influence quality of garment related to machine selection and quality are as follows:

- Appropriate selection of machine type- The machine selection should be done according to the task and fabric.
- Machine operation and Performance- The machines should also be check for their smooth performance so that the entire process can be carried out smoothly.
- Consistent quality of machines- Machines should be check for their quality and pressure which should be consistent throughout the process.
- Machine maintenance- The machines should also be checked for proper maintenance. The machine maintenance process should be carried out at regular bases.

5. Quality of Sewing

The quality of sewing plays a vital role in garment quality. The factors that influence sewing quality includes:

- Sewing thread- Sewing thread used must be according to the specification and it should be in line with the overall aesthetic and quality of the garment.

- Type of Sewing machines- The sewing machines can be of different types of multi-purpose. They can be used for different kind of operations of sewing, or the machines can be specialised to be used for specialised operations only. The most common multipurpose machine is the single needle machine. For knitted fabrics the machine which is used is chainstitch machine which is a specialized machine.
- Sewing operations- The in-line checker must check whether the appropriate swing operations are being carried out according to the specifications.
- Sewing machine needle- The needles must also be checked for their quality and function. Damaged needle can pucker the fabric or damage the fabric. The needles used should be according to the fabric type.
- Machine maintenance- The machines should also be checked for proper maintenance. The machine maintenance process should be carried out at regular bases.

6. Quality of Washing

The washing of garments has great influence on garment quality, appearance, fabric tensile strength, seam strength and fabric weight loss. The following factors influence the quality of washing:

- Washing method- For a quality garment, appropriate washing method must be chosen. An in-line checker has to check weather proper washing method is used according to fabric type.
- Washing machine- the washing machine should properly function. An in-line checker must ensure the functioning of washing machine.
- Wash time- Appropriate wash time results in a quality garment. An in-line checker has to check the washing time each operation takes.
- Wash treatments- garment quality depends on the kind of washing treatment. This treatment depends on the type of fabric and accessories.
- Wash process- the quality of a finished garment may also depend on the wash process. The wash process must be chosen according to the type of fabric and accessories.
- Fabric properties- An in-line checker must check the overall properties of fabric so that the appropriate wash process could be done for a specific fabric.
- Mechanical Action- An in-line checker must check if there is any mechanical process to be carried out for the garment washing.
- Type of chemicals involved in washing (Detergents, bleach, softeners)- the chemicals must be according to fabric type and style.
- Buyers requirement- An in-line checker must ensure that the specifications provided by the buyer are followed.

- Temperature- An in-line checker must ensure appropriate temperature on which garments are washed.
- Time- to maintain the quality of the garments, the time taken by the machine in washing or spinning process must be monitored.

7. Quality of finishing

Finishing quality control is an important process and last step of garment industry to ensure the quality of garments. The garment industry uses Standard Operating Procedures as per the manufacturer's requirement to confirm the quality of products in finishing process.

- Shade of the washed garments- An in-line checker must check if the color of garment is changed from its original color.
- Thread trimming- An in-line checker must check if all the unwanted threads are trimmed properly to make the garment look neat and well finished.
- Size-wise and style-wise bundling- An in-line checker must ensure that the garment bundling is done according to their size and style.
- Defective garment piece- An in-line checker must check if there are any defective garments. So that those garments can be separated from the bundles.
- Ironing and snickering- the garments must be properly ironed and tagged.
- Folding and packing of garments- An in-line checker must ensure that the garments are folded properly according to the fabric used and style.
- Acceptance Quality level- The overall quality should also be checked and the in-line checker must check that the finished garment attest possesses the accepted quality level.

Activities

Activity 2: Visit a garment manufacturing unit andrecognise and inspect various garment parts visually for quality conformance.

Materials required:

1. Measuring tape
2. Specification and instruction sheet
3. Various garment parts

Procedure:

1. Visit a garment manufacturing unit and recognise different garment parts at various stages of production.
2. Ask for specification and instruction sheet for inspection.
3. Based on your knowledge inspect the garment parts at various stages of production and identify the defects.
4. Report the same in an inspection report format.

Check Your Progress

1. Fill in the blanks:

1. Fabric samples are sewn together by using appropriate _____ .
2. The fabric performance standard describes the fabric's _____ .
3. yarn quality refers to the quality of _____ .
4. Detergents, bleach, softeners are used for _____.

2. Multiple choice questions

1. Seams are used to join
   a) Fabric
   b) Metal
   c) Air
   d) None of above
2. Colour fastness refers to the quality of
   a) Fabric dye
   b) Fabric seams
   c) Fabric finishing
   d) All of above
3. Fabric pilling refers to
   a) Formation of little holes on fabric surface
   b) Formation of dirt on fabric surface
   c) All of above
4. Garment closers and fasteners are part of garment
   a) Colour scheme
   b) Bundle
   c) None of above
   d) Accessories

3. Short answer questions

1. What is Spreading?
2. What is tear strength?
3. What is the meaning of fabric quality?

4. Long answer question

1. Discuss the fabric cutting process inspection in detail
2. Discuss the factors which influence the quality of washing
3. Discuss various finishing defects which can be there in a garment

Session 2: Classification and Rectification of Defects

Anything which is not required by the buyer or anything which exceed measurable limits is known as defect. Defects are inversely proportional to the quality of the product.

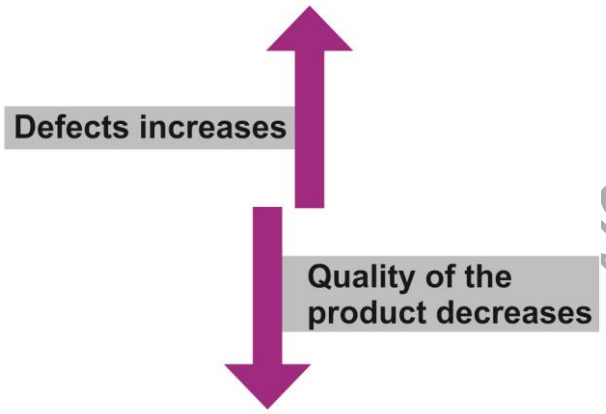


Fig.:3.1 – Relationship of defects with quality of garment

Whenever number of defects raises the quality diminishes. So, when defects and quality both are maintained, the productivity improves automatically. So, in this session how garment defects can be recognized visually and their possible solutions are discussed.

Defected garments in manufacturing industries are identified as rejected items.

Different types of defects are found, in the garment industry and these defects are dependent upon the classification and an inspector's ability to make decisions.

While inspecting the shipment, the defects are categorized into three different categories as stated in the AQL system. These defects are:

1. **Critical Defects:** These are the most serious flaws or defects in the garment/product that might cause it to fail to fulfill necessary requirements or endanger the consumer's health and safety. Even if a single significant defect is discovered in the garment, the entire cargo or shipment might be rejected since no importer can risk endangering the lives of his consumers. The following are some of the primary reasons why a critical fault causes an order to be rejected right away:

- It endangers the health of customers.
- Affects the reputation of the distributor.
- In the case of a product recall, the brand is exposed to liabilities and needless expenditures.

Examples of Critical defects include presence of a broken needle or a sharp object, use of prohibited chemicals etc..

Examples of Critical defects include :

a) Left over needles on garment from cutting and sewing operations

b) Stains – blood, tea or *gutka*

c) Broken buttons and accessories

d) Unsecured fasteners

e) Length of the trims are too long or loosely stitched.

f) Missing suffocation warning labels

2. **Major Defects:** These defects do not endanger the safety of the end-user but they do cause the garment to fail to satisfy the importer's predetermined specifications. These flaws can lower the value of a product by interfering with its intended usability, resulting in a loss of revenue when buyers return the items. If the number of these defects discovered in the shipment is excessive, the importer may request that the manufacturer hold the shipment until the defects are rectified.

   Examples of Major defects includes the deviation in size of the product away from the tolerance levels.

   The defects those do not pose a threat to the safety of the wearer or end user, but they do cause the garment to fail to satisfy the importer's predetermined specifications. They lower the value of the product, adversely affects its marketability and increases product returns for replacement or refund resulting in a loss of revenue.

   If the number of these defects discovered in the shipment is excessive, the importer may request that the manufacturer hold the shipment until the defects are rectified.

   Following are the example of Major defects:

   1. Deviation in size of the product away from the tolerance levels.
   2. Color or designs not as per the specification

3. Open seams
4. Holes
5. Broken stitches
6. Damaged fabric
7. Bubbling due to fusing
8. Zipper breakage
9. Button not well attached
10. Incorrect SPI
11. Incorrect placement of Main label

3. **Minor Defects:** these defects are those that occur in small numbers, have no direct influence on the product's salability, and are unlikely to be seen by the end-user. However, these flaws fail to comply with the importer's standards.

   Examples of Minor defects includes present of dirt, variation in content or quality of labels, minor shade variation etc.

Consumer expectations are increasing day by day, to meet their expectation levels manufacturers need to reduce the number of defects. This is the simplest way to get the customer's faith in their brand and for increasing bottom-line gains manufacturers should follow 4 key steps :

1. Evaluate quality control sampling plans.
2. Employ a Tightened Inspection Level III - sampling plan.
3. Adopt a zero-defect policy
4. Four point fabric inspection system

GARMENT INSPECTION- AQL LIMITS

A quality control checklist—sometimes called an inspection criteria sheet is a fundamental sheet for maintaining the quality control during inspection and for all kinds of product or garments.

Inspection criteria sheet contains tolerance related to dimensions of the products and packaging specifications. It also includes the common defects which needs to be taken care of during inspection and classification should be done under critical, major or minor defects.

Acceptable quality limits or AQL is an international quality system for inspecting any product, piece or garment before exporting or importing. AQL categories the defects for critical , major and minor categories, according to

lot size and number of pieces to be inspected. Standard emphasize on random sampling of an order to check conformance to their standards

Along with AQL, a checklist can be used as per the products or orders to get the assurance of consistent quality products. This will help the garment manufacturers to reduce the defects in their products. Reducing defects or no defect policies always felicitate the manufacturers or suppliers to gain more satisfied customers. Strict inspection procedures always help in long run to save money and big losses.

CLASSIFICATION OF DEFECTS

For an in-line checker it is important to understand the defects related to garment production. These defects may occur during various stages of production or they might be related to the raw materials. One must understand the cause of a defect while inspection.

A way of classifying defects is to categorise them under the stages of production. The classification based on the criteria is as follows:

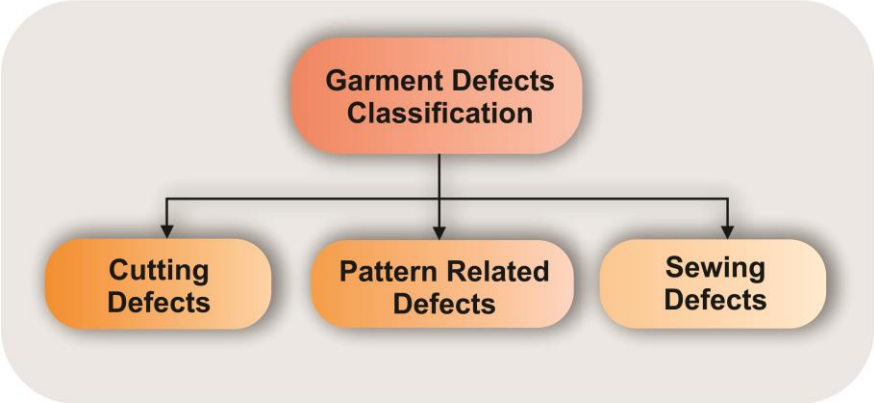


Fig.:3.2 – Classification of defects

1. Cutting defects

- Distorted garment panels due to non-following of marker lines
- Misplaced notches and drill marks
- Misplaced bits at the edge of lay
- Damaged garment parts / panels
- Too much opened slits

Shade variation

Difference in the color of the final garment from the sample shown to the buyer or shade variation between the panels of the same garment is considered a color defect.

2. Pattern defects

- Mixed parts due to improper labeling resulting in joining of wrong sized parts.
- Mixed parts due to improper labeling resulting in a joining of wrong sized parts.
- Out of grain or un balanced grain
- Inaccurate cutting, scanty marking, worn out edges,
- Mismatched check prints or lines across the seam.
- **Sizing defects**
    - Garments are not as per the size chart
    - Size grading is inaccurate
    - Sleeves of small size are stitched to large size shirt

3. Sewing defects

Sewing defects are common defects and leads to major losses.These defects can be easily checked by visual inspection, some are listed as follows:

- open seams
- incorrect stitching method used
- mismatched sewing thread with garment
- miss stitches
- unbalanced thread tension
- unfinished raw edges
- irregular or un even hemming
- stitched faulty zippers or fasteners
- loose trims or buttons
- Improper button holes, uneven parts

PROBABLE CAUSES OF VISUAL DEFECTS

1. Broken, skipped or miss stitches

These defects are common during the sewing operations and generally occur due to the faulty machine settings or by the carelessness of the operator.

Broken, skipped or missing stitches occur during the sewing process and are due to either a fault with the sewing machine or a worker error.

Broken /skipped / miss stitches badly affects the performance of the garments by decreasing the stitch strength and causes seam failure during wearing.

Defects related to stitches are not comes under major defects, if that defect or fault is not on the noticeable region of the garment.

These defects are generally rectified before the shipment.

2. Untrimmed threads

An untrimmed thread is a common defect in garment manufacturing industry. During internal quality checks and final inspection these untrimmed treads are checked and trimmed neatly to avoid such kind of defects.

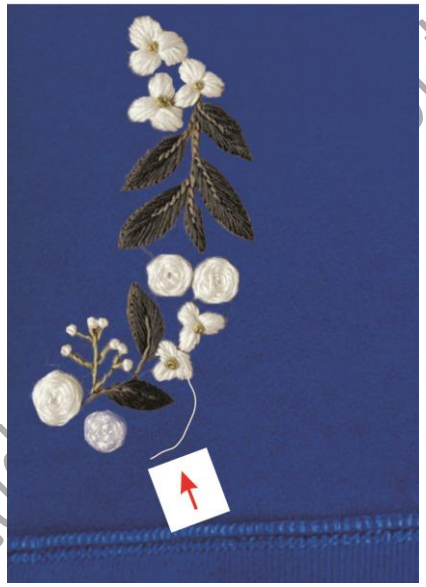


Fig.:3.3 – Untrimmed threads

Loose sewing threads gives a "cheap" appearance. Untrimmed /loose threads are a sign of poor workmanship. Trimming of loose threads before packing and shipping is essential.

3. Inappropriate dimensions

Sometimes faulty patterns are used during cutting and stitching which leads to dimensional issues in the final garment. Incorrect seam allowances or tolerances also generate the cutting and sewing defects. It is always advisable to refer supplier's correct/agreed tolerances and points of measure during the process. As incorrect dimensions results in improper garment size and sometimes leads to remaking the garments from raw material.

4. Puckering

Irregular or Waviness on seam surface is known as puckering. This defect is commonly seen on the on tightly woven fabrics and majorly related to workmanship. Following are the reasons for puckering:

- High or too much tension on the thread during sewing causes the fabric to bunch up
- Dull or Blunt needle, creates puckering defects

Clothing affected by puckering cannot be reworked neatly as stitches leave the marks of needle holes on the fabric.

Fig.:3.4 – Puckering

5. Open Seams

Open seams always gives a very bad impression to the customer as it decreases the beauty of the garment along with seam integrity. This defect comes under major defect be it is small in size, because repairing of open seams leaves signs of repairing or mending.

6. Incorrect Stitches per Inch

This is caused by incorrect settings of the machine. SPI is always mentioned in the specification sheets attached with a style or order. Sometimes due to incorrect setting of the machine stitches per inch cannot be maintained during stitching of the garment. That leads to higher or lower SPI as compared to specified requirement of the garment specification. These less dense stitches can compromise seam strength, seam elasticity and stitching appearance of the garment. Costing of the garment is increased in case of higher stitches per inch as time required to complete the garment is also increased. A simple check can be performed to measure stitches per inch with a ruler prior to shipping.

RECTIFICATION OF DIFFERENT DEFECTS IN GARMENT

A defect in a garment indicates the quality deficient product. Various types of defects occur during the garment manufacturing process related to raw material, cutting, sewing and finishing.

Garment defects signify lack of quality. During apparel manufacturing process various types of defects occur in garments like faulty zippers, irregular hemming, loose buttons, raw edges, improper button holes, uneven parts, inappropriate trimming, and difference in fabric colours.

1. **Spirality in fabric**

Causes

- Yarn twist too high.
- Yarn quality is very poor.
- Bad combination between yarn twist and machine rotation direction.

Remedies

- Control of yarn twist (yarn twist should never be above 700 try/m).
- Yarn twist should be maintained above 700 try/m
- Feeder number should be maintained .
- Selections of correct finishes for reducing spirality.

2. Holes in fabric

Causes

- Sometimes holes appear during fabric manufacturing process
- Very stiff and dry yarn
- Fluff and Improper cleaning

Remedies

- through inspection of fabric and cut piece.
- Use a fabric fault detector.
- Air humidification
- Yarns having low hairiness should be used

3.Stain /spots

Causes

- Drops of Lubricants and chemicals on the garment.
- Water and hot scorch marks

Remedies

- Through cleaning of irons for any kind of dirt and malfunctions
- Thread take up hooks should be free from any lubricants and coatings
- Operator / workers should maintain cleanliness and discipline
- Steam should not be substituted with watersprinkling

4. Seam Puckering

Causes

- uneven stretching of the fabric during the stitching operation causes puckering
- Improper thread tension,
- wrong sewing thread selection

Remedies

- periodic checks and maintenance of the following parts :
  - thread guides
  - Feed dog,
  - eyelets
  - Machine feed mechanism
- Tension, stitch per inch and presser foot, pressure should be maintained properly
- Use of thread trimmer instead of pulling and breaking thread
- Needle-thread-fabric combination should be well judged

5. Open seam

Causes

- Improper setting and timing between needle and looper or hook etc. Creates improper thread tension.
- improper thread tension can be due to the incorrect needle and looper settings
- Wrong sewing thread selection

Remedies

- Stitch per inch, back-tack settings, feed dog and hook set timing should be checked periodically

- Periodically check for threading, SPI and back-tack settings, feed dog and hook set timing
- Quality of feed mechanism should be maintained
- Needle-thread-fabric combination should be well judged
- Sewing thread quality should be checked

6. Broken Stitch

Causes

- improper threading in the needle or machine usage leads to Non-continuous sewing thread on the surface of the fabric

Remedies

- machines parts like feed dog, needle plate and presser foot should be checked periodically
- Washing instructions need to followed every time
- Sewing thread selection should be according to buyers specification
- Needle thread fabric combination should be well calculated
- Needle alignment should be appropriate

7. Skipped stitch

Causes

- Improper threading of needle and improper handling of cut pieces or machine usage creates irregular stitches along the seams.

Remedies

- Setting of the needle, needle and hook timings should be maintained
- Needle size , thread size and thread tension must be adjusted.
- Pressure foot should be adjusted for maintaining the accurate pressure

8. Wavy stitching

Causes

- Improper handling of cut pieces leads to wavy stitches or sometimes are not straight
- Due to selection of wrong or deflected needle and damaged feed mechanism wavy stitches appear

Remedies

- Shrinkage should always be considered beforehand and suitable thread should be used.
- Feed mechanism, needle and thread size must be checked
- periodical checking of feed dog is important

9. Uncut loose thread

Causes

- improper trimming of extra threads may appear on the seam line. Improper finishing also leads to hanging loose threads

Remedies

- Loose threads should be trimmed with trimmers
- Garments should be checked properly during finishing operation

10. Improper aligned Seams

Causes

- Improper or unaligned seams are due to the wrong handling of the cut piece

Remedies

- Operator must well trained and practiced fully for stitching garments
- Operators should be aware of the handling of machines

11. Shade variation

Causes

- Color variation in the panels of the same garment appears after stitching

Remedies

- Check all cut parts of garment prior to sewing for shade variations and replace those parts

12. Pattern defects

Causes

- Variation in the measurements of the various parts of garments.

- Incorrect placement of garment components like pockets, patches etc
- Poor ironing

Remedies

- Measure all cut parts of garment prior to sewing
- Correct placement of pockets, correct alignment of buttonholes according to buttons , embroidered panels and prints before sewing.
- Iron all parts of the garment properly to maintain the shape and drape of the garment.

Activities

Activity 1: Inspect a garment and rectify its defects.

Materials required:

1. Measuring tape
2. Specification and instruction sheet
3. Various garment samples

Procedure:

1. Visit a garment manufacturing unit and identify different garment samples.
2. Ask for specification and instruction sheet for inspection.
3. Based on your knowledge inspect the garment and identify the defects.
4. Rectify and mend the defects identified.
5. Report the same in an inspection report format.

Check Your Progress

A. Fill in the blanks:

1. Joining of pieces together is known as _____.
2. SPI stands for _____.
3. Checking of pieces in the line is done by _____.
4. Defects are classified in three categories these are_____,_____,_____.

5. Improper handling of cut pieces leads to wavy stitches ,this defect is called_____.
6. Unwanted color or dye on a garment is known as _____.

B. Long answer questions:

1. List out Common Defects in Garments .Describe any three.

2. How to rectify different defects in garment? Enumerate.

3. Write down the importance of Quality check in Garments ?

4. Explain any two processes of visual inspection procedures?

Session 3: Inspection of Garments as per Visual Checking Procedures

Visual inspection of garments refers to visual analysis of a garment for different measures of quality. The main purpose of inspection is to make sure that the garment conforms to its predetermined specifications. Inspection is done to control the quality of garment at different stages of production. Checking of raw material, cut components, under stitch and under finished parts according to quality standards, specifications and procedures is known as inspection for quality control.

Visual inspection is an effect way in analysing and maintaining the quality of a garment. Quality inspectors inspect the garments visually for identification of defects if any. An in-line checker visually inspects the garment parts at every stage of production.

Visual inspection procedures are as follows:

1. Fabric Width

a) Take measurements of the fabric width at the beginning, middle, and end of each roll.

b) If a variation in fabric width is found, call Inspection manager to determine if the fabric is usable and if a replacement is necessary.

c) At this point, the in line checkers should also check the condition of the selvedges. The selvedges should as per customer requirement, lay flat, free from tension, and should not have a tendency to curl.

2. Fabric inspection on fabric checking machines

Inspection machines used in the industry are with variable speed drives and with digital counter meters for inspecting the fabric construction from the top. Special light is attached to the underside of the table with an overhead light for complete inspection.

a) Every machine should be attached with weighing scale and need to check actual GSM vs permissible GSM

b) Inspection Speed - Inspection Machine runs at the speed of 27 meters per minute and should have both forward and reverse controls.

c) Viewing Distance - The inspection should be performed from an observation distance of 2 to 4 feet (60 to 120 centimeters) so as to get full vision of the fabric width.

d) Lighting - Overhead lighting is recommended for the inspection.

e) minimum surface illumination level of machine should be 1075 lux (100 foot candles)

2. Roll Length

Measure and record the length of each roll inspected. Ensure the roll length is based on buyer's specifications. If specifications are not available, calculate GSM and roll weight should not exceed 75Kgs.

3. Fabric Quality

This is an industry guide for evaluating, grading and separating the quality of fabric as per buyer's specification.

This process also assists industries in detecting defects and preventing substandard fabric. Ultimate goal is to promote communication and align procedures between the industry and the customer to resolve quality problems.

a. Calibration and Maintenance - Inspection frame should be included in periodic maintenance plan. All components of equipment which can output a quantifiably value needs to be calibrated annually e.g. Speed drive/ Counter/ Weight.

b. Tools - Measuring Tape, Pick Glass, Scissors, Defect Stickers, Selvedge Defect Flags, Tags, and Inspection Report Forms.

c. Approved Item Swatch - In bulk production hand-feel, colour and aesthetic properties should be verified with the fabric swatch which was inspected during the quality check operations. These swatches are considered as the reference swatches. Keep a clean sample folder with appropriate information such as customer name, item number, colour name, date approved, approved test report, Production spec, and any other relevant information along with a swatch.

4. Color Evaluation

a. Colour Standard - Check the upper-middle-end sample in the light box against the lab-dip under primary and secondary light source. This process should be done once for each colour inspected.

b. Shading within the roll - Check for shading at the beginning, midway and at the end of each roll and also Side to center, Side to side and End to end using the upper -middle-end sample for comparison.

c. Color Continuity Card- Check for colour consistency between the dye-lots, for this a 3 square specimens need to be cut, one fromthe left corner, one from the right corner and one from the centre of the each dye lots and attach to the colour continuity card. Labelling should be done properly on the cards. Samples are checked against approved lab-dip. Record any significant variation of shade from roll to roll.

5. Aesthetics Evaluation

- During development stage products are inspected as per the buyers approved swatches for various properties like drape ,overall appearance, hand-feel and texture etc
- This reference sample should be stored carefully for further use in quality comparison.
- Keep a clean sample folder with appropriate information such as customer name, item number, colour name/code, date, batch number, and any other relevant information.

6. Inspection for Defects

Once the colour and aesthetics have been checked and approved, begin the visual inspection for defects. Always inspect the side which will be used as the face in the finished garment. Mount the roll on the inspection frame with the face side up.

7. Traffic light system

To reduce defect generation traffic light system is the most effective visual Quality Control tool. This works like a random inspection system. It measure operator's performance level in quality. This system makes operators alerts for any kind of faults or problem in their ongoing work. Also helps in-line checker to identify the problem and for instant correction of the fault.

- Working procedure

This light system for quality check works along the lines of the traffic signal framework of transport department with three color lights.Here three color cards are used :

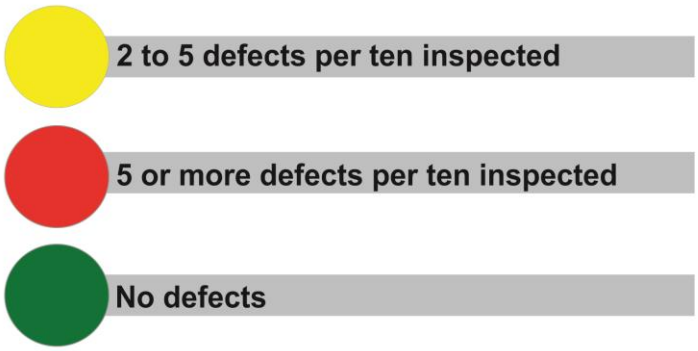


Fig.:3.5 –Traffic Light System

- Green card indicates that quality meets the customers standard.
- Yellow card depicts minor fault and care is required.
- Red card depicts the Quality of the current pieces are not meeting the customer's standard requirement.

So, in-line checker are responsible for the quality of their operators working in their line. Generally lines of any style consist of 15-20 workstations under one in line checker. Operators working in the line are responsible for the quality of the products and in line checkers keep check on the semi-finished pieces in an hour and two for all the quality parameters required for that operation. For maintaining the quality of the finished product in-line checkers randomly checked the various parameters related to sewing and finishing. On the basis of their inspection they give the cards to the operators, red cards are given to those operators who repeatedly produce more than 05 defects out of 10 inspected pieces.

In-line checker gives yellow card to those operators who have produced 5 or more defective items out of ten inspected. In case of no rework is required in piece than the green card will be given to that operator. So, this method easily identifies the quality output of the operators. Can Quality heads

can easily monitor the performances of the operators from any corner of the floor easily.

By this tool they can find out the operator doing maximum faults, by his red card. That card itself indicates his performance and need to be corrected on time to avoid losses of rework. Sometimes extra trainings are also given to these operators for neat and correct stitching.

Fig.:3.6 – Traffic Light flags

- Traffic light system record

The format shown in (Fig.:3.6) is for a single operator or workstation. A date wise record of operators with his name and line information is maintained in a single sheet for the whole month. On the starting of every month this record sheet is filled and maintained by the in line checkers at every hour after inspecting the pieces for each shift. Red, yellow and green color pens are used respectively for filling the entries and signing. Performance of each operator can be easily noted form colour filled columns at the end of the month. It is practiced by lot of industries nowadays and they find improvement in employee performance.

..... GARMENTS										
OPERATOR :						LINE #				MONTH :	
DATE	#1	#2	#3	#4		#5	#6	#7	#8	REMARK	QC / SUP
1.											
2.											
3.											
4.											
5.											
6.											
7.											
8.											
9.											
10.											

LUNCH

Fig.:3.7 – Traffic light system record

For reducing the cost of production and improving supply chain, lead time and quality of the products this Traffic light system plays an important role.

8. Garment specification sheet

While creating garment specification sheet, tolerance is given for all measurements to avoid margin of error. And provide this list of tolerances to both the supplier and QC team to ensure goods are produced and inspected at level. Each point of measurement should be specified in a garment specification.

Garment specification should include,

a. Each point of measurement - These will vary depending on the type of garment manufacturing.

b. Desired standard measurements for each size ordered - These are normally based on a pattern grading but sizing might vary based on the customers' preferences and garment type.

c. Tolerance for each point of measurement - This is the range above or below the standard measurement that will still accept, typically presented as a "+/-" value.

d. Depending on the complexity of the garment, industry can set upwards of 15 points of measurements. But some dimensions for garments may be less crucial to the overall fit of the garment than others. In such cases use a higher tolerance for dimensions less critical to the item's fit. Other times, set a lower tolerance if the nature of the item or dimension allows for a lower margin of error.

For example, manufacturing dresses, one such dimension might include "shoulder width from edge to edge". This might be a less-forgiving dimension with a relatively small discrepancy of 1/8" allowed to ensure a proper fit or use a looser tolerance of 1/4" for another dimension, such as "neck width from edge to edge", which won't affect the overall fit as much. A size 12 dress with the desired measurement of 10" for the neck width could, therefore, be 9 7/8" or 10 1/8" and still pass inspection.

Clothing brands face daily scrutiny for their supplier's working conditions, their environmental impact and their delivery times. Products ultimately need to speak for themselves. And there's no better way to represent the brand than with a product that meets the customer's expectations. Managing garment quality can be especially difficult when importing garments from abroad. The garments are inspected of their conformance to the size and appearance specifications, where the defects identified are stickered, to identify the rejected pieces easily on the floor.

Initial apparel visual inspection goal is to inspect and sort first-quality pieces.

First step is conducting a thorough apparel visual inspection of merchandise at various stages of production. Trained team inspects and sorts the garments pieces. Depending on the quality issue, the next step involves various apparel repair strategies.

- Inspection team comprising of the in-line checker is trained to inspect garments for a wide variety of issues and are,

2. Fabric flaws related to construction and finishes. Sewing related like uneven seams , incorrect measurements etc.

   Garment trim – Garments with faulty fasteners like broken buttons, hooks or faulty zippers .attached wrong labels or hangers

   Colour matching – Sorting of shades will be done proper color matching.

2.Stains –Include soiling, rust, oil stains and water stains.

Fig.:3.8– Garment inspection

3. An in-line checker should check all the pieces according to buyer's instruction and confirm according to buyer's instruction in inspection of garments are,
   - Garments parts need to checked for any shade variation
   - Garments measurement with allowance from buyers measurement chart
   - Balanced collar and sleeves
   - Pockets shape, size and correct placement
   - Zero fabric faults and stains,
   - Patterns should match

- Plackets, waistband belt closing, dart width, yoke and notches should be finished neatly
- Absence of miss missed stitches, minimizing miss stitches or puckering etc.
- Seams finished correctly - side seam margin, in seam margin, etc
- Assembly - shoulder sleeve attachment, collar, buttonholes should be stitched neatly and without any faults etc.
- Correct placement of accessories
- Proper functioning of accessories
- Correct labeling

ZONE WISE INSPECTION OF THE GARMENTS FOR QUALITY CONFORMANCE

Garments are checked for various type of defects visually and classified as Major, Minor and Critical defects. A significant defect or major defect can be considered as minor dependent on type of garment, location or place or area of the defect or the type of defect.

This area is called as a zone of that garment. So, garment is divided into three zones for complete evaluation or quality inspection. Generally garments are divided in to three zones i.e A, B and C and location of these zones are shared by the customers. Customer shares the images of their garment with the markings of the A, B and C zones on it. After inspecting the garments according the specified zones, inspection report is prepared with details of the defects and their zones in detail.

Few examples are given to understand the zones in different garments.

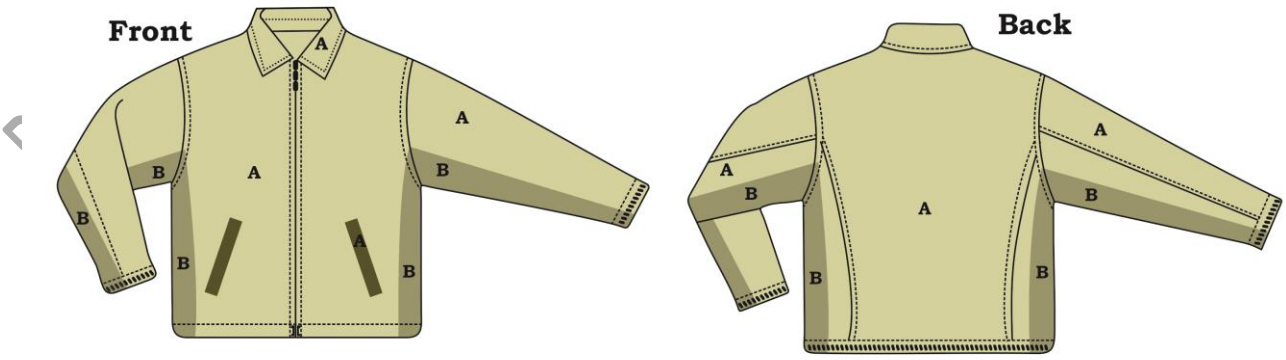


Fig.:3.9 Zone wise inspection of Bomber Jacket

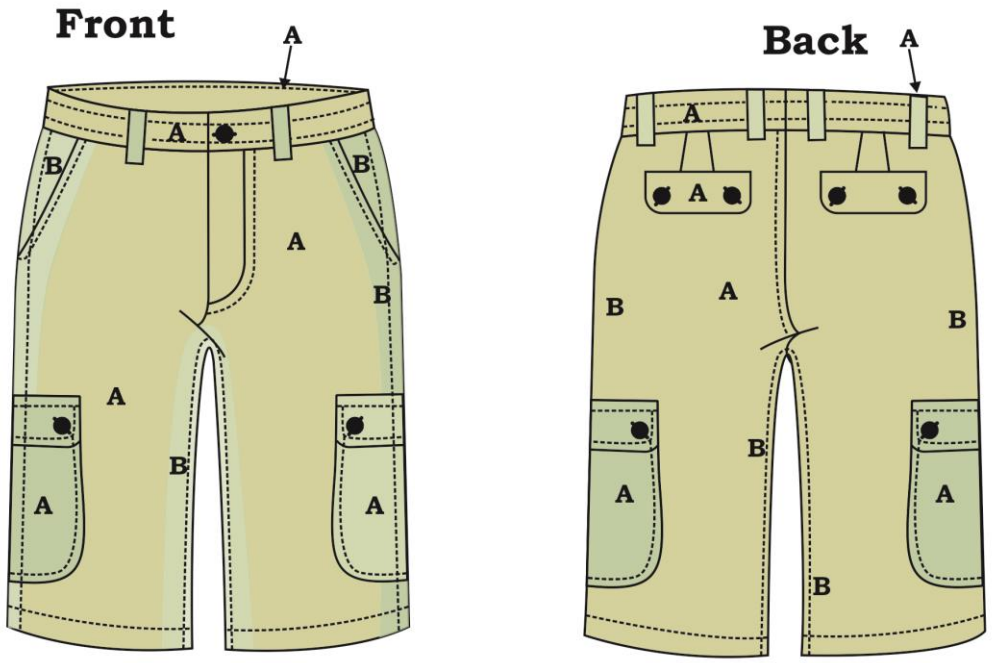


Fig.:3.10 Zone wise inspection of Shorts

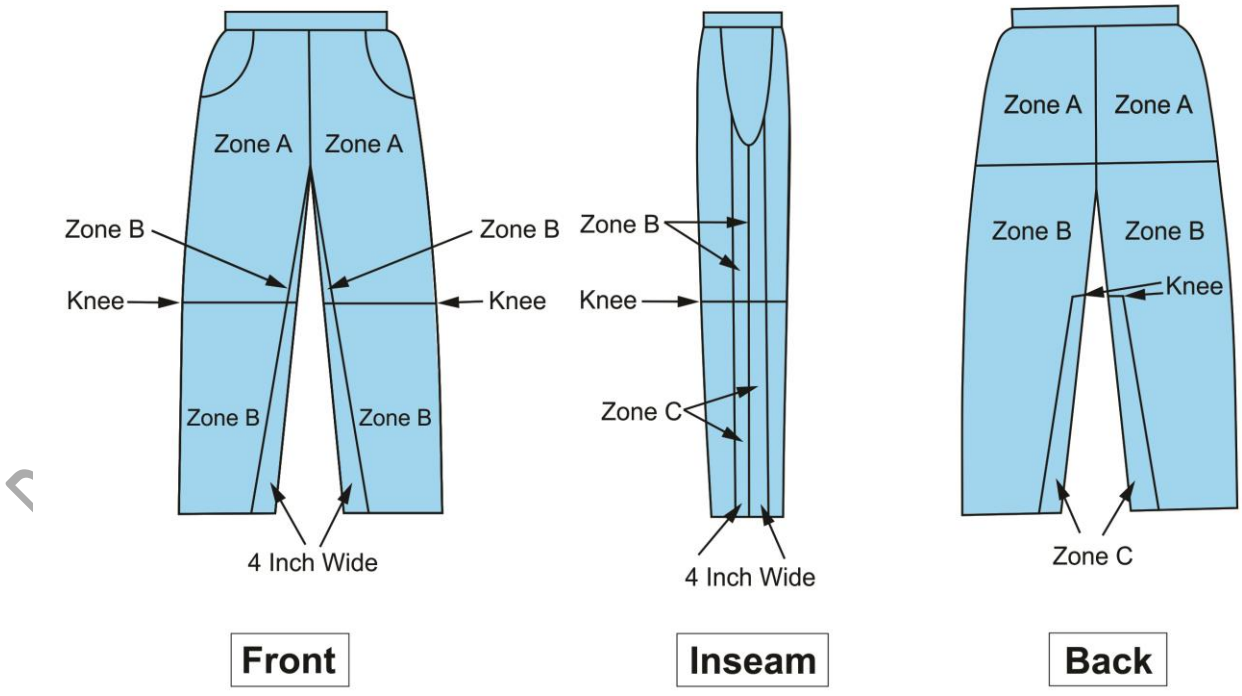


Fig.:3.11 Zone wise inspection of Pants

Activities

Activity 1: Inspect a garment visually and identify the zones.

Materials required:

1. Measuring tape
2. Specification and instruction sheet
3. Various garment samples

Procedure:

1. Visit a garment manufacturing unit and identify different garment samples.
2. Ask for specification and instruction sheet for inspection.
3. Based on your knowledge inspect the garment and identify the zones.
4. Report the inspection in reporting format.

Check Your Progress

A. Fill in the blanks:

1. Inspection Machine runs at the speed of _____ meters per minute and should have both forward and reverse controls.
2. _____ measure operator's performance level in quality.
3. While creating garment specification sheet, _____ is given for all measurements to avoid margin of error.
4. Initial apparel visual inspection goal is to _____and _____ first-quality pieces.

B. Long answer questions:

1. What is visual inspection? Enlist its importance in garment quality control.
2. How traffic light system improves the quality of the products?
3. Write down the methods of inspecting the garment parts visually for quality conformance?

Session 4: Reporting Problems to Concerned Authority

For in-line checker it is extremely important to report the problems to the right person so that the right decision can be taken to rectify the issue. Reporting the problem also provides a way to potential problems. Reporting is very crucial, any delay on reporting can very easily have the knock on effect on the further quality of garment production and manufacturing. Reporting problems will help the authority's / line manager to go deeper and dig down more about defects generation with the information inline checker has provided. Based on the report the reasons of defect can be tracked and stopped from rescoring it.

It is extremely important for an in-line checker to communicate problems to the right person so that the right decision can be made to fix the problem. Reporting a problem also opens the door to understand potential problems. Accountability is very important. Any delay in reporting can very easily affect the further quality of production and production of garments. Reporting issues will help the manager / line manager to gain a deeper understanding of the occurrence of defects using the information provided by the built-in validator. Based on the report, you can track the causes of the malfunction and prohibit its recovery.

REPORTING GARMENT DEFECTS TO AUTHORITY

In garment industry from raw material inspection to final product, inspection is perfectly carried out and at the same time report of garment defects or problems to authority is also very important. In many garment units the reporting system or formats are not properly maintained which is an essential action to followed that helps to take action and decision post inspection. Preparation of format for defect checking and reporting authority is preliminary.

The manager will expect in-line checker to report the issues if there are any. He would also like to see the examples. In-line checkers job is to highlight the potential problems and current problem. The in-line checker should fill the prescribe formats to document and report the problem to the manager. In-line checker should also orally report the problem to the manager.

An in-line checker reports all the in-line and related activities to supervisors i.e. who as at upper level in the hierarchy as per the organisational structure. A standard reporting format is used to report in-line activities such as in-line inspection. This format is either written/ oral and is followed for the reporting in the organisation. Once these problems are reported to

the authority necessary actions as stated by the authorities are taken by the in-line checker for the rectification of the defects identified.

The department-wise defects and their reporting authority is as follows:

S. No	Section / Unit / Department	Defects	Reporting Authority
1	Store Section	Trims Inventory	Store in-charge
2	Store Section	Trims inspection	Stores Quality inspector
3	Store Section	Fabrics Inventory	Fabric store in-charge
4	Store Section	Supplier packing list / Test report / invoice	Store in-charge / QC
5	Store Section	Fabric style/ Fabric shade / Fabric colour / Fabric shrinkage	Store in-charge / QC
6	Cutting Department	Fabric checking / Inspection	Cutting Department QC / QI
7	Cutting Department	Shade band and shade band list	Cutting Department QC / QI
8	Cutting Department	Continuity card	Cutting Department QC / QI
9	Cutting Department	Iron and Wash Shrinkage Test	Cutting Department QC / QI
10	Cutting Department	Fabric Spreading Quality (Cut numbers, Ends, Leaning, Tension, Narrow Goods, Remnants, Counts, Ply Height, Fabric Fault)	Cutting Department QC / QI

11	Cutting Department	Fabric cutting Quality (Number of parts, Miss cut, Ragged cutting, Notches, Matching plies)	Cutting Department QC / QI
12		Fabric cutting Process Quality (Fabric upside down, Fabric Skewing, Relaxation, The height of cutting pile, Numbering and bundling)	Cutting Department QC
13	Cutting Department	Marker maker checking (Marker length, width, Lay quantity, Style/ lot, Ratio, Individual parts measurements	Cutting Department QI /QC
14	Cutting Department	Checking of Pattern	Cutting Department QI
15	Cutting Department	Complete garment panel check	Cutting Department QI
16	Cutting Department	Bundle check	Cutting Department QI
17	Cutting Department	Fabric relaxation check – knit Fabric / spandex Fabric / mesh	Cutting Department QI
18	Cutting Department	Fabric relaxation Report – knit Fabric / spandex Fabric / mesh	Cutting Department QI
19	Fusing Department	Fusing report / record - Temperature, Time and Weight (Two times a day)	Fusing Operator
20	Fusing Department	Bonding strength checking by washing and machine	Fusing Operator

		(Two times a day)	
21	Fusing Department	Recording of Heat seal (Two times a day)	Fusing Operator
22	Sewing Department	Machine maintenance (Two times a day)	2 Hours QI
23	Sewing Department	In-process quality control system / 7.0 checking system or Traffic light inspection system	2 Hours QI
24	Sewing Department	Process checking - Process name, defect name, date, size, bundle	Process QI
25	Sewing Department	Stitch inspection and monitoring (Critical operations, Attaching of labels, Seam allowance, Numbering)	2 Hours QI /QC
26	Sewing Department	End line inspection at the output table by mentioning the process name and defect name	Output QI
27	Sewing Department	Measurement report of every three pieces	Line QC
28	Sewing Department	Box audit report (hourly audit, re-check m/b re-audit)	Line QC
29	Sewing Department	Inline inspection process control - daily one time, check QNTY20/32 pcs	Line QC
30	Sewing Department	Quality goal / Defect analysis - daily /weekly /monthly	Line QC
31	Sewing Department	First production review report along with sample and follow pp	Line QC

		comments	
32	Sewing Department	Weekly defects analysis report along with Corrective action plans	Line QC
33	Sewing Department	Monthly defects analysis report along with Corrective action plan	Line QC
34	Sewing Department	Root cause analysis with highest 3 operations and 3 defects	Line QC /QAM / GM production / GM operation
35	Sewing Department	Broken needle control log - line-wise and with all broken needles m/b put log book	Safety officer
36	Sewing Department	Flag defect record i.e. found defect operator - line-wise report	Maintain line chief
37	Finishing and Packing Department	Pull test (Two times a day)	2 Hours QI
38	Finishing and Packing Department	First button &last button procedure (each new bobbin insert the machine first button attached mockup)	Button QI
39	Finishing and Packing Department	Garments check by needle detector machine (PO wise)	Needle detector operator
40	Finishing and Packing Department	9 point check - check the machine every hour	Needle detector operator
41	Finishing and Packing Department	100% complete visual audit of buttons, snap buttons, eyelets, etc.	Button QI
42	Finishing and Packing Department	Process check inside inspection report	Process QI

43	Finishing and Packing Department	Process check top side inspection report	Process QI
44	Finishing and Packing Department	Flag defect record (found defect iron man)	Get up QI
45	Finishing and Packing Department	Get up check	Measurement QI
46	Finishing and Packing Department	Measurement (100% chest, back/front length, Waist, bottom, sleeve length, inseam, leg opening)	Hangtag QI
47	Finishing and Packing Department	UPC labels or hangtag.	Get up QI
48	Finishing and Packing Department	Re get up /ironing audit	Two hours QI
49	Finishing and Packing Department	Two hours of an audit with measurement	Carton QI
50	Finishing and Packing Department	100% Ratio check (put seal after complete carton)	Finishing QC
51	Finishing and Packing Department	Day final with measurement	Finishing QC
52	Finishing and Packing Department	Defects record either daily or weekly report	Finishing QC
53	Finishing and Packing Department	Reject register - mention the style, colour and size	Q AM
54	Finishing and Packing Department	Pre-final audit with carton number	Finishing in charge
55	Finishing and Packing Department	Carton weight and assortment check	Finishing QI

ASSISTING IN CARRYING OUT FOUNDATION INSPECTION SAFELY AND AT A RATE WHICH MAINTAINS WORK FLOW AND MEETS PRODUCTION TARGETS

An in-line checker plays an important role in achieving the production timelines. He assists the foundation quality checkers such as the fabric and accessories checkers in inspection the raw material. The in-line checker also assists the final inspectors in inspecting final produced garments. This helps the final inspectors to easily identify the problem areas.

In-line checker should also assist managers to carry basic inspection in a manner which results in appropriate quality of the garments within the deadlines. In-line checker should assist the following tasks:

- Specification sheets: The in-line checker must be able to understand the specifications provided by the company for a particular style of garment.
- Fabric Quality: In-line checker must assist the manager towards understanding and examining the fabric quality to make sure that the fabric quality is according to specific instructions. This will help the managers to understand the work progress and to prevent the issues if there are any.
- Various Inspections: An in-line checker has to carry out various types of inspections of a garment and different stages to make it sure that everything used is according to specifications.
- Wastage: In-line checker has to help the managers by ensuring minimum wastage of resources. Which will make the production process cost effective and sustainable.
- Documentation: An in-line checker must check the documents and maintain the documents of task allocation and compilation. They must also maintain documents for tools and equipment.

Activities

Activity 1: Demonstrate reporting problems encountered while in-line inspection.

Materials Required:

1. Reporting formats

Procedure:

1. Divide among your classmates in two groups namely the in-line checkers and supervisors.
2. Report the inspection of garment as performed in the previous session in prescribed formats and also demonstrate the reporting of such inspection orally to the supervisor group .

Check Your Progress

A. Fill in the blanks:

1. Based on the _____ reasons of defect can be tracked and stopped from rescoring it.
2. Causes of the malfunction can be tracked through _____.
3. In-line checkers job is to highlight the _____problems and _____ problem.

B. Long answer questions:

1. Briefly explain the importance of reporting problems.

Module 4	Maintain a Clean and Hazard Free Working Area

Module Overview

A clean workplace means more than just having a fresh surrounding area. Clean workplace encompasses various elements:

- Walking surfaces
- Light Fixtures
- Air quality

A clean and hazard free workplace ensures the safety and health of the employees and visitors. Clean walking surfaces, suitable footwear, and appropriate speed of walking are important to preventing falling accidently. Stairways and aisles that are clean and dry are also vital in reducing accidents and ensuring a safe workplace. Clean light fixtures improve lighting efficiency in the workplace. Good air quality greatly influences work environment as well as the health of the employees.

The negative effects of the unclean environment are as follows:

- A build-up of dust, lint, and grease can create breathing problems for everyone in the working area, resulting in asthma attacks, stuffy noses that may lead to serious health issues.
- A dirty work environment is breeding ground for various germs and allergens.
- Workstations, tools and equipment, machinery, materials, and the progressive bundling system of production systems are all poorly constructed, increasing the risk of musculoskeletal injury and stress-related disorders.
- Fire dangers are typically caused by overcrowding and incorrect storage of flammable goods.
- The significant health and safety risks are caused by bad sanitation and a lack of effective maintenance procedures.

Two most common ways to tackle it are:

- Use of disinfectants to prevent the spread of germs and microbes.
- Proper disposal of waste and recyclable materials keeps work areas clutter-free.

Therefore, the major health and safety concerns of the apparel industry are related to general conditions of the work environment.

Proper maintenance procedures are a must to ensure a clean and safe working environment.

Learning Outcomes
After completing this module, you will be able to: • Identify Importance of routine maintenance and its procedures • Explain how to Maintain cleanliness • Analyze handling of machinery, equipment and tools safely and correctly • Describe Effective oral and written communication at workplace

Module Structure	
Session-1	Importance of Routine Maintenance and its Procedures
Session-2	Maintaining Cleanliness
Session-3	Operation of Machinery, Equipment and Tools Safely and Correctly
Session-4	Effective Oral and Written Communication at Workplace

Session 1: Importance of Routine Maintenance and Its Procedures

MAINTENANCE PROCEDURES

Maintenance is defined as the group of systematic activities carried out to keep the machines or equipment in proper running condition.

Proper working condition of machines is a must to produce good quality products in time. Therefore, there is a need to establish a maintenance department in every factory to ensure timely production. Moreover, it is required to document the process and procedures for assistance of auditor.

Good maintenance includes the regular upkeep of material, equipment, machinery and good housekeeping, e.g. trolleys are used extensively throughout the industry and play a major part in reducing manual handling. Systematic cleaning and maintenance of wheels ensure that risks of injury are minimized. Clean floors benefit by ensuring ease of movement

THE IMPORTANCE OF RUNNING MAINTENANCE

Running maintenance means routine maintenance, inspection and servicing of machines and systems to ensure smooth functioning and efficient production. Running maintenance also means routine maintenance irrespective of presence of problem in any of the machines or systems.

The major reasons for running maintenance are as follows:

1. To increase the life and productivity of machinery, equipment and tools.
2. To avoid delays in production due to malfunctioning of machines
3. To ensure better or superior quality for the product.
4. To control and reduce the wastage.

Effective maintenance program plays an important role in the manufacturing processes. The importance of running maintenance can be understood from following points:

- It effectively reduces waste and run an efficient and continuous manufacturing / service operation.
- The cost of routine maintenance is very less than the cost of repair of a major breakdown.
- Daily inspections, cleaning, lubrication and minor adjustments can be detected and corrected before they become a major problem and may result in complete shut-down of a production line.

The running maintenance is one of the three maintenance systems present in apparel industry. The maintenance systems are as follows:

Fig.: 4.1- Types of Maintenance Systems

a. Breakdown Maintenance

Breakdown Maintenance is the repair process carried out after the equipment stops functioning.

Machine breakdown time should be recorded and tracked to see mechanic performance. It is carried out only when evident problems occur. These are unpredictable type of maintenance and difficult to schedule. The equipment is either repaired or replaced. They are important because machine breakdown time is considered as loss time in garments manufacturing.

b. Preventive Maintenance

Preventive maintenance is periodical and timely inspection which includes daily, weekly, monthly based cleaning, inspection, equipment condition diagnosis, oiling and alignment, and servicing activities.

Maintenance team carries out preventive maintenance as per their maintenance schedule.

c. Routine Maintenance

Routine maintenance consists of periodical and timely inspection, servicing, lubrication and cleaning of the equipments. It might also involve replacing certain parts to prevent sudden failure and avoid problems to ensure un-interrupted working condition of all machines.

SAFETY PRACTICES

The maintenance systems are inadequate to ensure safe and clean working environment until they are complemented by the various safety practices. Presence of hot steamers, electrical equipment, and sharp tools and devices combined with the busy schedule make it important to work carefully and pay constant attention to safety practices. The various safety practices are as follows:

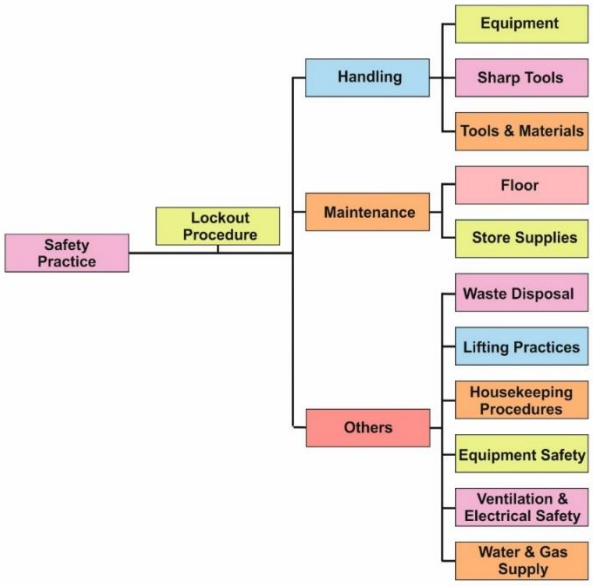


Fig.: 4.2Safety Practices

1. Lock-out procedures

Locking out a machine means disconnection of the power feeding the machine.

The designated person carrying out the maintenance or repair is in charge of the key to the lock of power supply. Before turning the power off, this person ensures the work on the machine has been completed.

The person in charge reports early before the shift timings and removes the power lock of all the machines. This allows the power supply to make machine functional again. It is the duty of the person in charge to lock the machines during the lunch and tea breaks.

To safeguard the key, lock-out poster or signage must be posted near the equipment, so that no one can accidently restore power without the person in charge's knowledge.

The steps listed below must be followed before repairs or maintenance is carried out.

Steps of Lockout Procedure:

1. Notify all workers on duty about the lockout and the reason for it.
2. If the equipment is operating, switch it off.
3. The power cables must be unplugged. Grounding, repositioning, blocking, and bleeding down must all be used to dissipate or release stored energy in capacitors, springs, raised machine members, revolving fly wheels, hydraulic systems, and air, gas, steam, or water pressure.
4. Operate the push button or other usual working controls to guarantee that the equipment is not functional after ensuring that no workers are exposed and that the energy sources have been disconnected.
5. The equipment is now locked out.

Restoring Equipment to Service:

1. When the repair / maintenance job is completed and the equipment is ready for testing or normal service, a check of the equipment area is carried out to ensure that no one is exposed.
2. When equipment area is clear, all locks are removed. Power cables can be then reconnected.

2. Equipment handling

The points to be kept in mind while handling the equipment are as follows:

1. Do not use any machine if not trained to use.
2. Ensure the machine is switched off before cleaning or adjusting any machine.

3. Ensure fingers, hands, tools, etc., are away from moving parts. Please wait until machine fully stops.
4. Care must be taken while cleaning the cloth cutting and drilling machines. The steps followed are as follows:
    i. Pull the plug from switch board.
    ii. Do not touch the edge of the blade.
    iii. Clean the blade moving from the Centre towards the outer edge.
    iv. Clean the inside edge of the blade with a stick that has a cloth wrapped around one end.
5. Do not start a machine until the parts are locked in place and the attachments are securely fastened.
6. Use a wooden plunger (rather than hands) or other metallic tools to clean the machine.
7. Ensure awareness of the lock-out procedures that are to be followed before repairing or cleaning any machine.
8. Do not wear rings, large size wristwatch, bangles, or a tie while operating electrical power equipment.

3. Sharp tools Handling

The points to be kept in mind are as follows:

1. Use the right cutter or knife for the job.
2. Avoid close proximity to falling cutters or scissors. When a knife starts to fall, jump backward to get out of the way.
3. Always carry a cutters or scissors with the tip pointing downward, with the cutting edge turned away from the body.
4. Never talk while holding a cutters or scissors in the hand.
5. While cutting with any cutters or scissors, always cut away from the body.
6. Place cutters or scissors in drawers or in racks for proper storage.
7. Always use a sharp knife; it is much safer than a dull one.
8. Take a firm grip on a knife handle and always make sure that the handle is free of grease or any other slippery substance.

Fig.: 4.3 - Sharp tools

4. Tools & Materials handling:

The points to be kept in mind are as follows:

1. Use dry towels while handling hot openers, steamer covers/doors as wet cloth conducts heat more readily than dry cloth.
2. Avoid splashing grease on top of the range. Grease will ignite quickly, causing a fire. Do not throw water on a grease or fat fire. Use a foam based extinguisher or a wet towel.
3. Remove the lids of iron steamer or washers slowly. Lift the side of the lid that is away from operator so the steam does not rush out too quickly, causing burns to the hands or face.
4. One should Know the location of fire extinguishers; know how and when to operate them.

5. Floor Maintenance

The points to be kept in mind are as follows:

1. Wet floors are dangerous. Keep them dry.
2. Wipe out any spilled water or other similar liquids immediately.
3. Walk. Do not run or slide across the floor.
4. Never leave tools and rags on the floor.

5. Keep all path areas clear of boxes, garbage cans, portable equipment, mops and brooms, etc.
6. Using rubber mats behind the range is a good practice. Mats must be kept in good condition by daily cleaning.

6. Store supplies Safety and Maintenance

The points to be kept in mind are as follows:

1. Always store heavy materials on bottom shelves, medium-weight materials next and light-weight items on top shelves.
2. Clean all dirt, grease, and trash daily to reduce fire hazards and to eliminate breeding places for rats and cockroaches.
3. Use ladders, not boxes or chairs, to get things from high shelves.

7. Waste Disposal

The points to be kept in mind are as follows:

1. Place cloth and other scraps in proper containers.
2. Do not allow containers to overflow. Empty them before they are completely full.
3. Report broken or defective containers.
4. Wear gloves while disposing off expired washing chemicals or similar liquid trash.
5. Wash and sanitize hands properly
6. Push garbage down using a tamper or other tool. Do not push it down with hand or foot.

8. Lifting Practices

The points to be kept in mind are as follows:

1. Keep back straight, but not necessarily vertical. Have a firm grip on the object.
2. Keep the object close to the body.
3. Bend the knees before lifting.
4. Lift the object by pushing weights on legs.
5. Call for help to lift or move heavy boxes or containers.
6. Use of trolley is advisable for heavy objects.

9. Good housekeeping procedures

The points to be kept in mind are as follows:

1. Do not block exits.
2. Maintain a clean, dry, and grease-free work environment.
3. Maintain the condition of your steps and ladders.
4. Keep emergency equipment clean and unobstructed.
5. Ensure that all warning signs and labels are in good working order and are easily visible.

10. Equipment Safety

Extreme care should be taken while operating equipment. Before operating any tool or piece of equipment, one must be fully trained. Make sure that all guards are in place and function properly and that all electrical connections are properly made.

- Precautions taken while using equipment are,

1. Understand the correct operating procedures and safety precautions before operating the equipment.
2. Ensure that all guards are in place and functioning before any machine is started.
3. Report defective or unsafe equipment to a responsible individual to prevent serious injury.
4. Keep edge-cutting tools properly sharpened. Store the same in safety covers.
5. Use tools only for their intended use and make sure the size of the tool is right for the job.
6. Lock the machines before lubricating.
7. Do not wear loose clothing, jewelry, or keep long hair open may around machines which increase the risk of being caught in the machinery.
8. Approach the supervisor for any queries about a machine safety.

11. Ventilation systems

The environment in which the workers work should be free from smoke, fumes and steam. Industries should have ventilation equipment with suppression systems to release fresh air.

Many industries use emergency shutdown systems or “panic buttons.” These are installed so that a single switch can be used to turn off the power to a large number of pieces of equipment.

These devices are intended to be employed in the situation in which a person is electrocuted or becomes caught in a piece of machinery. In these conditions, quick action is required. The points to be kept in mind are:

- Hit the panic button.
- Locate and learn how to use the emergency shutdown.

12. Electrical safety

The points to be kept in mind are as follows:

- As human body is sensitive to relatively small values of current, worker can receive a shock or burn from any common electrical circuit.
- Worker should be made aware of the location of the main panel or sub-panels being used, and learn how to shut them off in case of an emergency. Notify the supervisor right away.
- Obtain permission from the electrician before using a new service.
- Electrical extension cords, if they need to be used, should be orderly and not allowed to become tangled. Such cords should be taped to the floor whenever possible as this will reduce the chance of someone tripping over them

13. Water supply

If a pipe breaks or bursts, the water may damage material, tools, and equipment or work already done. In addition, water may create an electrical hazard if it comes in contact with electrical panels or outlets. Locate water shut off point of the industry, shut the water off and notify supervisor at once.

14. Gas supply

Escaping gas can cause an explosion that could injure anybody or cause severe damage. When the valve handle is running parallel with the gas line, the supply of gas is flowing and on. Locate the gas shutoff in the industry, shut the gas off and notify supervisor immediately.

CARRY OUT RUNNING MAINTENANCE WITHIN AGREED SCHEDULES

Maintenance is the action to retain, fix or restore an item in a state where it can perform its required function by the combination of all technical administrative, managerial and supervision actions.

The maintenance strategy has a significant impact on the industry's bottom line, but many maintenance managers have trouble selecting an appropriate strategy or overlook their approach altogether. Benefits of optimizing maintenance strategy include extending asset life, reducing asset failures and downtime, minimizing repair costs, and improving health and safety.

It's important to follow agreed schedules to maintain the assets properly and ensure that they remain in working order. Cutting, sewing, washing, ironing, folding, packing and finishing machines are important for the production of garments. So it is necessary to keep them in the best operating condition at economical cost.

1. Maintenance department activities in garment industry

The maintenance department is mainly responsible to look after the machines and other production equipment in proper working condition and take corrective action against any environmental pollution

a. Functions of Maintenance Department

1. Inspection of all machines and other machinery in the industry, repairing and up gradation.
2. Maintaining and ensuring continuous power supply in the factory.
3. Maintaining the water plant, compressors, air conditioning systems, Generators and boiler.
4. Planning, design and implement any kind of expansion of the industry.
5. Purchase of new machinery.
6. Issuing of different spare parts and accessories according to the production requirement.
7. Housekeeping.

2. Responsibilities of machine mechanic

a. Daily basis work of machine mechanic

1. Check machine setting correct or not
2. Check oil level and oil leaks of the machine
3. Check un-usual noise of the machine
4. Check safety equipment
5. Check machine allocation
6. Check production plan
7. Check for any loose nuts or bolts.

b. Monthly basis work of machine mechanic

1. Cleaning of whole machine by opening parts
2. Check back/ front cover

3. Check Oil lubrication, Oil level/ oil filter condition
4. Check functioning of machine
5. Check condition of Machine table
6. Cleaning and blowing
7. Check Power on/ off switch
8. Check Motor and control box condition
9. Observe abnormal sound Connections

3. Machinery maintenance schedule and procedure

a. Daily maintenance

If a machine breaks down during its operation, floor mechanics are called in to repair it. If this is not achievable in a reasonable amount of time, the machine is relocated to the maintenance room and replaced by another machine, with the appropriate steps done to repair it. The daily record of maintenance work is kept in a systematic format. Following are few of the maintenance work which are conducted daily.

Activities carried out daily:

1. Check speed and working of the machine.
2. Complete cleaning of the machine.
3. Check un-usual noise of the machine.

Activities carried out every four hours:

- Check for oil leaks.
- Clean machine parts.

b. Monthly maintenance

It is a preventive maintenance to reduce machinery problem and increase machine life, execute as per predetermined schedule fixed at the starting of the year by regular basis. This maintenance program covers total servicing of the all machine, oil change, oil filter change, or change of any defective parts. Records of monthly maintenance works must be kept in specified format.

HAZARDS LIKELY TO BE ENCOUNTERED WHEN CONDUCTING ROUTINE MAINTENANCE

Regular maintenance is essential to keep equipment, machines and the work environment safe and reliable. Maintenance workers are more likely to be exposed to various hazards.

Potential hazards could be:

A. Dangerous substances,

B. Confined spaces,

C. Working at height,

D. Awkward positions,

E. Plant under pressure,

F. Moving parts of machinery,

G. Unexpected start-ups,

H. Chemical substances or dust in the air, etc.

Insufficient maintenance can result in unsafe circumstances, accidents, and health issues. Working alongside a running operation and in close proximity to machinery makes maintenance a high-risk activity with distinct dangers and risks.

In contrast to regular operation, direct contact between the worker and the machine cannot be decreased significantly in maintenance activities, where workers must be in close proximity to the processes.

Maintenance activities are critical for the health and safety of maintenance staff. They may also be critical for others, in particular, for the equipment users or the production operators.

According to the relationships between maintenance and production, some accidents can be traced back to maintenance failures, such as insufficient, inappropriate, or late maintenance. For example, if maintenance is not performed on a regular basis, the equipment or installation can become dangerous to maintenance and production personnel. Other accidents may result from the co-activity of the two types of operators for example repair without interrupting operation.

Maintenance operations include both disassembly and reassembly, often involving complicated machinery and working at height. These can be associated with a greater risk of human error, increasing the accident risk.

Maintenance often involves unusual work, non-routine tasks and it is often performed in exceptional conditions, such as working in confined spaces. Working in confined spaces may expose workers to risks, which are:

1. Exposure to harmful gas, fumes, vapours or lack of oxygen
2. Risk of drowning in water or free-flowing solids

3. Risk of getting injured due to fire or explosion.
4. Risk of getting burned by high temperature machines

The hazards are commonly grouped as physical, chemical, biological and psychosocial. The hazards may vary significantly between planned, preventive and repair or corrective maintenance tasks.

- Type of hazards are as follows:

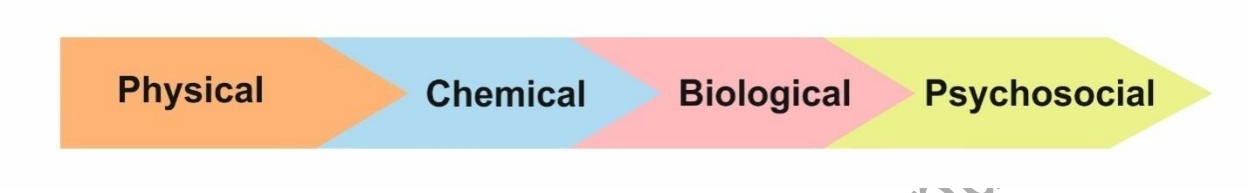


Fig.: 4.4 – Types of Hazards

1. Physical Hazard
   a. Mechanical movement - rotating elements e.g. flywheels, compressed springs, unexpected start-ups e.g. blockages cleared, trapped air in lines operating valves, restoration of power, computerized auto-start, failure of sub-standard parts and sewing machines
   b. Electrical - capacitors; high voltage; static
   c. Hydraulics - high pressure fluids
   d. Pneumatic - high pressure steam, gases, vapors
   e. Engulfment - oxygen deficient atmospheres
   f. Fire/explosion - extreme heat/cold, noise, vibration
   g. Work at Height – visibility, loading, unloading, etc.

2. Chemical Hazards
   a. Dusts and fibres e.g. heavily starched fabric materials, accumulated polluted air within production line, fibre/fabric dust and tiny fabric rags.
   b. Dangerous substances e.g. chlorine, oxygen, hydrogen
   c. Toxic, oxidizing, explosive, flammable, corrosive
   d. Hydraulic fluids, oils, acids, alkalis, organic solvents

3. Biological Hazards
   a. Pathogenic bacteria, viruses, parasites, insects, moulds and fungi.

4. Psychosocial Hazards
    a. Time pressure, long hours, shift work
    b. Poor work organisation, unsocial working hours

Activities

ACTIVITY 1

Visit a Garment manufacturing firm, discuss with maintenance team and prepare a report on various types of maintenance conducted by them.

Materials Required:

1. Writing material
2. Ruler
3. Adhesive

Procedure:

1. Make a group of 4 students each.
2. Visit a garment manufacturing firm
3. Enquire about its maintenance activities.
4. Prepare a report of your observation with pictures.
5. Submit the report to the teacher for evaluation and feedback.

Check Your Progress

A. Fill in the Blanks:

1. A clean and hazard free workplace ensures the _____and health of the employees and visitors.
2. Overcrowding, together with improper storage of flammable materials, frequently creates serious _____hazards.
3. _____maintenance means routine maintenance, inspection and servicing of machines and systems to ensure smooth functioning and efficient production.
4. Locking out a machine means _____of the power feeding the machine.
5. The environment in which the workers work should be free from _____and steam.

B. Write short answers for the following:

1. What is maintenance? Briefly explain running maintenance.
2. What are hazards? Enlist different types of hazards.

C. Write long answers for the following:

1. Briefly explain activities of maintenance department.
2. What are the types of running maintenance?

Session 2: Maintaining Cleanliness

Maintaining clean and organized premises is one of the biggest struggles of the job. Keeping the machines in the production line clean and in perfect working order and the aisles of work area free of debris with the minimum of effort is very essential. It requires a bit of effort and forward planning which can pay back several times with increased productivity.

THE BENEFITS OF MAINTAINING CLEANLINESS

Working environment that is clean, safe, and efficient, motivates employees to take pleasure in their work. A place when clean also helps to make place look more organised and contributes to worker's efficiency.

COMPLIANCE WITH HEALTH AND SAFETY REGULATIONS /GUIDELINES

Section 11 of The Factories Act, 1948 suggests "Every factory shall be kept clean and free from effluvia arising from any drain, privy or other nuisance."

Whereas Section 12 advise that effective provisions should be established in every factory for the treatment of wastes and effluents resulting from the industrial process carried out therein, so that they can be rendered harmless and disposed of.

Section 13 specifies that effective and acceptable provisions should be provided in every factory for securing and maintaining enough ventilation via the circulation of fresh air, as well as such a temperature as will provide reasonable conditions of comfort to workers and prevent danger to health.

Section 14 suggest how dust and fumes to be handled in a factory as- Every factory where, as a result of the manufacturing process, dust, fumes, or other contaminants of such a nature and to such an amount as to be hurtful or objectionable to the employees employed within are released.

CLEANING PRACTICES

The types of work perform in the industry premises will determine how frequently it needs to be cleaned, but one should perform two kinds of cleaning schedule- deep and regular cleaning.

1. Deep cleaning

Over time, the floor of industry gets dirty; dust and grunge also gets accumulated on equipment, which can affect productivity. In this case machinery needs to be cleaned deeply. Time required in cleaning depends on what kind of work is performed, and may be different for each section of the production processes.

Deep cleaning of working area takes several hours to clean surface, tools and machines, using heavy duty cleaning equipment.

To perform the deep clean, each cleaning / housekeeping staff should be assigned an area of the premises, in order to ensure accountability. Each housekeeping staff should then be provided with the equipment and supplies they need to thoroughly clean everything in their designated area. They should be provided training to use any special cleaning equipment if they require. One should schedule the deep clean during a slow production period or a non-working day, so that there won't be any loss of productive work hours.

2. Regular cleaning

A messy work environment doesn't reflect well on the business and may have an impact on work quality and production speed.

Frequency of performing regular cleaning depends majorly on two factors, which are:

i. Type of work performed in the industry

ii. Frequency of visit of clients and suppliers in the working area.

Following are the suggestion for Regular cleaning activities:

1. Employees should be instructed to clean up any spills, debris, rubbish, etc. as they appear to prevent them from causing any sort of health / safety hazards.
2. Providing employees with a buffer time of around 5 minutes, at the end of every shift, to get their workspace clean and tidy so the next person can use it straight away.
3. Providing employees with the suitable cleaning equipment and supplies like cloth, dustpan, brush, paper towels, etc. to clean up any spills and messes on their own.
4. Management should ensure the presence of waste and recycling bins at each work station. Management should also encourage the staff to dispose of waste as soon as it appears rather than leaving it to build up. They should also set up a rotation for emptying the waste bins so they don't overflow and become a hazard themselves.

5. Equipment not used regularly, should be kept covered and cleaned once a week, to prevent dust accumulation which may potentially affect its performance.
6. Management should invest in cleaning equipment because it helps in making regular cleaning routines easier, faster and efficient as possible.
7. Make an inventory of every item that needs to be cleaned in the industry that could help the staff to clean it more efficiently.
8. A regular cleaning routine chart can also be maintained by the management to keep a track of cleaning schedules.

DIFFERENT TYPES OF CLEANING EQUIPMENT, SUBSTANCES AND THEIR USE

A variety of necessary and vital cleaning equipment and substancesaredesigned and available in various colours, materials, mechanisms, shapes, sizes and styles to meet a cleaning need. They are used to clean easily, effectively and efficiently.

Types and uses of cleaning equipment:

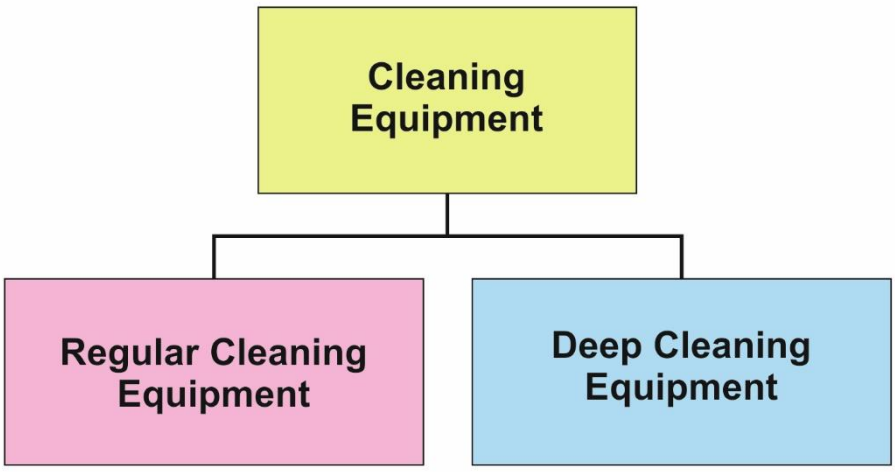


Fig.: 4.5 - Types of Cleaning Equipment

1. Regular Cleaning Equipments

1. Broom – It is a cleaning equipment made of bundle of straws or twigs attached to a long handle used to sweep the floor area.
2. Dustpan- A cleaning tool used to scoop the dirt and wastes from the . floor.
3. Water Hoses – It is used to supply the water in washing, toilets and other cleaning units.

4. Bucket and mug - To carry water or any other cleaning substances within the premises area and to clean the work areas.

5. Scrubber - A scrubber is a type of wide brush with a long shaft used for cleaning hard floors or surfaces. At the end of shaft attached soft bristles to sweep dirt away and hard bristles for brushing. It may be used wet, with water or cleaning fluids. There may also be a detachable mechanism to fix mop cloth, either soaked in water for cleaning or dry for wiping dry surfaces.

6. Dust cloth – Dust cloth is used to clean all fine dust build up on any surface.

7. Sponge - A sponge is a soft, porous cleaning device that is used to clean impermeable surfaces. Sponges excel in absorbing water and other water-based solutions.

8. Tissue paper- Tissue is a type of absorbent and disposable paper. They can be used for the same things as regular towels: drying hands, wiping windows and other surfaces, dusting, and cleaning up spills. They're commonly found in public restrooms, where paper towels are thought to be more hygienic than hot-air hand dryers.

2. Deep Cleaning Equipments

1. Spray cum vacuum suctioning cleaner– Cleaning is done automatically. It is used in professional cleaning to apply a pressured, diluted cleaning solution to filthy or contaminated surfaces, followed by vacuum suctioning to remove the applied liquid, as well as the suspended solids and dissolved pollutants.

2. A floor scrubber – It is a floor cleaning device that cleans bigger areas by injecting water with cleaning solution, scraping, and removing the residue off the floor as a floor mop or floor brush.

3. Auto floor scrubber – Auto floor scrubbers are used to scrub a floor, clean of light debris, dust, oil, grease or other marks on floor. These machines have an automated system for dispensing cleaning solution and then vacuuming it up.

4. Washing machine - For bulk washing, the industry uses a high- capacity washing machine. For washing a smaller number of garments and sample pieces, the domestic washing machine is used for removing dirt of soiled mop clothes and other materials.

5. Vacuum washer - A wash-head of a vacuum washer sprays water without detergent and quickly suctions it out, generating a swirl of water. The drying

time is substantially reduced by instantly reabsorbing the wash water. This cleaning approach is appropriate for both intermediate and basic cleaning. The technique works on all water-resistant surfaces, such as carpet, upholstered furniture, wooden floors, stone, plastics, and so on.

6. Vacuum cleaner - Both scrap and dust vacuum cleaners are used to clean all production line floors to remove the scraps and dust quickly to keep the working area clean and tidy.

Cleaning substances

Cleaning substances are hard-surface cleaners available in the form of liquids, powders, sprays, or granules and are used to remove dirt, including dust, stains, bad smells and clutter on surfaces. Purposes of cleaning agents include health, beauty, removing offensive odor and avoiding the spread of dirt and contaminants of work areas.

Disinfectants are cleaning agents that can kill bacteria or other microbes on surface of commonly used items like door handles, working tables etc. Other cleaning substance is degreaser which contain organic solvents and help to dissolve oils and fats.

a. Types of cleaning substances are:

1. Detergents

Detergents contain significant quantities of a group of chemicals known as 'Surfactants' They are similar to soap but are more soluble in hard water. It works by breaking up dirt or soil, making it easy to wash it away. Detergents are commonly available as powders or concentrated solutions. Detergents are also foaming agents of varying degrees.

2. Degreasers

Degreaser is used to remove grease from surface such as machine tops, counters and grill backsplashes. Methylated spirits or white spirit is commonly used for degreasing. It usually consists of strong alkalis, which can dissolve proteins and disperse grease or similar substances. It is generally based on caustic soda or sodium metasilicate. Sodium carbonate is also used as stain remover and for clearing blocked drains, cleaning all types of washers and other industrial equipment.

3. Abrasives

Abrasives are chemicals used to clean dirt from hard surfaces. In commercial industries abrasives are used to clean floors, pots and pans. The

cleaning action of abrasives depends on the presence of fine particles which when rubbed over a soiled hard surface, dislodges the soil, remove tarnishing and surface scratches.

The various types of Abrasives are as follows:

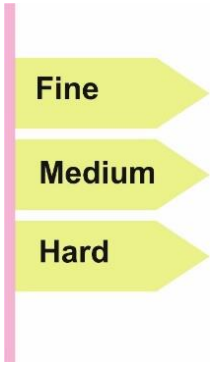


Fig.: 4.6 - Types Of Abrasives

Fine abrasives are preferred over coarser ones. For example nylon pads, powdered pumice, feldspar, fine ash, filtered chalk, etc. are available in liquid, paste or powdered form.

Examples of Medium abrasives include rottenstone, salt, scouring powder and scouring paste. Scouring powders are made up of fine particles of pumice mixed with soap/ detergent, alkali and bleach.

Examples of Hard /coarse abrasives include bath bricks, sandpaper, powdered pumice, steel wool and emery paper. Abrasives are used along with other substances such as bleaches, anionic surfactants, alkaline builders and perfumes.

4. Acids

Acid cleaners are used to remove mineral deposits and for descaling or removing rust from any surfaces. Often, surfactants and corrosion inhibitors are also added to the acid. Acids dissolve metals and are thus used to remove metal stains, stains from deposits around taps, and tarnish on copper and brass, among other things.

Vinegar can also be used to clean hard surfaces and remove Calcium deposits.

a. Acidic drain cleaners use sulphuric acid to unblock clogged pipes by dissolving greases, proteins and even carbohydrate-containing substances such as toilet tissue.

b. Hydrochloric acid (HCL) is a common mineral acid. Stubborn hard-water deposits are removed by concentrated HCL. **DiluteHCL** is used for removing stubborn scales and deposits from sanitary ware.

c. To remove tarnish and stains from metals such as copper and brass, acetic acid is used.

d. Toilet cleansers use their acid content to clean and sanitise the W/C pan while also removing metal stains. They come in a variety of forms, including crystalline, powdered, and liquid.

- Powder toilet cleaners are in the form of solid salts, such as Sodium Hydrogen Sulphate.
- Liquid toilet cleaners contain other acids like dilute hydrochloric, phosphoric or formic acid.

These acids can convert the calcium carbonate into salts that are soluble in water and can easily be rinsed away. The toilet brush is used to scrub the toilet, remove stubborn stains and biological debris.

5. Alkalis

These are used in the form of liquid and powders. Many alkalis have bleaching properties. Alkaline cleaning chemicals include bleach and ammonia. These are dispersants that keep dissolved dirt and rust from resettling.

Caustic alkalis are very strong alkalis. Cleaning products based on caustic soda are used to unclog drains and clean industrial equipment. Fats, such as grease, oils, and protein-based compounds, can be dissolved by alkaline cleaners. Strong bases, such as sodium hydroxide or potassium hydroxide, are found in cleaning products.

6. Neutral

Non-ionic surfactants are used in neutral washing products to disperse various types of dirt. Water is the most popular cleaning agent that, even when used alone, can dissolve some type of dirt. It becomes more effective when combined with additional cleaning agents, such as a detergent.

Water is used to carry the cleaning materials to the soil, suspend the soil, remove the suspended soil from the cleaning site and rinse the detergent solution from the surface.

7. Organic Solvents

These are substances that dissolve fats, oils, grease, wax, and other similar substances. Methylated spirit, white spirit (turpentine replacement), carbon tetrachloride, and other kinds of alcohol such as isopropyl alcohol and rubbing alcohol are all examples of organic solvents. The first two are extremely flammable, whereas carbon tetrachloride is toxic if inhaled and should never be used in a confined space. Many of them are commonly used to remove stains. They are irritating to the skin and might cause fires.

8. Other Cleansing Agents

1. Polishes

They smooth out the unevenness of the article's surface by applying a thin coating of wax on it. On the surface, it also serves as a protective layer.

a. Metal polishes - They come in the form of a liquid or a paste. Plate powder, mentholated spirit, and Ammonia are examples of fine abrasives waxed with grease solvent and occasionally with an acid. When abrasive is rubbed on the metal's surface, friction is created, which removes tarnish and produces a shine.

b. Floor polishes – Spirit-based polishes, which come in paste or liquid form, may contain Silicon. It is suitable for wood, cork, linoleum, and magnesite floors. Water-based polishes are emulsions made up of fine natural and synthetic wax particles mixed in water. They can be used on thermoplastic, rubber, PVC, asphalt, and combination floors, as well as wood, cork, magnesite, and linoleum that has been sealed.

2. Floor Seals

These are placed as a semi-permanent finish to flooring surfaces to act as a protective barrier against dirt, germs, fluids, grease, stains, and bacteria. They protect the surface from scratches and make it easy to clean.

3. Bleaches

Bleaches are alkaline stabilised sodium hypochlorite solutions that are excellent for cleaning stained sinks, W/C pans, and other surfaces. They contain germicidal and whitening effects. With oxidation, bleaches can break down the tough stains. Sodium perborate is a common ingredient in detergents for washing fabrics.

4. Disinfectants and De-odorants

Disinfectants, antiseptics, and deodorants are not cleaning agents, but they are frequently used in cleaning operations. With their fragrance characteristics, these help to keep rooms free of infections and fresh.

a. Air sanitizer – It is a disinfectant/sanitizer that is used to disinfect or sanitise inanimate surfaces in the institutional and/or commercial environment by limiting or moderating the growth or development of microbiological organisms such as bacteria, fungi, or viruses. Some glycol vapours, such as tri-ethylene glycol, can operate as an air sanitizer.

b. Deodorants – It can hide unpleasant odours by interacting chemically with the particle that causes the odour or by having its own scent dominate. Restrooms, guestrooms, guest bathrooms, store rooms, and public areas

such as lobbies all use them. Aerosol sprays, liquids, powders, and crystalline blocks are the most common forms.

c. Carbolic soap – It is also known as red soap, and is a mildly antiseptic soap that contains carbolic acid and/or cresylic acid, both of which are phenols and is derived from coal tar or petroleum. Carbolic acid is a skin irritant that is utilised in a wide range of industrial and consumer products.

5. Glass Cleaners

Glass cleaner comes in sprays or liquid form and is made up of water-miscible solvents. It's frequently used with isopropyl alcohol, as well as modest amounts of surfactants and alkali, to boost the cleanser's polishing effect. It can be sprayed directly onto windows, mirrors, and other glass surfaces, or it can be applied with a soft cloth and then rubbed off with a soft, lint-free glass cloth.

6. Metal cleaners

Metal cleansers contain chelating agents, abrasives, and surfactants for cleaning stainless steel sinks, faucets, metal trim, silverware, and other ferrous metals. These agents include citric and phosphoric acids, which are nonaggressive. Stainless steel, nickel and chromium cleaners contain lactic, citric or phosphoric acid.

Nonferrous metal cleaners contain ammonia, ammonium oleate, stearate and chelating agents like ammonium citrate and oxalate.

7. Absorbents

They carry out the action by absorbing the stain or grease. They are used only when the quantity of strain is too much. e.g. starch powder, fuller's earth, bran, French chalk powder, etc.

8.Anti-mildew agent

The chemical which protect the fabric material and garments from mould and mildew namely zinc chloride. It is used in textile / garments store and industries.

9. All-purpose cleaners

All-purpose cleaners are usually concentrated solutions of surfactants and water softeners, which enhance the behaviour of surfactant when used with hard water. Common examples could be alkyl benzene sulfonates, anionic detergent and modified fatty alcohols.

SAFE WORKING PRACTICES FOR CLEANING AND THE METHOD OF CARRYING THEM OUT

Safe work practices are steps that guide a worker to perform a task with minimum risk to people, equipment, materials, environment and processes.

Safe working practices for cleaning are:

1. Understand the risks and hazards of the workplace during cleaning hours and take necessary steps to reduce risk of work-related injury.

2. Measures must be taken to ensure that cleaning operations can be carried out safely.

3. Use mechanical aids for cleaning, wherever possible.

4. Use ergonomically designed cleaning equipment, and re-arrange the work area so that everything is within easy reach.

5. Use necessary tools and personal protective equipment to carry out safe cleaning and maintenance

6. Wear protective equipment to suit the cleaning tasks. Gloves, full-face mask and apron can reduce risk of injury from concentrated cleaning substances and sharp equipment. Respirators may be used while cleaning filters.

Fig.: 4.7 – Personal Protective Equipments

7. Surrounding windows must have curtains or blinds which workers can adjust to prevent reflected glare during cleaning of production floors and machineries.

8. Humidity- It is important to maintain ventilation and humidity at a level which keeps the cleaner comfortable.

Methods for cleaning

It is the best practice to use a two or three-bucket system for mopping. This can be facilitated by using a cleaning cart or on a separate trolley, if a full cleaning cart is not available. The various methods and tools used in the cleaning process are as follows:

1) Two-bucket system – It is used for routine cleaning with one bucket containing a detergent or cleaning solution and the other with rinse water.

2) Three-bucket system- It is used to for disinfection. The detergent or cleaning solution is in one bucket, the rinse water is in another and the disinfection or disinfecting solution is in the third.

3) The rinse water bucket is used to rinse and wring out the mop before re-dipping it into the prepared solution. This extends the solution's useful life, saving both time and money.

The points to be kept in mind along to ensure proper cleaning are as follows:

1. Cleaning staff should be trained on appropriate use, application and removal of PPE for all environmental cleaning procedures and tasks for which they are responsible.
2. Put on all parts of PPE before entering a working area and remove it (for disposal or reprocessing, if reusable) before leaving that area.
3. Include required PPE for specific tasks in standard operating procedures and other visual job aids.
4. All PPE parts (reusable and disposable) should be available in sufficient quantity, well maintained (good quality, appropriately stored stocks) and clean before use.
5. Reprocess (i.e. clean and disinfect) all reusable PPE, at least once a day
6. Use reusable rubber gloves for cleaning.
7. To avoid interfering with gloves or affecting hand hygiene, keep sleeves at or above the elbow.
8. Wear rubber-soled closed toe shoes or boots (but not sandals), to prevent accidental injury.
9. Regularly reprocess all reusable items (i.e. thoroughly clean, disinfect, and dry).
10. Whenever a solution is changed, thoroughly clean, disinfect, and rinse equipment such as buckets and containers. To allow full drying, store them upside down.
11. Launder mop heads, floor cloths and soiled cleaning cloths at least once a day (e.g. at the end of the day) and allow them to fully dry before storage and reuse.

12. As directed by the manufacturer, reprocess all reusable materials and equipment in a separate area that is not used for other purposes.
13. Cleaning aids and products should be disinfected by thoroughly immersing them in boiling water or a disinfectant solution for the required contact time, then rinsing with clean water to eliminate any residue.
14. All reusable supplies and equipment should be kept clean and in good operating condition at all times. All reusable equipment should be evaluated on a regular basis and replaced or repaired as needed.

CARRYING OUT CLEANING ACCORDING TO SCHEDULES AND LIMITS OF RESPONSIBILITY

During the whole Garment production process, management should ensure that maintenance is coordinated, scheduled and performed correctly as per plan, and that the equipment or workplace is left in a safe condition for continued operation.

Environmental Cleaning guidelines deal with cleaning of the physical environment as it relates to the prevention and control of infections. Administrators, supervisors of housekeeping departments, infection prevention and control experts, construction/maintenance project supervisors, and public health officers are among those who fall into this category.

Cleaning according to schedule and responsibility

1. Written procedures for cleaning and disinfection of working areas and equipment should be followed.

- Defined responsibility for specific items and areas
- Clearly defined lines of accountability
- Procedures for daily and terminal cleaning
- Procedures for outbreak management
- Cleaning and disinfection standards
- Frequency of cleaning and disinfection.

2. Regular cleaning is necessary to maintain a standard of cleanliness.

3. Thorough and timely cleaning.

4. Monitoring of environmental cleanliness.

5. Ongoing review of cleaning procedures.

6. Cleaning schedules should be revised and developed, depending on:

- Surfaces of high-touch or low-touch items / equipment,
- The type of activity taking place in the area and the infection risk associated with it,
- The vulnerability of the cleaning staff working in the area.

7. Each health care facility should have written rules and procedures for proper cleaning that clearly identify the frequency and amount of cleaning, as well as the cleaning authority.

8. Institutions should have in place systems with regard to frequency of cleaning. They should periodically conduct audits to ensure a clean environment during working hours.

9. Cleaning audit results should be evaluated and analysed, and cleaning employees should be given feedback.

10. To detect and solve cleaning issues, an action plan should be developed.

11. Knowledge of Personal Protective Equipment (PPE), hand hygiene and safe work practices is required for every cleaning staff.

12. All chemical cleaners and disinfectants should be properly labelled and kept to reduce the danger of contamination, inhalation, skin contact, or bodily damage.

13. Develop a facility-level monitoring and maintenance schedule that clearly describes the items, inspection frequency, and responsible personnel. Certain equipment, such as floor cleaners, may require regular maintenance checks by qualified personnel, as directed by the manufacturer.

14. Prepare and keep a service record, and make it available to the cleaning programme manager for examination.

Storage of cleaning substances

Cleaning agents with a longer shelf life are bought in bulk because of the reduced costs.

Points to be considered for storage of cleaning substances are:

a. Storage racks should be strong enough to carry the weight of the items. Heavier containers must be kept on the bottom shelf.

b. The store-room should always be well lit, well ventilated and clean.

c. Ensure that the lids of the containers are tightly fitted.

d. While issuing cleaning substances, use appropriate dispensers and measuring apparatus.

b) Ensure that no residual deposits of the cleaning substance is left around the rims of the containers.

c) Spillage should be avoided. And if spill occurs, it should be cleaned immediately.

d) A systematic procedure should be followed for rotating stocks.

e) Organic solvents, strong reagents and polishes should be kept away from heat sources.

f) Stock check should be conducted at regular intervals.

g) Store should be locked when not in use.

Activities

ACTIVITY 1

Prepare a geographical poster on PPE kit for safety.

Materials Required:

1. Writing material
2. Ruler
3. Adhesive

Procedure:

1. Based on your understanding, prepare a graphical and interactive poster on PPE kit for safety.
2. Display the same in your class.

Check Your Progress

A. Fill in the Blanks:

1. Working environment that is clean, safe, and efficient, _____ employees to take pleasure in their work.
2. _____cleaning of working area takes several hours to clean surface, tools and machines, using heavy duty cleaning equipment.
3. _____are cleaning agents that can kill bacteria or other microbes on surface of commonly used items like door handles, working tables etc.
4. _____is used to remove grease from surface such as machine tops, counters and grill backsplashes.
5. _____cleaning is necessary to maintain a standard of cleanliness.

B. Write short answers for the following:

1. What are the benefits of maintaining cleanliness in apparel industry?
2. Describe various cleaning practices.

C. Write long answers for the following:

1. Briefly explain different types of cleaning substances.

Session 3: Operation of Machinery, Equipment and Tools Safely and Correctly

The most important concept to remember is that - one is responsible for one's own safety and the safety of others. Most safety practices are though very common, unfortunately can be forgotten or overlooked unless one makes safe practices a habit or an instinct.

GENERAL SAFETY

By following the right procedures, workers will commit themselves to safety on the job and with that everyone will be benefited. Accidents may occur in many ways but most often can be based on ignorance or carelessness.

Safety precautions to be followed in work area are as follows:

1. Walk instead of running - People who rush around in the work area tend to increase the likelihood of an accident.
2. Concentrate on work - Stay completely alert on the job. Lack of interest, personal problems, and distraction by others can all lead to serious accidents in the working area.
3. Understand all the rules for operating equipments. Never operate the equipment until trained
4. Never work under the influence of drugs or alcohol.
5. Pay attention to moving objects, such as equipment, cloth cutter and driller, trolleys etc.
6. Avoid back strain by lifting the materials in proper position.

Accidents are caused due to overlooking of situations involved with risk. They are the result of not knowing the proper way to do a task, carelessly performing an operation or job, or not being consciously aware during the performance of a task.

The most common accidents in the working area are as follows:

a. Cuts

Cuts are too common in the industry because cutter, needle and other cutting equipment and tools are constantly in use. These cuts, as well as the severity of the cuts, can be avoided by following the right safety standards and following proper cutting methods.

Accidental cuts can be prevented if the expertise of using a cutter has been mastered. If they do occur, however, they should be treated safely and promptly. If infection sets in, it can result in more serious consequences.

b. Burns

Two types of burns occur in the working area-

- Minor
- Major

Minor burns occur when an exposed body part comes into contact with a hot surface, such as a steamer, a hot air oven, or concentrated chemical compounds.

When grease and chemicals are spilled, steam is discharged too quickly, or gas is released unintentionally, major burns occur.

Burns are more painful and take longer to heal than cuts. If a blister forms as a result of the burn, it should be treated as soon as possible by skilled medical staff.

c. Falls

Falls can cause some of the most serious injuries in the commercial industry. They may disable or incapacitate a person for life.

Falls are caused by extreme carelessness, wet floors and aisles, spilled materials, rags, grease, and by torn mats or spread rags and floor boards.

d. Strains

Strains are very painful and can cost you a lot of time at work. They are caused by carrying excessively heavy loads and using inappropriate lifting techniques. The majority of strains do not require medical attention, but they do necessitate time and care in order to heal properly.

HANDLING MATERIALS, MACHINERY, EQUIPMENT AND TOOLS SAFELY AND CORRECTLY

Employers are legally required to ensure that all equipment and materials supplied and used for work purposes are safe and does not pose a long-term hazard or risk to employee's health. Employees must have sufficient knowledge and training to handle materials, machinery, equipment and tools safely.

Safe practices to handle machinery, equipment and tools are:

1. Worker should possess the required know how of machinery, equipment and tools used for the job.
2. Routine maintenance must be carried out for all machines, equipment and tools.
3. Inspection at regular intervals to avoid wear and tear that might compromise safety.

4. Proper inspection of machines before use if the equipment's safety depends on installation

5. Noise and vibration levels should be checked and should not affect the operator and others.

6. Use hand-held tools safely- Anyone who uses a hand-held tool might be at risk of injury.

7. Band knives can cause serious wounds unless effectively protected. The circular knife of portable cutting machines should also be similarly protected.

8. If power presses are used, adequate machinery guarding, preferably fixed, is necessary to keep hands out of the danger area. Guards which prevent the pressure head from coming in close contact (most importantly, the hand) comes within the area are to be used. All presses, with their steam and pneumatic supplies, must be frequently inspected.

9. The drive motors and the needle are the two most dangerous parts of a sewing machine. Long lines of machines are still driven by under bench shafting in several places. When workers bend under benches to grab goods or fix belts, many entanglement mishaps might occur, so it's vital that this shafting is effectively protected by enclosure or close railing. Several different types of needle guard, which keep fingers out of the area of risk, should be used.

10. Handling old equipment - Ensure that it is safely and properly handled, stored, transported and recovered or disposed-off. If the equipment contains hazardous components, follow additional requirements under hazardous waste legislation.

11. Personal Protective equipment -Workers in many activities may require special protective equipment at work like helmets, bump caps or hair nets for the head crash and climbing. Hearing protection should be worn if exposed to high noise levels. Safety glasses, goggles and face shields can also be used to prevent eye hazards. As a standard, everyone should wear safety spectacles, goggles and face shields while using hand or power tools. Other PPE types likes Safety boots or shoes, gloves, gauntlets, mitts, cuffs, armlets or elbow protectors, overalls, boiler suits, high visibility clothing, leggings and gaiters for different activities in production line are required. Cutting machine operators must wear a protective glove, preferably of metal mesh.

12. Amputation and Caught-in Hazards – Machine guards are mounted on machines to protect employees from moving parts. Every day, equipment should be checked carefully to confirm that all guards are in place.

13. Chemical Hazards – Chemical-processing equipment can be a source of a variety of risks. Leaks can result in slipping dangers and chemical exposure. Chemical-leaking hoses could cause respiratory

problems for workers working nearby. As a result, caution must be given when using such devices.

14. Sharp Edges – Walking very close to machinery area, may be hazardous if sharp edges are not guarded. Hence equipment mounting brackets, signages and control boxes should be checked regularly to see if sharp edges are present.

15. Ensure that all equipment are well maintained and checked regularly. All equipment should be removed from the platform, at the end of the working day, and all power supplies should also be switched off.

16. Risks caused by workplace equipment - Cutting equipment, forklift trucks, equipment using heat or bright light, can cause risks not just during the normal operation of the equipment but also during installation, maintenance, repairs, breakdowns and servicing. Hence, use of appropriate warning signs is advisable.

Tool safety

Workers should be taught how to use tools in a safe manner. When tools are misplaced or handled incorrectly by workers, they can be dangerous.

Following are some suggestions for safe handling of tools are:

a. Tools should never be tossed but should be properly passed from one employee to the next. Pointed tools should be passed with the handles facing the receiver or in their carrier.

b. Workers carrying large tools or equipment on their shoulders should pay particular attention to the workspace clearances.

c. Cutter and screwdrivers should never be carried in a worker's pocket. In a toolbox, pointed down in a tool belt / pocket tool bag, or in the hand with the tip always held away from the body are all acceptable ways to carry them.

d. Tools should always be put away, when not in use. Leaving tools on an elevated structure such as a scaffold, poses a significant risk to workers working below the elevated structure.

e. Fabric cutting tools - Cutting tool guard must be correctly set in order to give the necessary protection to the hand positioning the material, otherwise it may have a risk of accidental cuts. Supporting and maneuvering a cutting machine, while stretching across the cutting table, can present a risk of neck, upper-extremity and back disorders.

f. Handling rolls of fabric, which can weigh up to 32 kg and must be lifted above the head onto a rack for spreading, also poses muscular

hazards. Proper material-handling equipment can eliminate or reduce these risks.

g. Sewing machine operators who operate in a seated position at poorly built workstations, executing the same operation throughout the workday with highly repetitive, time-pressured work are at a significant risk of acquiring musculoskeletal disorders. It is necessary to take proper precautions.

h. Adjustable seats and worktables have the ability to reduce the dangers connected with using a sewing machine.

i. Finishing workers, such as pressers, are frequently required to work standing and in static positions. Many of these occupations can benefit from the addition of chairs, stools, or sit-stand chairs. With a slanted mechanism, table tops may be adjusted to the correct height for the operator, allowing them to work in a more comfortable position. Hands, wrists, and arms can be relieved of some stress by padded table edges and appropriately made and sized equipment.

j. Burns and ergonomic dangers can occur when using presses and irons. The majority of the presses are constructed with two-handed controls, which eliminates the risk of a hand becoming stuck in the press. Working on a pressing machine also puts you at risk for shoulder, neck, and back injuries due to repeated overhead reaching and standing while using the foot pedals. By properly situating the worker at the machine make this task safer and minimise the excessive stress.

k. Ticketers who use manual ticketing guns to place tags on finished garments, are at risk of hand and wrist injury with highly repetitive operations. Automatic ticketing guns can decrease the force required to perform the operation, hence reducing stress and strain on the operator's fingers and hands.

l. Many injuries in warehouse activities, such as lifting and overhead work, are caused by manual material handling. Mechanical material handling equipment such as forklifts and hoists, can reduce injuries caused by lifting heavy lifts. This can also be reduced by designing the distribution workplace with adequate material handling, such as positioning of conveyors and worktables at appropriate heights.

m. Chemical exposure - Workers at every stage of apparel production may be exposed to the chemicals used in fabric finishing, the most common is formaldehyde. Formaldehyde releases into the air from fabric in the form of a gas. Workers may also have skin exposure to formaldehyde as they handle the fabric. Exposure to formaldehyde can be prevented by allowing the fabric to blow off-gas in a well-ventilated area before it is handled. Workers must wear gloves or apply protective cream.

Instruction for Safety at work place are as follows:

1. Keep the work area clean, tidy, well swept/washed and well lit. Floor should be level and must have a non-slippery surface.
2. Do not remove any guarding device; before operating, the operator must ensure that guarding devices are in position and good working condition.
3. Before measuring, cleaning, maintaining, or adjusting the machinery, follow the lock-out procedures.
4. Check and adjust all safety devices before operation.
5. Wear appropriate personal protective gear as prescribed, including CSA-approved safety glasses with side shields.
6. Ensure that all cutting tools and blades are clean, sharp and rust free and should be able to cut freely without extra effort.
7. Ensure there is enough space around the machine for operator, maintenance team and cleaning staff to do their job freely.
8. Ensure that all stationary equipment /machines are anchored securely to the floor.
9. Maintain distance with the cutting head and all moving parts of the machine, to avoid any accident.
10. Avoid awkward positions and postures as sudden slips could cause the hand getting harmed by the cutting tool or blade.
11. Do not leave machines unattended: turn OFF the power, when not in use.
12. Avoid distracting the operator; horseplay can lead to hazard and injuries.
13. Wearing loose-fitting clothing, gloves, neckties, rings, bracelets, or other jewellery that could get tangled in moving parts is not a good idea. Long hair should be kept out of the way, and rags should not be used near the machine's moving parts.
14. Return all portable tools to their proper storage place after use.
15. Clean all tools after use.
16. Use a vacuum cleaner or a brush to remove any rag cuttings.
17. Do not use compressed air, to blow debris from machines or from worker's clothes.
18. Keep the tools out of the aisles and out of the way of other workers. Knives and scissors must be sharp; dull equipment pose a greater risk than sharp ones. Cracked saw blades must be removed from service immediately; else, an accident may occur.

19. In the presence of combustible substances, iron or steel hand tools may produce sparks, which could lead to an ignition. Spark-resistant instruments made of nonferrous materials should be used near flammable gases, highly volatile liquids, and other explosive chemicals wherever this hazard exists.

20. Because power tools can be exceedingly dangerous if handled incorrectly, they must be equipped with guards and safety switches. Electric, pneumatic, liquid fuel based, hydraulic, and powder-actuated power tools are classified according to their power source.

USE CORRECT LIFTING AND HANDLING PROCEDURES

Musculoskeletal problems often emerge from poor work place or job design. Among the most common risky activities are as follows:

- Heavy loads
- Difficulty in gripping
- Excessive use of force
- Repetition
- Twisting and other awkward postures.

Some of these problems can be prevented in following ways:

1. **Manual handling of fabric rolls often close to machinery**, e.g. lifting to and from store room, in storage and dispatch areas, shelves, racks, trolleys and stillage, in quality control areas, reduces the risk of hazard.

Fig.: 4.8 - Manual Handling of Fabric Rolls

a. Mechanical methods of handling the rolls, for e.g. on a conveyor and mounting on roller tracks.

b. Organize rolls according to weight, so that heavier rolls are stored at a convenient height for handling. Stackers with adjustable widths are ideal for lifting and lowering rolls in storage facilities. A roller track

attached to the top of two support arms allows rolls to be passed easily to and from storage racks. The height of the trolley, which is supported by wheels, may be simply modified using a foot pump. The trolley is especially designed for transporting and moving rolls in the confined spaces of cutting section.

c. Rolls exceeding a specific weight can be routed to a truck pick-up point for loading, while lighter rolls are diverted to a manual pick-up station, where personnel can pick up the roll before bringing it to the vehicle.

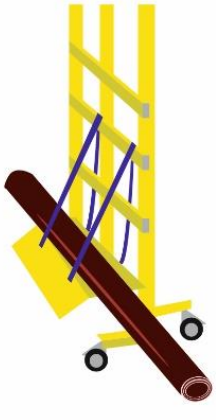


Fig.: 4.9 – Mechanical handling of fabric rolls

2. **Handling loosely folded cloth at intermediate stages of the production process,**e.g. moving cloth to or from machines, inspection and quality control areas, including lifting to or from weighing scales.

   A lightweight 'stretcher-board' can be utilised to reduce the distance through which the load is lifted as well as increase its stability and give a more uniform distribution of weight between two lifters. It also helps with grip and the ability to implement the proper force during the lift.

3. **Handling boxes** –It happens mainly in delivery and storage areas, loading and unloading from vehicles. Suspended overhead rail system allows the load to move freely within the storage area. Pneumatic grippers grasp the box securely and scales built into a roller conveyor to compensate for the weight of the load, allowing it to be moved with minimal effort. The device can be adapted to suit a range of different items and containers. Use of mechanized procedures reduces the risks.

4. **Lifting to and from bins, stillage, trolleys and machinery**- Trolley fitted with a self-leveling base can be used. As the material is removed, the suspended base rises, maintaining a constant height from which to lift an inner lining thereby preventing material from being caught in the springs.

5. **Working around machinery**- Use a mechanical handling device suspended from an overhead support or rail that grabs the package's

centre and assists with lifting and manoeuvring by balancing and supporting the load.

6. Maintenance tasks can lead to some of the most hazardous handling operations. Flexible multi-purpose handling devices like tool-box trolley can be more practical during machine installation to minimize repetitive lifting of heavy loads at work place.

7. Do not attempt to lift by bending forward. Bend your hips and knees to squat down to load, keep it close to the body and straighten the legs to lift.

8. Any heavy object should never be lifted above shoulder level.

9. Avoid turning or twisting of body, while lifting or holding a heavy object.

10. **Work safely at height or in a confined space** -Plan work to be carried out at height. Plan steps to reduce the risks of all falls liable to cause personal injury or to anyone on the premises / site, e.g. employees, visitors and contractors. Make sure roofs, working platforms and walkways are safe.

MAINTENANCE OF TOOLS AND EQUIPMENT

A competent employee must regularly inspect, test and maintain the machine's guards and safety control system with reference to manufacturer's instructions. This will ensure the reliability and integrity of the safety system.

Maintenance and repair program should specify -

1. Where, how much, what type of and how often servicing is required?

2. Responsible worker for conducting the repair and maintenance program.

3. What standards to be used for performance testing and evaluation?

4. Program should be reviewed regularly to ensure their effectiveness. Develop, implement and maintain an accurate record of maintenance.

Following are the suggestions for Maintenance of machinery and tools

1. Carry out cleaning according to schedules and limits of responsibility.
2. Workers should take all practical steps to make sure all hazardous machineries are switched-off, before any cleaning or maintenance is

done and whether it is safe to clean, maintain and repair. Standard procedures must be followed by trained workers for these activities to be performed safely.

3. Establish and follow a safe work system.
4. The machine should run at the slowest practical operating speed for cleaning, loading and setting up.
5. Restrict access and control of danger areas to one person only.
6. Emergency stop controls can be set within immediate reach.
7. Employers should maintain and keep machinery in sound operating condition at all times. They can manage the maintenance using:
    a. Preventive maintenance schedules.
    b .Regular inspections.
    c. Unsafe condition reports and feedback.
8. Carry out running maintenance within agreed schedules.
9. Carry out maintenance and cleaning within one's responsibility.
10. Report unsafe equipment and other dangerous occurrences.
11. Ensure that the machine guards are in proper place.
12. Use correct lifting and handling procedures for the tools and equipment.
13. Store cleaning equipment and tools safely after use.

Activities

ACTIVITY 1

Visit a Garment manufacturing firm, discuss with the safety officer / team and prepare a report on safety measures adopted by them.

Materials Required:

1. Writing material
2. Ruler
3. Adhesive
4. Camera for clicking pictures

Procedure:

1. Make a group of 4 students each.
2. Visit a garment manufacturing firm
3. Enquire about its safety measures.

4. Prepare a report of your observation with pictures.
5. Submit the report to the teacher for evaluation and feedback.

Check Your Progress

A. Write TRUE/FALSE the following:

1. People who rush around in the work area tend to decrease the likelihood of an accident.
2. Accidental cuts can be prevented if the expertise of using a cutter has been mastered.
3. Equipment mounting brackets, signages and control boxes can not be checked regularly to see if sharp edges are present.
4. Mechanical material handling equipment such as forklifts and hoists, can reduce injuries caused by lifting heavy lifts.
5. Workers should take all practical steps to make sure all hazardous machineries are switched-off, before any cleaning or maintenance is done and whether it is safe to clean, maintain and repair.

B. Write short answers for the following:

1. Enlist precautions which are taken while handling sharp objects.
2. What is safety? Why issafety important while working with machines?

Session 4: Effective Oral and Written Communication at Workplace

Effective Oral and Written Communication not only helps in communicating one's thoughts clearly and concisely, but also to create focus, energy, and passion. Clear messages help to build trust and integrity between the writer and the reader. Well-written communication helps to define goals, identify problems and arrive at solutions. Employees must clearly write and talk so that other staff understand the situation without confusion.

Effective writing allows the reader to thoroughly understand everything that one is not able to say. Listening, reading, writing and talking are collectively known as effective communication skills. Good communicators have a wide range of skills and are able to adjust their communication style in response to the many variables they face at a given time.

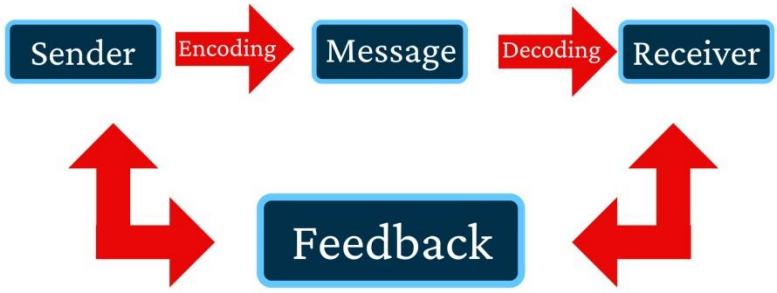


Fig : 4.10 – Communication Process

The Communication Process includes the following:

1. Sender

The sender bears the responsibility for ensuring that the message is understood and that the expectations for deliverables are clear. The sender should also consider any obstacles that may prevent the recipients from understanding the message. Languages, ethnic cultural beliefs, degree of education, and/or experience are all barriers.

2. Message

Verbal, non-verbal and written communications are affected by the sender's tone and method of communication. While sending a written message, the sender must be sure that it is professional, precise, clear and in simple language. Written communications are open to interpretation by receiver. Proof the written communication for typographical errors, grammar,

punctuation and sentence structure to reduce the chances of miscommunication.

3. Method and Environment

Messages are conveyed through channels. These channels are affected by the method and environment which is chosen to communicate. All written communications are one-way communication, as there is no opportunity for people to ask questions, provide feedback, express concern or gain clarification during or immediately after communication.

4. Receiver

Messages are delivered to the concerned receivers. Receiver enters into the communication process with ideas and feelings that influence his understanding of the message and send their response.

One of the indicators of a high-performance culture is open communication in the workplace. Workplace communication is the process of exchanging information and ideas within a company. Effective communication, on the other hand, occurs when a message is sent and received correctly.

a. Effective communication at workplace is center of all business goals. Its benefits are :-

- It avoids confusion
- It provides purpose
- It builds a positive company culture
- It creates accountability

b. Skills that employers mostly seek are:

- Oral communication
- Listening
- Written communication
- Public speaking
- Adaptability

c. The importance of good communication at workplace

At all levels of an organisation, effective communication is critical to attain productivity and maintaining healthy relationships. Employers who devote time and effort to establish open lines of communication will quickly gain employee trust, resulting in increased productivity, output, and morale. Employees should be able to effectively communicate with their co-workers,

managers, and customers. The message is the outcome of the encoding, which takes the form of verbal, nonverbal, or written language.

THE LINES OF COMMUNICATION, AUTHORITY AND REPORTING PROCEDURES AT WORK PLACE

Lines of communication can include a chain-of-command that requires employees to communicate only with their direct superior. Workplace communication is the process of exchanging information and ideas, both verbal and non-verbal, between one person/group and another person/group within an organisation. To establish and manage, various lines of communication within a business is essential so that all workers and managers can contact the communicator, for example a manager communicating to an employee and an employee to a customer.

Protocol is a set of guidelines regarding the chain of command for how various members of an organisation must communicate with each other.

1) Owner to Manager

The company owner provides directions to manager as well as any update or news he wants to give employees through manager.

2) Manager to Employee

Managers must delegate specific duties to workers and provide directions about work projects. A manager commonly communicates through regular meetings with the entire department. Manager may also schedule yearly employee review sessions with individual workers to discuss performance and productivity.

For example a flow chart of reporting and conducting maintenance in an industrial set-up is given as below:

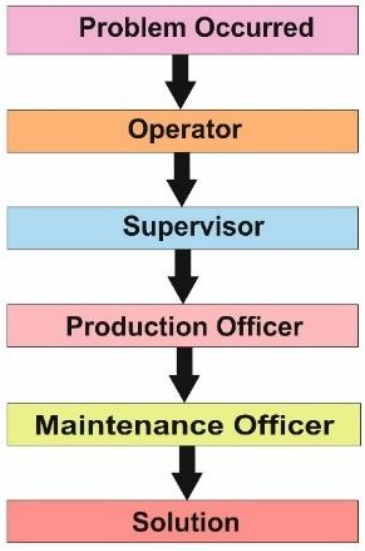


Fig.: 4.11 - Flow Chart of Maintenance

3) Employee

A line of communication is also established between employees / managers and outside business contacts. Certain employees of a manufacturing unit may have to communicate directly with representatives of companies to supply raw materials, submit orders or request information.

4) Communication with Customers

Possibly the most important line of communication at a business is between the employees of a business and its customers. In some cases, certain employees are authorized to speak to clients for business contacts.

Reporting procedures at work place

Effective communication in the workplace is imperative in a leadership role. Having effective communication skills is the key to good leadership. In turn line of communication begins in descending order, i.e. reporting procedure begin from customers to employee, employee to supervisor, supervisor to manager and from manager to industry owner.

Ways of reporting procedures for effective communication at workplace are as follows:-

1. Open Meeting

It is easier to communicate in the work place situation via open meetings. In this kind of forum, workers will hear, see and feel it. This oral communication is one of the best approaches to communicate effectively with a team.

2. Emails

In official settings, written communication via email remains potent. It will enable to pass messages to the members of the team without pulling them out of their workstations.

3. One to One

Workers understand better when we talk to them on a one-to-one basis. Ensure to maintain eye contact with them to enable the message to sink in.

4. Create a Receptive Atmosphere

To effectively communicate with the team, one must create an interesting atmosphere which is open for communication.

5. Display Confidence and Seriousness

Ensure that one must display confidence and seriousness because if team members notice any uncertainty and lack of seriousness while communicating with them, they are likely to treat the information with disregard.

6. Use Simple Words

To be effective in the communications with the team members, use words that are easily understood.

7. Use Visuals

Place visuals at strategic positions around the work place of the team. Delivering messages both through sight and sound gives room for better comprehension.

8. Listen to the Team Members

Encourage team members to open up so that the leader can be well informed while communicating with them.

9. Use Body Language

The message will be conveyed much more quickly and effectively through body language. When communicating with your team, master the skill of utilizing body language. Smiles, handshakes, and eye contact should all be used.

10. Use the Appropriate Tone of Voice

Use the appropriate tone of voice to communicate the message to the team so that the message is not misunderstood and discourage / frighten the receivers. Voice modulation in such scenarios help to be beneficial.

11. Be clear

Being clear to communicate to the team members makes it easier for them to understand the message. Make a message to the point for better comprehension. Keep the focus of point to be conveyed straight forward.

12. Encourage Feedback

Do not just talk and walk away, give room for feedback so that one can measure the effectiveness of the style of communication. It will also afford the privilege of knowing if the message was well understood.

13. Gesticulate

Use the hands to demonstrate the message. Make hand motions and signals to establish the seriousness of the subject matter while communicating with the team members.

14. Be Appreciative

Always remember to thank the listeners for their time after each communication session. Working hard on these communication strategies and establishing ground rules to keep everyone up to date will ensure a smooth project conclusion. Lines of communication make it easier to not only express the information effectively, but also to respond quickly in order to avoid missed opportunities or late work delivery.

THE IMPORTANCE OF COMPLYING WITH WRITTEN INSTRUCTIONS

A written communication is always put into writing form and used when the audience is at a distance or when record is required or where its preservation is essential and required as an evidence. It is in the form of instruction, orders, rules and regulations, policies, procedures, posters, memos, reports and information bulletins.

1. The importance of written instructions is mentioned as below:
   a. It keeps evidence of what has occurred or what was stated.
   b. It keeps permanent record for future use.
   c. It reduces the chances for misinterpretation and distortion of information.
   d. It is more reliable when transmitting lengthy information on financial, production or other important data.
   e. It provides an opportunity to put up their grievance in writing and get it supported by facts.
2. Comply with industries written instructions
   a. Carry out work functions in regulatory and accordance with legislation and organisational regulations, guidelines and procedures.
   b. Seek and obtain clarifications on policies and procedures, from the authorized person.
   c. Apply and follow the policies and procedures within work practices.
   d. Provide support to the supervisor and team members in enforcing these considerations.
   e. Comply with health and safety and security related instructions applicable at workplace.
   f. Use and maintain personal protective equipment as per protocol
   g. Carry out own activities in line with approved guidelines and procedures.
3. Writing Care Instructions

   Care instructions should be written in the form of notices or signages to help employees remind of care or caution to be followed with regard to machinery or wet floor or any hazardous situations.

Equipment operating procedures / manufacturer's instructions

The manufacturer of machines, as well as the operator, both should take all technical and organisational measures, in order to ensure the safety of machine operators. It includes the general rules for approaching safety issues that should be taken into account by machinery designers in the design process e.g. inherently safe design, safeguarding and protective measures, information for use, mode of application, conformity assessment

procedures etc. Use of machine operating manuals should be encouraged to employee designated to use particular machine.

Implementation of safety measures by the manufacturer

The manufacturer of machinery should eliminate hazards or reduce risks associated with these hazards by applying safety measures in the following order:

1. Inherently safe design

Hazard can be eliminated through the right choice of the machine design and features and minimizing personal exposure to hazards, through reduction of the number of un-necessary interventions within the danger zones. All accessible parts of the machine should have no sharp edges, sharp corners, rough surfaces, protruding parts, etc. Many hazards of the machine can be eliminated by means of choosing proper shapes and employing proper arrangement of mechanical parts.

2. Safeguarding

The hazards that cannot be eliminated using the inherently safe design approach should be reduced by means of the application of guards or protective devices. Covers, doors, fences, etc. also perform guarding functions. Guards should be difficult to remove or switch off, situated at a proper distance from the danger zone and allow performance of required operations like installation, tool changing or maintenance, guard locking, providing only limited access to the area where the operations are to be performed and without the necessity for removal.

3. Protective device

Protective devices that do not create actual physical barriers perform their protective functions by means of generating a signal that stops a dangerous motion of a given machine element. When it is impossible to apply guards, sensitive protective devices are used to reduce risk. There are several types of these devices. Optoelectronic protective devices such as light curtains, scanning devices like laser scanners and pressure-sensitive devices, mats, trip bars, trip wires etc. are often used.

4. Functional safety of machinery control system

If failure of a control function performed by a control system can result in an immediate increase in risk, then this function is named a “safety function”. Generally, safety functions can be implemented for the reduction of risk associated with the improper machine operation, failure of technological processesandmechanical hazards.

The safety functions included in manufacturer’s instructions are:

a. Safety-related stop function initiated by a safeguard
b. Manual reset function
c. Start/restart function
d. Local control function
e. Muting function
f. Monitoring of safety-related input values
g. Response time
h. Monitoring of safety-related parameters such as speed, temperature or pressure
i. Reaction to fluctuations, loss and restoration of power sources.
j. Common cause failure factor
k. Components and elements to achieve emergency stop function
l. Measures for escape and rescue of trapped persons
m. Measures for isolation and energy dissipation
n. Provisions for easy and safe handling of machines and parts
o. Measures for safe access to machinery.

5. Information for use

Despite the adoption of measures for inherent safe design, safeguarding and protection, the user is informed about machine design and their parts, running and maintenance of machine.

a. The information may be in the form of accompanying documents and instruction manual, on the machine itself, on the packaging and by other means, such as signals and warnings outside the machine. Information and warnings on machinery is provided in the form of readily understandable symbols or pictograms. The operator must have facilities to check the operation of the warning devices all the time.

b. Visual signals, such as flashing lights and audible signals such as sirens may be used to warn of an impending hazardous event, such as machine start-up or over-speed.

c. All the necessary markings on machine itself

- For unambiguous identification,
- In order to indicate compliance with mandatory requirements,
- For safe use.

d. The instruction handbook or other written instructions includes all information for safe commissioning, operating, adjusting and maintenance of the machine.

e. Implementation of safety measures by the user of machinery and work equipment. Work equipment should be properly adapted to the work without impairment to their safety or health.

6. Additional safeguarding

The employer should ensure that work equipment is installed, located and used in a way ensuring that the risks to the operators and other workers have been reduced. In particular, sufficient space between moving parts of work equipment and fixed or moving parts should be allowed with movable guards or protective devices.

7. Use of personal protective equipment

Technical safety measures comprise personal protective equipment. These are devices or equipment designed to protect worker against single or multiple risks that may affect health or safety at work.

Personal protective equipment also comprises,

1. A unit constituted by several devices or appliances which have been integrally combined by the manufacturer for the protection of an individual against one or more simultaneous risks, e.g. a helmet coupled with a visor and/or hearing protection.

2. A protective device or appliance combined or separately, with personal non-protective equipment worn or held by an individual for the execution of a specific activity e.g. clothing or knee protectors included in trousers used for performing work while kneeling.

3. Personal protective equipment should include the items such as:
   - Clothing - Well-fitted pants and jackets with all buttons fastened. Sleeves should be close fitting, hair nets and Aprons made of non-combustible and flame-resistant materials.
   - Footwear – Approved and sturdy footwear with non-slip sole and a closed toe and closed back.
   - Hand protection - Natural rubber latex gloves, synthetic rubber gloves, and vinyl gloves or thick plastic gloves.
   - Eye protection - Safety goggles or masks

- Respirators - Properly fitted to provide the best protection from inhaling harmful fumes or vapours.

8. Work organisation and procedures

Proper work organisation is important in ensuring safe operation of the work equipment. All operations should be performed according to established safe working procedures. The employer should take necessary measures to ensure that the use of work equipment is restricted solely to persons given the task of using it. Written permission for conducting high risk works should be issued namely, repairs, modifications, maintenance or servicing.

SUGGESTIVE STANDARD OPERATING PROCEDURES OR INSTRUCTIONS

a. SOP for machine inventory including spares, tools and tackles.

- Receipt of material against packing list/indent.
- Machine taken for installation as per requirement.
- After installation machine is numbered. Record is to be maintained in Asset register / computer excel sheet.
- Machine is not issued to production until the numbering is complete.

b. SOP for machine installation

- Arrange the related person from agencies to install the machine**.**
- After installation arrange to train production from company technician.
- Hand over the bobbin/bobbin case or related material use to run machine to production department.

c. SOP for maintenance of utilities - air/water/steam related

- Making indent for materials for installation.
- After receiving of materials from vendors, installation from vender.
- Looking After the maintenance of Steam Generator and Air compressor.
- Operating of steam generator and air compressor in shift timing.

d. SOP for machine's preventive maintenance

- Preventive maintenance schedule is prepared.

- As per schedule, preventive maintenance is done and record is maintained
- All weighing scales shall be calibrated once a year and certificate is obtained.
- Maintenance department shall inform the purchase department regarding renewal of AMC (Annual Maintenance Contract) at least 1 month prior to its expiry.

e. SOP for machine breakdown maintenance

- Breakdown intimation is received from concerned department.
- Breakdown maintenance is done considering type of fault.
- Record of breakdown maintenance is maintained in the breakdown maintenance register.
- Electrician repairs all electrical faults and maintains a register for electrical repair and breakdowns.
- A machine history record shall be maintained for all machines.

f. SOP for calibration of measuring instrument &Light Illuminations record

- Any machine having measuring instrument should be calibrated yearly.
- The calibration check list shall be maintained for all such instruments.
- The maintenance in charge shall keep the certificates of calibration in a file.
- Actual date of calibration shall be maintained in the machine history sheet.
- Monthly light illumination shall be recorded in all working area on the production floor.
- At least once in 6 months, illumination checking is done and record is maintained

Activities

Activity 1:

Prepare a graphical poster on SOP instructions.

Materials Required:

1. Writing material
2. Ruler
3. Adhesive
4. Camera for clicking pictures

Procedure:

1. Based on your understanding, prepare a graphical and interactive poster on SOP instructions.
2. Display the same in your class.

Check Your Progress

A. Fill in the Blanks:

1. Well-written _____helps to define goals, identify problems and arrive at solutions.
2. Verbal, non-verbal and written communications are affected by the sender's _____and _____of communication.
3. Use of _____manuals should be encouraged to employee designated to use particular machine.
4. When it is impossible to apply guards, _____devices are used to reduce risk.
5. Written permission for conducting high risk works should be issued namely, _____or servicing.

B. Write short answers for the following:

1. Which are the ways to create effective communication at workplace?
2. What are SOPs? Briefly enlist SOP for maintenance of a needle detector machine.

Module 5	Health, Safety and Security at Workplace

Module Overview

Health, safety and security are one of the most important aspects of human concern at the workplace. Therefore, we should aim at building a working environment which provides and maintains highest degree of physical, mental and social well-being for workers in all occupations. Industries and organisations should focus on health and safety related practices at workplace and should ensure availability of all the basic facilities like safe and clean drinking water, clean rest rooms, proper ventilation and lighting facilities etc.

With the advent of technical advancements in the form of imported machineries and others services in the apparel industry, we should give more emphasis on the principles of ergonomics and occupational psychosocial factors.

Thus, the benefit of maintaining occupational health, safety and security are:

i. Reduced work related injuries
ii. Make the working conditions healthy and safe in the interest of workers, employers, as well as the public/society at large
iii. Reduce the risk of potential accidents and emergencies
iv. Preparedness with suitable responses to accidents and hazards

Hence, workers should be trained to identify and report to seniors/supervisors or any other authorized personnel in case of any malfunctions in machinery and equipments, emergencies and take necessary corrective actions for the same.

Learning Outcomes

After completing this module, you will be able to:

- Analyze Compliance to health, safety and security requirements at workplace
- Explain Potential safety risks and emergencies
- Identify and report malfunctions in machinery and equipment or any other hazard at workplace
- Explain reporting emergency situations

Module Structure	
Session-1	Compliance to Health, Safety and Security Requirements at Workplace
Session-2	Potential Safety Risks and Emergencies
Session-3	Identifying and Reporting Malfunctions in Machinery and Equipment or any Other Hazard at Workplace
Session-4	Reporting Emergency Situations

Session 1: Compliance to Health, Safety and Security Requirements at Workplace

Safety and security of the workplace greatly depends on the enforcement of safety policies and rules of the industry which also ensures compliance with health and safety standards. Compliance is obtained through specific efforts made to reduce the risk of potential hazards and accidents at the workplace.

It is increasingly observed that the health, safety and security of workers are subject to a variety of risks. Inculcation of safety culture in the working environment along with strict guidelines on safe work procedures significantly reduces the risk of potential hazards/accidents.

HEALTH AND SAFETY RELATED PRACTICES APPLICABLE AT WORKPLACE

Apparel industry is a labour oriented industry. Workers are the main resources and all companies must follow certain practices applicable at workplace for maintaining health and security of their workforce.

Following points must be taken care–

- Ensuring availability of fully stocked first aid boxes at every designated location according to the floor plan/layout.
- Fire extinguishers should be placed at clearly marked areas at regular intervals.

Fig.: 5.1 (a & b) - HEALTH AND SAFETY RELATED PRACTICES

- It is advisable to maintain an accident register. This helps in record keeping of various accidents, their causes and the damages. The information in accident registers can be useful in prevention of accidents in future.
- Factories should ensure proper positioning of emergency lights on work floor leading the pathway to exit.
- It is essential to ensure that all fire-fighting equipment such as extinguishers are regularly inspected and kept in good working order.
- Exit signs should be clearly marked and displayed.

Fig.: 5.2 – Exit Sign

- Yellow lines should be marked on the factory floor to demarcate the pedestrian pathway from the space allocated for machines.

Fig.: 5.3 – Yellow Demarcation for Pedestrian Pathway

- Aisles should be designed wide enough and should not have any obstruction in between to prevent any accidents during movement of men and material.
- Cables /Wires should never be left loose or visible hanging at the floor.
- Proper lighting with well-distributed artificial light to ensure effective use of available daylight should be arranged.
- Good general ventilation plus local exhaust ventilation to remove air contaminants at the source should be ensured.
- A clean lunch room commonly called as canteen area for employees to have their meals should be allocated.
- Oily floors are a common cause of accidents and fire hazard. Splash guards and drip pans should be installed wherever oil spills or drips may occur. Prevent accidents by keeping oil and grease off the floor.
- Adequate supply of clean and pure drinking water must be ensured for all workers.
- Workers should be encouraged to use mask and gloves wherever required.
- Provision must be made for clean washrooms/restrooms for workers and staff members
- Mock drills must be performed with the workers at regular intervals for them to be prepared in case of any spills, fire, and explosion.
- It is advisable to carry outthe regular maintenance of the factoryif something gets broken or damaged. It must be ensured that same be replaced or immediately corrected/fixed, for example - defective ladders, broken handrails, steps, etc.
- Factories should have a provision of regular maintenance programmes like inspection, lubrication, upkeep and repair of tools, equipment, machines and processes.

Compliance to health, safety and security requirements at workplace will help in eliminating risk related to potential accidents and hazards caused by unfavourable conditions and thus, will lead to efficient, smooth and uninterrupted production cycle and safe and secure work environment.

ACCESS TO CLEANDRINKING WATER AND SANITARY FACILITIES

Welfare facilities like access to clean drinking water, hygienic and well ventilated wash rooms or rest rooms are a vital part of good working conditions in an industry.

Clean Drinking Water -

Provision of safe and clean drinking water, beverages or an adequate meal is mandatory for a healthy workforce.

Availability of clean drinking water is indispensable for all workers. Mostly in hot weather conditions a lot of water is lost from the body in the form of sweat or evaporation. If appropriate arrangements are not provided then the workers might have to make the arrangements by themselves or leave the workplace often in search of clean and safe drinking water.

In case of impure or contaminated water being made available for the workers, it can be a cause of frequent transmission of diseases among them. If the workers get dehydrated, they can be tired, exhausted or fatigued and will be less productive in their outcome. Thus, provision of clean and pure drinking water should be made near the workstations. Preferably, cool drinking water must be provided specially in hot weather conditions. For example - Arrangements of water coolers or water dispenser with clean and cold drinking water can be done at regular intervals near the workstations.

Sanitary Facility –

All industries must ensure appropriate sanitary facilities for workers within the working premises. Hygienic and disinfected toilets/restrooms are very important. It is also requisite to equip adequate number of washrooms as per the number of workers/staff working in an industry and ensure their maintenance and cleanliness.

To ensure mental and physical well-being of workers and to prevent spread of any diseases within the working premises, it is vital to have proper sanitary facilities. These facilities also helps in improving rate of production as healthy workers are more efficient in their working and it simultaneously leads to lower rates of absenteeism within the workforce.

Therefore, developments in sanitary facilities should be undertaken and materials incorporated should be durable, easy to clean and quick drying likes tiles. Frequent cleaning and maintenance of toilets is also recommended.

The following points must be considered-

i. Sanitary facility must be within easy access from the work site.
ii. These facilities must be well enclosed, well lit and adequately ventillated.
iii. Proper supply of toilet paper and other hygiene supplies must be ensured.
iv. It must be equipped with a covered garbage bin.
v. Hand claning facility like a wash basin along with soap and a sanitary way to dry hands must be installed in every single toilet facility.

Activities

ACTIVITY 1

Prepare a report on various types of health and safety related practices applicable at a work place. Place it a file and submit the same.

Materials Required:

1. Writing material
2. Adhesive
3. Ruler

Procedure:

1. Visit an apparel industry, learn and understand about the health and safety related practices being followed.
2. Make a report on the same.
3. Submit the report in your class.

Check Your Progress

A. Fill in the Blanks –

1. _____, safety and _____are one of the most important aspects of human concern at the workplace.
2. _____ should be placed at clearly marked areas at regular intervals.
3. Factories should ensure proper positioning of _____lights on work floor leading the pathway to exit.
4. _____ floors are a common cause of accidents and fire hazard.
5. _____ leads to lower rates of absenteeism within the workforce.

B. Write short answers for the following –

1. Mention points that must be taken care for maintaining health and safety related practices at workplace. (Any Five)
2. Write about the importance of having access to clean drinking water and sanitary facilities at the workplace.

Session : 2 Potential Safety Risks and Emergencies

Safety risks are chances of any detrimental or unfavourable result/outcome or anticipated losses (For example – Deaths or injuries caused due to malfunction of a machine in a factory) caused due to natural or human induced causes.

Emergency is an unforeseen and unexpected incident demanding instant/immediate response. It may be caused due to natural, technological or human causes/forces.

Preparedness against any potential safety risk or emergency is essential to protect the workers against any damage of life and property. The impact of any emergency crisis can be substantially reduced by active participation of employees and employers in safety related practices at workplace.

RESPONSE TO POTENTIAL ACCIDENTS AND EMERGENCIES

Ergonomically designed work areas have several benefits like:

- Increased human comfort
- Reduced stress and fatigue
- Increased workers rate of production
- Reduced risks of potential accidents/hazards.

Some of the factors that must be considered to be prepared are as follows –

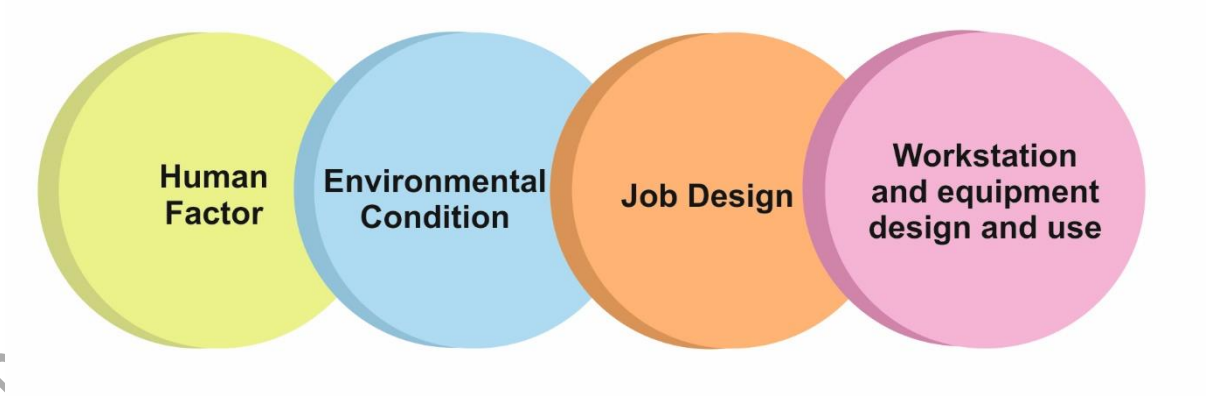


Fig.: 5.4 – Factors Responsible for Potential Accidents

1. **Human factors**

   Major human factors that affect are:

   - Physiological
   - Psychological

- Physical
- Cognitive

Human factors mostly include all physiological and psychological factors. Workers dimensions like reach, posture and strength must be considered while considering the human factors. Physical injury can cause a negative impact on employee's work performance and lead to increase cases of absenteeism. Cognitive factors equally affect the job performance. For Example – Lack of proper guidance and feedback from supervisors or lack of autonomy can often cause stress and result in lack of motivation among workers to perform well.

2. Environmental conditions

Environmental Conditions in particular like proper lighting facilities, sound & vibrations, extreme temperature, humidity and poor air quality may affect the workers performance. Undesirable and unpleasant levels of a fore mentioned condition can be detrimental to workers health and safety.

3. Job Design

A job must be designed keeping in mind the anthropometric characteristics such as age, gender, height, weight and ethnic differences. Proper use of ergonomics is advised as tasks can be either static or dynamic. Static tasks need a sustained position which can cause stress and pain in the lower back, neck and shoulder areas. Whereas, dynamic tasks require continuous body movements, very fast movements can cause fatigue, pain, weakness and sometimes lead to injury if performed with excessive force. Poor job designs and lack of proper training to workers can often be cited as an underlying cause of injuries among workers.

4. **Workstation & Equipment Design and Use**

A workstation should be designed keeping in mind factors such as workable heights, placement, reach, requirements and postures. Adjustable equipments make it possible to adapt it in accordance to individual requirements. Tools and equipments must also have flexibility of usage and it should not force the workers to use an unnatural body posture or motion while using it. All equipments and workstation should work together in a well-coordinated system to ensure a smooth flow of production and safety of workers.

The following points are mostly the main sources of accidents at the workplace -

- Spills
- Slippery surfaces

- Obstructions (Unclear Pathways)
- Broken equipments/tools.
- Machineries which are not regularly checked/maintained and kept unrepaired.
- Areas lacking safety signages (Fire and Emergency Exits)

Therefore, workers and employers must take collective active measures to adhere to an accident prevention plan. The following points must be considered to strengthen the safety practices at work and be prepared with response to any emergency situation –

1. Regular programmes and training sessions must be conducted on safety related practices at workplace for workers. It can be held in the form of mock drills for evacuation during fire hazards or any chemical spills, quick response training during accidents/emergencies etc.

2. Ensuring installation of proper lighting system, to have a well-lit and clear visible job site/ workstation, to avoid any potential risk associated with darkness around the workplace.

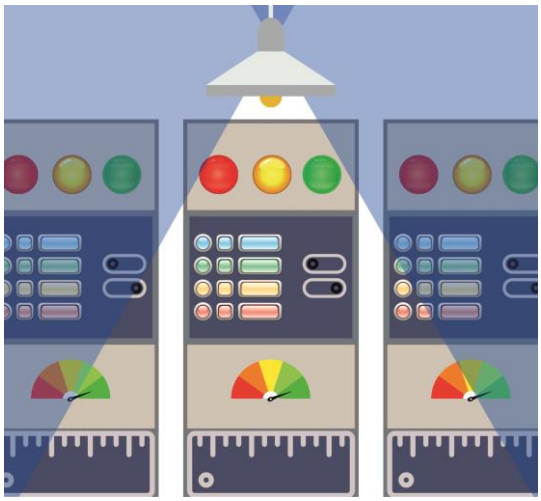


Fig.: 5.5 – Proper Lighting System

3. Clearly visible and demarcated safety signs must be placed/ installed wherever necessary, which will help in clear identification of hazardous areas and associated risk like obstacles in pathway, toxic chemicals being stored, slippery floor, emergency exit doors etc..

4. In case of a chemical or any hazardous spill, ensure to always suppress and hold the spill and always keep the cleaning equipment at an easily accessible location.

5. Ensure to conduct routine audits and checks for all potential safety hazards and emergencies to prevent any actual loss.

6. In case of an emergency/ accident, evacuate the premises and helps fellow workers in need.

7. Proper ventilation facilities must be ensured throughout the working place to avoid inhalation of any toxic chemical or foreign particles by the employees at the time of any chemical leak.

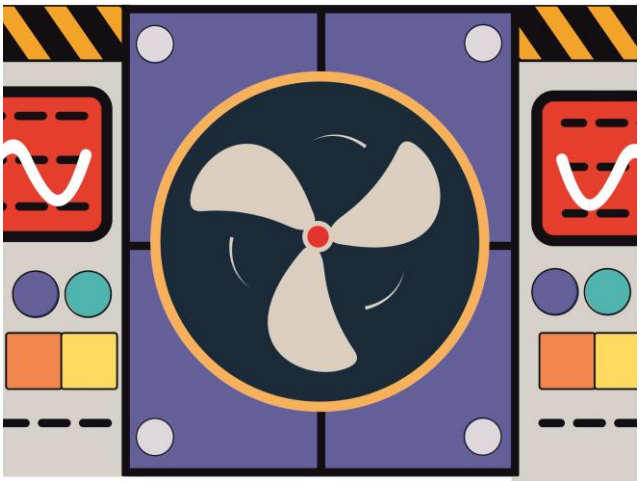


Fig.: 5.6 – Proper Ventilation System

8. Workers must be instructed to follow all the rules with regards to the attire/uniform permitted for their job role. For example- Workers working in the dyeing unit must wear slippage resistant shoes to prevent any fall or trips which can lead to injury.

9. Employees in an apparel or home furnishing industry need to spend long hours in the sitting posture which can cause soreness in back and reduced circulation in legs. Therefore, to avoid any pain or injury, adjustable chairs must be provided to ensure easily adjustable heights, seat tilt and backrest positions.

10. Chairs with a cushioned/contoured seat, which distributes the worker's weight ensuring no body part feels all the pressure must be preferred.

11. To minimise awkward body postures, chair should also be placed at an appropriate distance from the workstation, so that the workers can perform their tasks without stretching their elbows away from the body.

12. Workstation design must ensure that all the tools and materials are positioned to reduce risk of tilting too far or leading to an awkward body position. It can increase the level of stress/strain in arms, shoulders and the neck. This greatly increases the risk of injury which can be avoided by proper preventive actions and adhering to ergonomically designed principles of work.

13. Workers who need to stand for prolonged hours must be provided with anti-fatigue mats. These mats help in better circulation and reduce fatigue in lower body parts.

14. Emphasis should be given on frequent short breaks to stretch and change body positions. It allows legs, beck, neck and eyes to rest in between long working hours. Shorter breaks often reduce the risk of discomfort, fatigue and injury among the workforce.

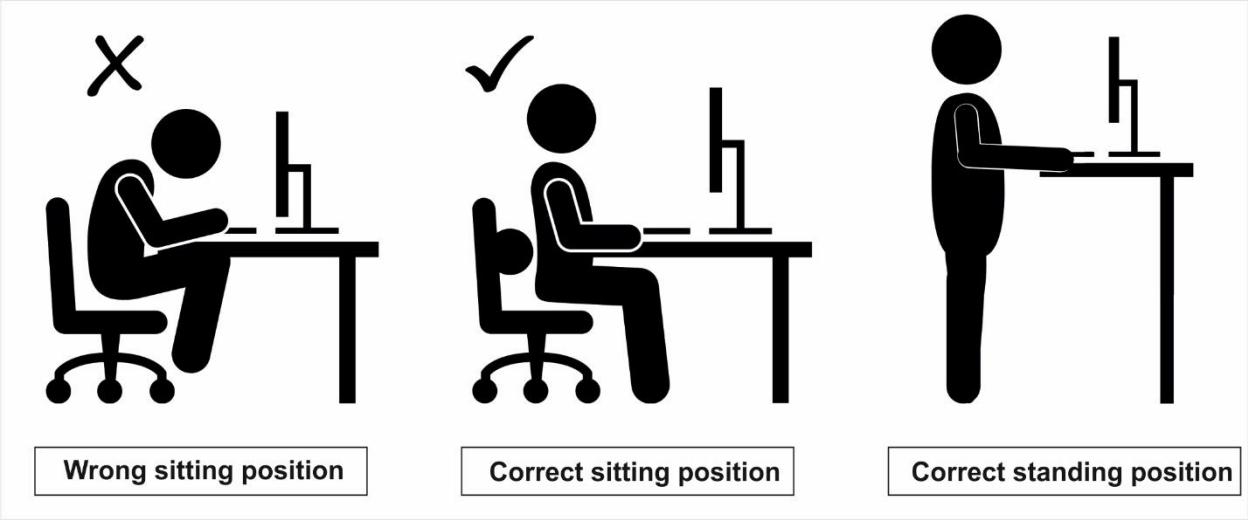


Fig.: 5.7 – Correct Body Positions

MAINTENANCE AND STORAGE OF PROTECTIVE EQUIPMENTS

An effective system of maintenance and storage of protective equipments and tools is crucial to provide the level of protection they are intended or designed for. Therefore, one must always maintain an inspection schedule for all the protective equipments and tools including its shelf life. Inspection must include thorough check against any breaks, tears or any other visible sign of damage.

Maintenance also includes cleaning, examining, repairing, testing and replacing (in case it cannot be repaired) tools and equipment on a scheduled basis. Some Examples of Protective equipment are – Gloves, masks, protective helmet, safety shoes/boots, protective eye wear, ear plugs etc.

Adequate and proper storage facilities for storing of all protective equipments and tools when not in use is must. Employers must provide for a clean and safe place for the same. For example – Pegs for hanging clothing or safety helmets, case for safety glasses, a zip lock bags, shelves or racks for storing of ear muffs, gloves, masks etc.

The facility of storage must be appropriate and sufficient to protect the protective equipments from any kind of contamination, loss or damage due to coming in contact of water or sunlight. The place should be dry, clean and well sanitized and should also not be subjected to extreme temperatures.

It should protect the equipments against ageing and damaging. For hygiene purposes, one must consider separate storage from ordinary clothing storage in cases where protective equipments may become contaminated during use.

Duties of the workers in respect to protective equipments –

5. All the protective equipments must be worn by the workers in accordance to the work requirements and instructions provided.

6. Workers must ensure that all the protective equipments must be stored back carefully to their designated/ allocated storage areas after use.
7. All the protective equipments must be inspected before use and any defect observed must be reported to the supervisor.
8. It is the responsibility of the worker/employee to take due care of the protective equipments provided to them and do not make any modifications to the same them unless and until they are authorized and trained for its maintenance activities.

Fig.: 5.8 – Proper Storage Facility for PPEs

Activities

Activity 1

Prepare a chart with details of potential hazards and their possible solutions applicable at a workplace.

Materials Required:

1. Writing material
2. Coloured pencils/pens
3. Eraser
4. Ruler

Procedure:

1. Collect information about the potential hazards and their possible solutions applicable at a workplace.

2. Take a chart paper and prepare the chart by placing the collected information on it.
3. Display the chart in your classroom.

Check Your Progress

A. Fill in the following blanks –

1. _____ is an unforeseen and unexpected incident demanding instant/immediate response.
2. _____ to a worker can cause a negative impact on his/her work performance and lead to increase cases of absenteeism.
3. A _____should be designed keeping in mind factors such as workable heights, placement, reach, requirements and postures.
4. To minimise awkward body postures _____should also be placed at an appropriate distance from the workstation.
5. Shorter _____often reduce the risk of discomfort, fatigue and injury among the workforce.

C. State weather the following statements are True/False.

1. Tools and equipments should not have flexibility of usage and it should force the workers to use an unnatural body posture or motion.
2. Workers and employers must take collective active measures to adhere to an accident prevention plan.
3. Safety signs must not be displayed clearly.
4. Routine audits and checks for all potential safety hazards and emergencies are not necessary.
5. Workers must be instructed to follow all the rules in regard to the attire/uniform permitted for their job role.
6. Emphasis should be given on frequent short breaks to stretch and change body positions.
7. The facility of storage for protective equipmentsmust be appropriate and sufficient to protect the protective equipments from any kind of contamination, loss or damage.
8. Workers must not ensure that all the protective equipments must be stored back carefully to their designated/ allocated storage areas after use.

Session: 3 Identifying and Reporting Malfunctions in Machinery and Equipment or any other Hazard at Workplace

Identification of malfunction in machinery/equipment or any other hazard at a workplace is an indispensable component of the health and safety management system. It is the first step in development of the safety procedures for prevention and controlling of any hazard.

A hazard is a source of any potential damage.

Identification of hazards includes the following:

- Identifying both existing and prospective workplace hazard
- Assessing or calculating the risks involved
- Determining and implementing the control measures
- Reviewing the situation

Workers must be trained to identify all the possible hazards associated with their job role and also know the control measures during an emergency situation to prevent any injury to people, property or environment from the same.

Workers must follow all the safety practices which comply with the standard operating procedures. They must regularly check/inspect the workplace, equipments, machines, tools for any abnormal changes, conditions or unanticipated emissions/leaks for identification of any perilous conditions. In case of an unsafe condition they must report them to their supervisor or authorized personnel and collectively work towards resolving the same.

Workers are exposed to various potential hazards while working near or on a machine. There is a risk of injury caused due to entanglement, friction or abrasion, cutting, stabbing or getting trapped in the moving parts of the machines. Therefore, it is suggested that workers must follow guidelines related to dress code/uniform/using protective equipments and safe working practices applicable while working near or on a machine.

Risk is also associated with noise, vibrations and radiations generated by the machines. Levels of the aforementioned must be monitored to prevent any health issues among workers. Workers must be also able to identify and report any sparks or loose fitting which can cause fire accidents or electric shocks, over speeding or under speeding of parts of machines etc.

The following points must be checked for identification of possible hazards linked with machines, equipments, tools and services –

1. Identify use of the machine by considering the following points-
   - Cycle time & rate of production.
   - Intended use of the machine.
   - Different types of materials being used on it.
   - Amount of force being generated.
   - Range of motion or moving parts of the machine.

2. Identification of space required by the machine for safe operation of **all** tasks including access for maintenance and repairs.

3. Identifying the environmental limits of the machine such as the operating temperatures, humidity levels, and noise generation level.

4. Consideration of all the tasks performed by and on the machine such as – trial runs including
   - Regular operations
   - Change of tools
   - Scheduled maintenance of machine
   - Recovery from crashes/timeouts.

5. Identification of operation/ motions of machine such as
   - Parts of the machine which are movable.
   - Range of motion of moving parts.
   - Type of motion (e.g., rotation, shearing, bending, cutting, punching)

6. Identify the entanglement hazards of the machine that can be caused due to coming in contact with rotating or moving parts of the machine.

7. Identify hazards due to cutting, where a worker can come in contact with cutting tools, saws, routers, knives, or any other sharp material.

8. Identify any potential hazard due to slips or fall in and around the machine due to the spills on the floor surface such as lubricating oils, grease, water etc.

9. Identifying any ergonomic issues caused while operating the machine. Ensure the following -

- Workers do not have to reach exclusively.
- Workers do not have to use excessive force.
- Workers do not have to perform movements at a very high speed.
- Machine cycle must be planned in accordance with the workers capacity
- Workers can perform work in multiple positions that promote a neutral body position.
- Work surface is adjustable according to the workers requirements.
- Worker has enough room space to move without striking anything.

10. Identify all the work that a worker must perform while operating the machine such as -

- Feeding stock into the machine
- Removal of final products from the machine
- Removal of scrap
- Scheduled and regular cleaning parts of the machine.
- Pre and Post shift safety checks.

Therefore, it is advisable to identify, report and correct any prospective risk which can lead to a hazard at a workplace, thereby ensuring prevention and control of any injury or loss.

SAFETY SIGNS AT WORK PLACE AND THEIR MEANING

1. First aid:

It is an emergency treatment given to a sick or injured person. The main aim of first aid is to preserve life, prevent from further harm or injury and to start the recovery process. A first aid kit is used in giving the first aid. The sign of first aid which is mostly used is as follows –

Fig.: 5.9 – First Aid Sign

2. Fire exit:

This sign marks the way to nearest exit point during a fire accident.

Fig.: 5.10 – Fire Exit Sign

3. Assembly points:

This signage marks the area where the workers need to assemble in case of any hazard or emergency.

Fig.: 5.11 – Emergency Assembly Sign

4. Fire equipment:

This sign marks the location of storage area of firefighting equipments such as fire extinguisher, fire blankets etc.

Fig.: 5.12 – Fire Equipment Sign

5. Smoking ban signs:

This signs mark areas/location where smoking is not allowed/prohibited.

Fig.: 5.13 – Smoking Prohibited Sign

6. Machinery Hazards:

These signs mark the areas near the machinery where one needs to be cautious of his/her movements and actions for safety purposes.

Fig.: 5.14 – Machinery Hazards Sign

7. Hazardous substance:

This sign marks the areas where any hazardous or toxic substance is stored.

Fig.: 5.15 - Hazardous Substance Sign

8. Pedestrian access and no access:

These signs indicate where pedestrians can and cannot access respectively.

Fig.: 5.16 – No Pedestrians access Sign

9. Flammable substance:

This signs denotes the location of any extremely flammable substance being stored there.

Fig.: 5.17 - Flammable substance Sign

10. Wet floor :

This sign marks the areas with wet/ slippery floor to be cautious while crossing it.

Fig.: 5.18 - Wet Floor Sign

Activities

ACTIVITY 1

Prepare a report with pictures and details of all the safety signs applicable at workplace.

Materials Required:

1. Writing material
2. Pictures of safety signs
3. Coloured pencils/pens
4. Ruler
5. Adhesive

Procedure:

1. Collect pictures and information about all the safety signs applicable at workplace.
2. Prepare a report with all the details.
3. Submit the samein your class.

Check Your Progress

A. Fill in the Blanks :

1. A _____is a source of any potential damage.

2. _____ of hazard is the first step in development of the safety procedures for prevention and controlling of any hazard.
3. _____ hazards of the machine can arise due to coming in contact with rotating or moving parts of the machine.
4. _____is an emergency treatment given to a sick or injured person.
5. _____ signage marks the area where the workers need to assemble in case of any hazard or emergency.

B. Write short answers for the following –

1. Mention points to be considered for identification of possible hazards in a workplace. (Any Five)
2. Identify and name the following safety signs –

-  .....
-  .....
-  .....
-  .....

Session : 4 Reporting Emergency Situations

Identifying and reporting all hazards/emergency situations is of vital importance for the safety and security of the workplace. All such unsafe incidents must be immediately and directly reported to a supervisor or any other concerned authority. All the workers must be trained so that in case of any hazard or potential emergency situation, the standard procedure could be followed like reporting it to the supervisors expeditiously.

Employers must develop and set up a hazard reporting system for the workers. Implementation of such a system will make the workplace a safer and secure place to perform and work well.

All the workers must be trained in hazard identification and its control measures. They must be trained on the following points –

- **Identification of an unsafe condition – This involves recognising any** incident that might cause harm or damage to the people, machinery, tools or property. For example - **Containers that are not labelled properly, insufficient stairway lighting, broken machine guards** etc.

- Identification of an unsafe act that must be reported – This involves any inappropriate behaviour that could lead to an accident/cause an injury or any other damage. For Example – Worker**usingequipments in a careless manner or not using PPE while running a machine.**

- Procedure followed if any unsafe condition is witnessed - Any such unsafe situation should be immediately reported to the supervisor. It can be in a form of a verbal complain, a hard copy of a form to be filled or an online complain system on the website of the company.

- Follow up action post reporting the incident – Workers must expect that the corrective and preventive measures will be taken within the expected time frame. In case of any delay, they must report it again till any necessary action is taken for the same.

Taking necessary preventive actions can save from potential injuries or any significant losses caused due to sheer negligence. Reporting of hazards ensures that employees are involved in the safety management system of the company and are aware of the safety guidelines followed in the company.

For making the reporting by the workers smooth and easy, the following points can be considered –

1. Making reporting procedures easy and possible.

2. Ensure that there is no negative impact or punishment linked with the process of reporting an emergency.

3. Workers who report the hazards or any unsafe incident should be rewarded or recognised for the same.

4. Posters or signs to encourage reporting of any unsafe practices at work can be placed within the work premises.

REPORTING PROTOCOL AND REQUIRED DOCUMENTATION

In case of any hazardous condition, all workers are responsible for reporting it to their supervisors. Supervisor is responsible to take corrective steps and in case of serious conditions, must fill the hazard reporting form along with the assistance of the worker. The following steps must be followed –

- Workers who identifies an emergency condition/concern must report to his supervisor immediately.
- The supervisor must respond promptly, take necessary actions to resolve the matter within the reasonable time limits.
- If the supervisor is not able to solve the situation, then he/she must report the matter to the manager or to concerned senior authority.
- The employee is responsible to draft a document/fill the form (Depending on the rules of the company) outlining the concerns and fact.
- The senior committee members will investigate the matter and ensure correction of the unsafe conditions.

The process of reporting the hazard immediately allows the workers to report the unsafe conditions immediately. This process allows a fast response and prevent further damage. Hazards can be reported verbally or by filling a form, generally called as a hazard reporting form.

Hazard reporting form is a document which is used to report an unsafe incident/ accident at the workplace and ensures that it has been reported formally and necessary corrective steps have been taken. It is used by the first line workers – such as factory workers.

Hazards Reporting Form

Use this form to report safety concerns

Employee Name		Employee Number
Department / Area		Supervisor Name
Describe Fully the safety concern or hazard:		
What can be done to make this situation Safe?		
YES		
YES	NO	Has the supervisor in that area been notified of the safety concern or hazards?
YES	NO	Has the maintenance team been notified of the safety concern or hazards?
Employee Signature		Report Date:

Fig.: 5.19 – Hazard Reporting Form

EMERGENCY RESPONSES DURING A HAZARD/EMEGENCY

Any kind of hazard or emergency can occur anywhere and at anytime. To prevent the amount of loss and damage caused due to such unwanted incidents, employers need to provide relevant training to their employees to be adequately prepared to deal with any undesirable circumstances.

Emergency response training can be very advantageous for the employees to acquire knowledge on how to respond to an emergency situation. Employees must learn life-saving skills and acquire knowledge to save themselves and co-workers during the course of any emergency.

It is advisable to designate roles and responsibilities to every employee in the form of tasks they must perform during an emergency and train them to be specialised to fulfil the requirements of specific roles, For example – specific employee may be trained to perform first aid in the event of any injury or specific group of employees must be trained to handle fire-fighting equipments in case of fire.

Details about the following equipments, people and locations must be displayed clearly at every workstation for reference for use during any emergency situations –

Location of emergency equipments -

- Fire alarm
- Fire extinguisher
- Fire hose
- First Aid
- Panic alarm
- Personal Protective Equipments

Emergency contact numbers -

- Fire station and employee trained in fix hazard handling
- Ambulance and first aid attendant
- Police
- Hospital

EMERGENCY RESPONSE PLAN

An emergency action plan involves allocating designated actions that all the employees need to take for their safety during an emergency situation. Some of the suggested actions to be taken in case of an emergency like a fire or chemical hazard, injury etc. are as follows –

- In case of a fire accident or a chemical spill, one must try to move quickly towards the nearest accessible exit door.
- Walk, do not run during an emergency and do not use elevators.
- Help other co-workers to evacuate along the way to exit.
- In case of fire, if the fire alarm does not ring automatically, try activating the alarm manually for notification of all other employees.
- Exit the building/factory premises and assemble in the allocated area of assembling during an emergency.
- If any person gets caught in fire then try to extinguish their burning clothes by using the drop and roll technique, dousing with some cold water and using an emergency shower or using a fire blanket.
- If caught in the area filled with smoke, then try and stay in lower positions as smoke will rise to ceiling level first. Drop down to your hands and knees and crawl toward the nearest accessible exit point.

Fig.: 5.20 – Emergency Response plan

- In case of any toxic spill or leak, alert all workers in the immediate area of spill.
- Wear your required personal protective equipments (PPE) like gloves, protective eye wear etc.
- In case of a minor spill try to contain the spill with spill absorbent material and clean the area where the spill occurred.
- Try to seek immediate medical help in case of any exposure to the spill contents.
- In case of a chemical exposure to the skin or eyes, try to immediately clean it with cool water for at least 15 minutes.
- Do not attempt to move or reposition a victim in case of a muscle, joint or bone injury, sprain or fracture as it can further deteriorate/worsen the condition.
- If there is any open wound injury or bleeding wound, then try to cover the wound with dressing/first aid at the earliest.

Activities

ACTIVITY 1

Prepare a sample report of an emergency situation at the workplace.

Materials Required:

1. Writing material
2. Ruler

Procedure:

1. Study an emergency situation at a workplace.
2. Prepare a sample report of the emergency situation.
3. Submit the same in your class.

Check Your Progress

A. Fill in the Blanks:

1. All unsafe incidents must be immediately and directly reported to a _____.
2. _____training can be very advantageous for the employees to acquire knowledge on how to respond to an emergency situation.
3. An _____action plan involves allocating designated actions that all the employees need to take for their safety during an emergency situation.
4. In case of a fire accident or a chemical spill, one must try to move quickly towards the nearest accessible_____.

B. Write short answers for the following –

1. Describe briefly about how the workers must be trained in hazard identification and its control.
2. Mention suggested actions to be taken in case of an emergency. (Any Five)

Module 6 Industry and Organisational Requirements

Module Overview

The Indian garment industry is well established and recognized worldwide and also enjoys a considerable demand from both domestic as well as global market. The growth of manufacturers and suppliers from developing countries like India, China, Pakistan, Bangladesh and others, and zeal to compete and offer products at competitive prices, the manufacturers have compromised with working conditions, safety and rights of workers. The recognition to Labour Standards and worker's rights, most of the international apparel buyers started focusing and pressurizing manufacturers to comply with the Labour Standards and Worker's rights. This resulted in increased awareness and compliance to code of conduct policies among Indian garment factories.

Indian apparel manufacturers and suppliers are not only bound to follow government guidelines but they also must comply with Social Compliance Standards and Code of Ethics. Such compliance is mandatory not only for the manufacturers but also for their vendors, distributors and other collaborators involved in the supply chain.

Learning Outcomes
After completing this module, you will be able to: • Define Standard organisational compliance and related documents • Explain Customer specific regulations and requirements • Describe Ethical compliance and related documents • Explain Documentation and reporting of compliance deviation
Module Structure
Session-1 Standard Organisational Compliance and Related Documents
Session-2 Customer Specific Regulations and Requirements
Session-3 Ethical Compliance and Related Documents
Session-4 Documentation and Reporting of Compliance Deviation

Session: 1 Standard Organisational Compliance and Related Documents

WHAT IS ORGANISATIONAL COMPLIANCE?

Compliance means conforming to a rule. Compliance helps in better organisational control as it is a set of processes to ensure that the organisation as a whole abide by these set of regulations.

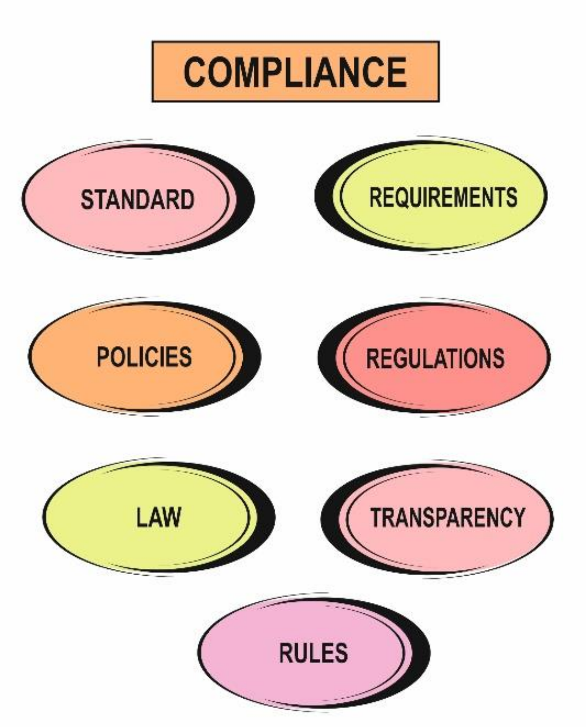


Fig.: 6.1 – Organizational Compliance

SIGNIFICANCE OF COMPLIANCE IN INDIAN GARMENT INDUSTRY

Compliance with respect to the garment industry must meet the audit requirements and refers to the following:

1. Quality of products
2. Safe and comfortable working environment

Apart from quality of products, International buyers are also demanding ethical manufacturing of products, which leads to the compliance of standards by garment manufacturers. The rise in export of garment products increases the demand for social compliance has also increased in the Indian Garment Industry.

Social Compliance

Social compliance refers to compliance in respect to social responsibility, ethical treatment of employees and the working environment. A code of conduct is followed regarding employee wages, working hours and work conditions. In order to keep a check on compliance by manufacturing unit, regarding various environmental standards, a compliance audit is conducted regularly. Some of the common requirements of social compliance are as follows-

i. **Child Labour-**Organisations must ensure no child under the age of 15 is employed.

ii. **Forced Labour-** No person should be employed under any threat and if they have not offered their services voluntarily.

iii. **Discrimination-** An organisation must not discriminate among its employees on factors like remuneration, promotion, training facilities etc.

iv. **Working hours-** An organisation must comply with government rules and industry standards on working hours, break timings, public holidays etc.

v. **Disciplinary Practices-** An organisation must not use any mental or physical abuse against the employees in the name of punishment.

Fig.: 6.2 – Social Compliance

INTRODUCTION TO AUDIT

Audit means to officially inspect, check or examine. Thus audit in organisational terms means check or inspection of various departments, resources and finances of an organisation. Audit is conducted regularly to ensure that no fraud or scam is caused by the organisation.

Audits and assessments ensure safety management, Security Management, and Risk Management. Aim of Auditing is to adhere to the prescribed

policies and procedures and to verify compliance with regulatory requirements and industry standards. It helps to ensure that all programs are properly designed and implemented. Further, audits also helps in identifying programme deficiencies so that recommendations can be developed for corrective action.

Audit in Garment Industry:

Audit can be done by:

1. Internal Auditor - Employees or heads of a particular department
2. External Auditor - An outside firm or an independent auditor.

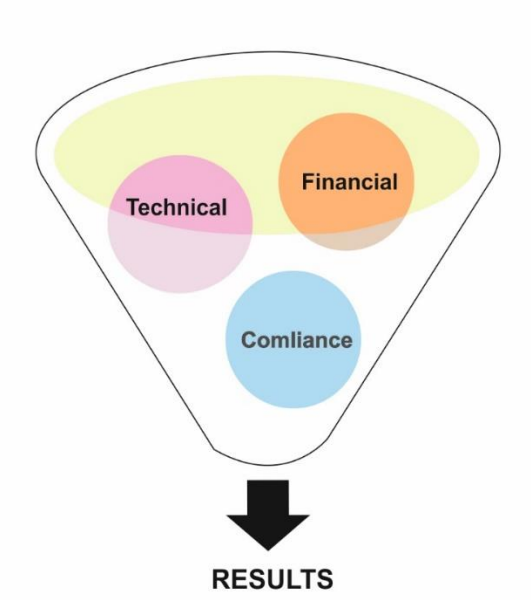


Fig.: 6.3 – Types of Audit

Compliance Audit

*A basic Complianceaudit may require the auditor to*examine the rules, regulations, orders and instructions for their legality, adequacy, transparency and prudence. Auditors gather information through visual observation at the site, review of document and interviewing staff. This collected data is then compared with the applicable permits and regulations to evaluate the compliance to the applicable legal requirements.

Following information may be collected and reviewed by an auditor during compliance audit-

1. Licenses, permits and facility information
2. Child labour
3. Forced labour and discrimination
4. Freedom of association and collective bargaining

5. Right of worker
6. Disciplinary practice
7. Working hours
8. Wages, benefits & compensation
9. Workplace safety
10. Occupational health & welfare
11. Environment management
12. Management practice & sub-contractor /supplier control
13. Training records
14. Company policies

Technical Audit

Technical Audit (TA) is a very crucial task for garment manufacturing unit. Every buyer conducts a technical audit before confirming an order to any garment factory. Many garment buyers have their own technical audit checklist, which may vary from buyer to buyer. Audit must be conducted in a routine manner at different stages of garment manufacturing. Through Technical Audit, auditors check the ability of a manufacturing unit to make export quality garments as per order and specifications. The initial step of a Technical Audit is to check the plant outline and its suitability to complete the order. The objective is to pick the right manufacturing unit for the order.

Following information is collected by an Auditor during Technical Audit-

- General Information about the Plant like number of staff members, production facility, location etc.
- Production capacity
- Versatility in product manufacturing
- Quality control of raw Materials
- In-house quality system
- Production planning &executions
- Process control
- Availability of in-house testing facility
- Availability of in-house design team
- Housekeeping and maintenance of instruments
- Quality assurance process
- Lighting, fire safety etc.

Financial Audit

Financial audit is an examination or inspection of accounts books by an auditor. It is then compared with physical checking of inventory to make sure that proper documentation is being followed. The objective is toconfirm the accuracy of financial statements prepared by the organisation.All the public listed firms are required to get their financial accounts audited by an independent auditor, before the results for any quarter is declared.

The idea behind financial audit is to check and verify the accounts by an independent authority to ensure that all books of accounts are maintained in a fair manner and there is no misrepresentation or fraud being conducted.

In India, independent financial audit for any organisation is conducted by chartered accountants licensed by The Institute of Chartered Accountants of India (ICAI).

Steps in auditing process:

Following are the four main steps in the auditing process:

1. **Defining the auditor's role and the terms of engagement**. It could be in the form of a work / authorization letter which is duly signed by the buyer.
2. **Planning the audit**. It includes detailed planning of deadlines and the departments the auditor would cover. Duration of audit may vary depending upon nature and area of work.
3. **Compilation of the information collected from the audit.** When an auditor audits the department, findings are usually put out in a report or compiled in a systematic manner.
4. **Reporting the result**. The results are documented in the auditor's report.

Phases of Audit:

There are three main phases of compliance audit in India:

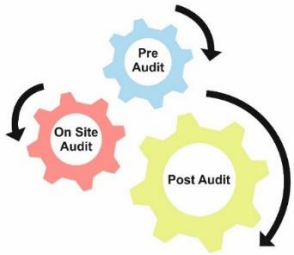


Fig.: 6.4 – Phases of Audit

i. Pre-Audit Phase

- Planning and organising the audit
- Establishing the audit objectives

- Scope and etiquette
- Reviewing the design of the programme by inspecting documentation.

ii. On-site Audit Phase

- Conducting personal interviews
- Reviewing records
- Making observations to assess programme implementation.

iii. Post-audit Phase

- Briefing the management about audit findings
- Preparation of Final report.

CORE LABOUR STANDARDS

International labour organisation has set rules for core labour standards, to protect the rights of workers and to ensure that worker get good working conditions.

Rules are set of four fundamental and universal Human Rights, as conceived by International LabourOrganisation:

i. Freedom from forced labour
ii. Freedom from child labour
iii. Freedom from discrimination at work
iv. Freedom of association and right to bargain collectively.

In most countries, all the export-import trade agreements require both the seller and buyer to meet the International labour Standards specially on the issues linked with Child labour and rights of workers.

These are the minimum 'enabling rights' which workers need to defend in order to improve their working conditions, to work in freedom and dignity.

The aim behind this concept is to make sure that the apparel industries have labour contractors which don't engage forced or child labourand get the supply chain of the suppliers audited.

Apparel Export Promotion Council (AEPC), which is an apex body of Indian apparel exporters, has designed a garment factory compliance program called 'Disha' (Driving Industry towards Sustainable Human Capital Advancement), with an aim to make India a global benchmark for social compliance in apparel manufacturing and export business. This Common Compliance Code project will prepare the Indian apparel manufacturers and exporters on a common platform towards a more social and environmentally compliant industrial environment.

Common Compliance Code

The common compliance code gives opportunity for the industry to negate international claims against child labour promotion in the garment industry. It also helps to improve the image of the industry and win more international businesses.

Some of the common compliance code guidelines for Indian Garment industry are:

- Employers must not be involved in unfair labour practices including child labour and forced labour.
- There should be no discrimination among workers' remuneration for work of equal value on the basis of gender, race, religion, age, disability, sexual orientation, nationality, political opinion, or social or ethnic origin.
- Employers should not threaten female workers with dismissal or any other employment decision that may affects their employment status negatively, in order to prevent them from getting married or becoming pregnant.
- Employers should ensure that proper air ventilation systems are installed within their factory premises to prevent airborne diseases among workers.
- If workers wish to form organisations or participate in union activities, including strikes, employer shall not restrict the workers in doing so by use any form of physical or psychological violence, threats, harassment, or abuse.
- Workers should be entitled to at a day rest in a week. If workers are required to work on a rest day, an alternative rest day must be provided in next week.
- Workers should be provided with paid annual leaves as per local laws, regulations and procedures. Employer shall not impose any undue restrictions on workers' use of annual leave or sick leave or maternity leave.
- Workers should be paid at least the legal minimum wage or the prevailing industry wage, whichever is higher.
- Employers should compensate workers for the hours they have worked. Workers engaged on a per piece rate payment scheme or any other incentive scheme, must be paid accordingly.
- There should not be any sort of unreasonable restrain in the freedom of movement of workers, including movement in canteen during breaks, using toilets, accessing water, or to access necessary medical attention.
- Garment exporters or manufacturer must ensure that none of their workers is less than 14 years of age, as per the guidelines for non-hazardous employment. Child labour is the most important concern in Indian Industries nowadays. Further, each worker shall have the right to enter into and to terminate their employment freely.

Indian apparel manufacturers must follow all the compliance related guidelines to comply with global standards. Compliance to such codes or

guidelines also helps the industries to boost their image or to project a positive image and protect their goodwill in the market. The Indian garment industry must stress on strong compliance rather than competition of manufacturing cheaper garments.

INTERNATIONAL LABOUR STANDARDS

International labour standard is a set of legal standards and guidelines whichset up basic principles and worker's rights at workplace. These standards aim at improving working conditions on a global scale.

Functions of International Labour Standards:

i. To prevent disruptive competition through the defence of particular workers group and setting minimum wage and working conditions.

ii. To promote constructive competition through definite rights, for e.g. workers involvement in decision-making, improvements in productivity and motivation of workers, increasing aggregate demand and promoting the creation of jobs, active labour market policies and ways of adjusting socially desirable measures.

Corporate Social Responsibility

What is Social Responsibility?

Social responsibility is "an organisation's obligation to increase its positive impact and reduce its negative impact on the society". It can also be known as "the concept that business entities should also be concerned with the welfare of the society at large".

The social responsibility of an organisation is referred to as 'Corporate Social Responsibility'.

Corporate social responsibility (CSR)essentially means that the organisation should work in an ethical manner and it should also be in the best interest of the various stakeholders. Nowadays, this concept of Corporate Social Responsibility in Indian garment industry is gaining great popularity. More and more organisations are trying to work in a way to protect the interests of the society at large along with the interest of its stakeholders including employees, customers and the suppliers.

Social Responsibility can be divided into two types:

a. Human responsibility refers to the responsibilities of the organisation towards the various 'stakeholders' in business parlance, including employees, shareholders, the government, customers, investors, suppliers, competitors and the society at large.

b. Environmental responsibility refers to the responsibilities of the organisation towards environment protection.

The scope of social responsibility extends beyond the legal responsibilities of an organisation. It has to be voluntarily fulfilled by the organisation; however there also are legal obligations.

Social Responsibility in the Garment Industry

The garment and textile industry is one of the largest industries in the world. It is also the biggest employer in India after agriculture. Globalization has made clothing affordable for all and competitive low prices. However, it has major negative impact on environment and society throughout the product life cycle. Production of textiles and garments requires consumption of vast energy. A considerable amount of wastes including sewage and discarded clothing is also generated which leads to the burden on the environment. Moreover, poor labour standards and poor working cum living conditions are additional outcomes of the ready-made Garment industry. Poor labour standards may include low wages, long working hours, hazardous work environment, workplace abuse and being excluded from unions.

Buyer companies in developed countries prefer outsourcing the production from overseas suppliers especially from countries where labour cost is considerably low, in order to keep the costing at the lower side as much as possible and also to avoid the ill effects of production and industrialization. Working conditions of labour and their human rights are a matter of great concern in developing countries such as in India, China, Bangladesh, Pakistan and other Asian countries. This poor condition leads to many tragedies like factory fire and labour abuse that again results in poor life for workers and even death.

Textiles and garment firms are realising their responsibilities towards its stakeholders, environment and society. The ways in which a textile firm can fulfil its responsibility towards various stakeholders are similar to those of firms in other industries, as is evident from the suggestive points mentioned below:

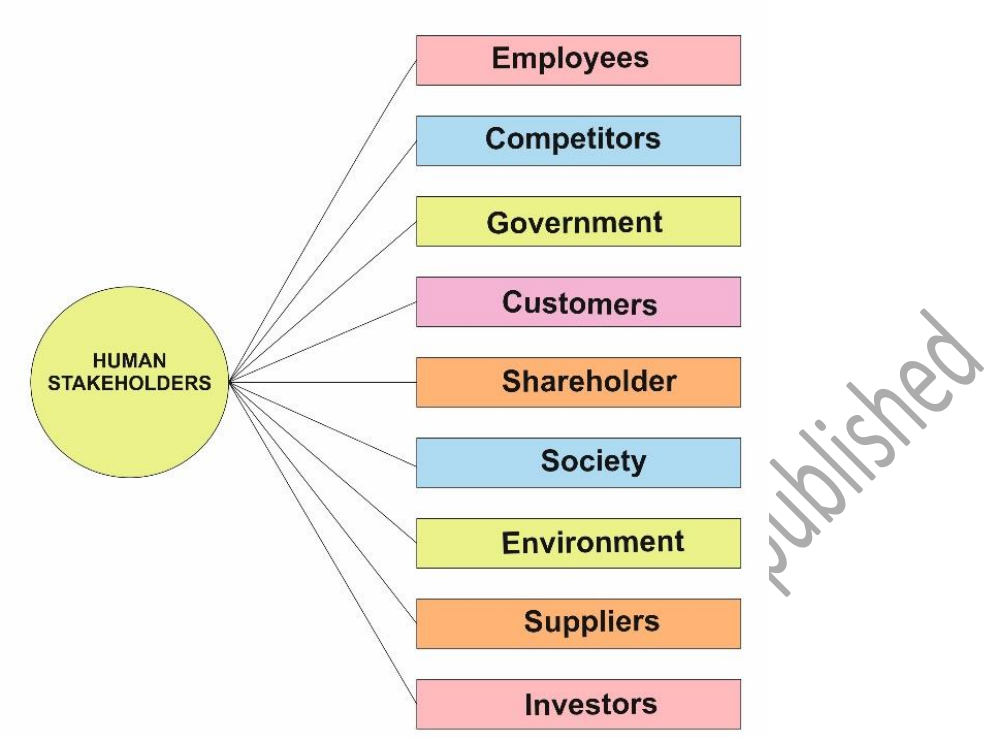


Fig.: 6.5 – Stakeholders in Garment Industry

1. Towards employees:

• By having ethical recruitment, remuneration, promotion and other policies.

• By providing opportunities to the employees to voice their opinion and complaints and have an effective policy for the solution of these complaints.

• Ensuring a safe working environment for the employees.

• Having fair policies for the solution of employee disputes.

2. Towards shareholders:

- By representing a fair picture of the company's financial position and profit/loss to the shareholders.
- By rewarding them with a fair rate of dividend.

3.Towards the government:

- By providing the necessary information to the government as and when required.
- By paying taxes and dues timely.
- By abiding by the laws and regulations of the area in which the firm operates.
- Contributing to the economy through exports.

4.Towards customers:

- By providing quality products to the customers at reasonable prices.
- By undertaking constant research and development and coming up with innovative and more useful products from time.

5. Towards investors:

- By giving the investors a true and fair picture of the financial condition of the business.
- By ensuring a fair ROI (Return on Investment)

6. Towards suppliers:

- By ensuring timely and fair payment to the suppliers.
- By maintaining a good relationship with the suppliers.

7. Towards competitors:

- By indulging in fair and ethical practices, thereby raising the spirit of fair competition

8. Towards society:

- By involvement in activities that ensure development of area and society at large.
- By having a philanthropy arm to take care of the needs of the under-privileged.
- By creating job opportunities.

9. **Towards environment:**

- By ensuring the purchase of environment-friendly supplies. By ensuring a pollution-free process of production. By establishing a system of efficient disposal.
- By adopting practices which make the production and product eco-friendly.
- By adopting eco-friendly packaging.

Activities

Activity 1

Make a power point presentation on CSR activities of a Firm.

Materials Required:

1. Writing material
2. Computer / laptop for PPT

Procedure:

1.Make a group of 4 students each.

2. Select a garment manufacturing firm

3. Enquire about its CSR activities through published literature or internet. (Volunteer in CSR activities if opportunity available)

4. Prepare a presentation document (preferably a PPT)

5. Present the presentation to the class.

Check Your Progress

A. Fill in the Blanks:

1. _____is conducted regularly to ensure that no fraud or scam is caused by the organisation
2. *A* _____ *audit may require the auditor to*examine the rules, regulations, orders and instructions for their legality, adequacy, transparency and prudence.
3. Compliance audit, Technical audit and _____ audit are three types of audits.
4. Pre-Audit, _____ audit and Post-audit are three phases of audit.

B. Write short answers for the following:

1. What are the three phases of audit? Explain.
2. What do you mean by audit? Explain its importance.
3. What is the significance of compliance in Garment Industry?

C. Write long answers for the following:

1. Explain types of audit.
2. Explain Corporate Social Responsibility.
3. Explain Core Labour Standards.

Session: 2 Customer Specific Regulations and Requirements

Customer specific regulations and requirements are the requirements developed by the customer with the expectations that the supplier will identify, implement and audit these requirements.

These requirements fall into following categories:

i. Material specific requirement
ii. Delivery requirements
iii. General requirements
iv. Process requirements (ex: calendaring)

Customers specific requirement cannot be ignored and seek to expand the standard or define how a customer wants a portion of the standard to be met.

Country specific regulations for sector and their importance:

There are several country based regulations and requirements which a manufacturer / supplier needs to comply with. Some of these regulations could be mandatory while the rest could be voluntary / suggestive which the companies are expected to follow. Compliance to all the regulations might give a company some competitive edge over others. There could be certain requirements specific for a market or specific to a product category.

1. MANDATORY REGULATIONS

There are several mandatory requirements that manufacturers and exporters need to comply with. This includes legal requirements concerning product safety, use of chemicals, product quality and labelling. Additionally, many buyers have created their own non-negotiable terms and conditions which all their suppliers are bound to follow. These requirements could be non-legal, but still mandatory. Following are the few textiles and apparel related mandatory regulations / guidelines followed worldwide:

i. REACH

REACH stands for Registration, Evaluation, Authorization and Restriction of Chemicals and applies to all products including textile and apparels to be exported to European Union.

Hundreds of chemicals are used at different stages of textile and apparel manufacturing. Some of these chemicals could be harmful to the user. Hence, it is essential to follow REACH regulations to avoid the possible harm to the user of the product. This restriction is imposed over a wide range of chemicals used in textile and leather and such restrictions could limit the use of these chemicals completely or partially as measured by weight.

A list of some of the important chemicals banned for textile and apparel sector is as follows:

a. **Azo dyes and its aromatic amines**–

   Currently, around 60%-70% of dyes used for industrial purposes belong to the family of azo dyes due to its economic efficiency and usability. They are widely used in the textile industry to give vibrant colors to almost all materials including cotton, silk, wool, leather and other fibers. Overexposure to azo dyes can cause diseases like bladder cancers, liver cancers, and hematuria.

   India has published legislation prohibiting the handling of a total of 112 azo and benzidine based dyes. In 1993, the Government of India prohibited the handling of 42 benzidine-based dyes. The Ministry of Environment and Forests further prohibited the handling of an additional 70 azo dyes in 1997.

   According to the Indian import policy, import of textiles and textile articles is permitted subject to the condition that they do not contain any of the hazardous dyes (azo dyes) whose handling, production, carriage or use is prohibited in India under the provisions of the Environment (Protection) Act, 1986.

b. **Tris (2,3-dibromopropyl) phosphate, tris (aziridinyl) phosphinoxide, and polybrominated biphenyls (PBB)** – Used as waterproofing and stain-repelling chemicals.

c. **Perfluoro octane sulfonic acid and its derivatives (PFOS)** – Used as biocide and preservatives

d. **Dioctyl tin (DOT) compounds, tributyltin (TBT) compounds, and pentachlorophenol (PCP)** – Used in metal trims and accessories (zippers, buttons, jewellery)

e. **Polycyclic-aromatic hydrocarbons (PAHs), and phthalates** – Used in leather products

f. **Persistent Organic Pollutants (POPs)** - used to make waterproof Textile material or flame-retardant fabric, and for leather finishing.

iii. **ORR Chem**stands for Chemical Risk Reduction Ordinance and is aregulation from Switzerland regarding use of chemicals. ORR Chem totally bans certain chemicals while allow them only for certain

applications when no other substitute is available. The idea is to minimize the risk and possible harm from chemicals by limiting their use.

Similarly, Austria, Denmark, Finland, Norway, Germany and the Netherlands also have specific regulations for the use of some chemicals like Formaldehyde and PCP.

iv. **Stockholm Convention**isa global regulation to protect human health and the environment from chemicals that remain intact in the environment for longer periods, become widely distributed geographically, accumulate in the fatty tissue of humans and animals, and have harmful impacts on human health and the environment.

v. Product Safety Regulations

It is buyer's responsibility to provide design of the product which is legally safe for consumers to use. However if a manufacturer / exporter is not sure about the safety of the product, he must discuss this with the buyer or check with the safety guidelines of the importer country. Before manufacturing a product for export, an exporter may always ask its suppliers for fabric, trims and accessories if they have exported their material before or are familiar with the legal safety requirements of apparel export.

a. Children's clothing regulations

Generally such regulations are formulated for children below 14 years of age. The idea is to avoid fatal incidents, strangulation and choking hazards. A few regulations have been developed by various countries as listed below:

- The European Union has a Specific Standard for the Safety of Children's Wearincludingbathrobes, pyjamas, nightshirts, etc.It does not apply to baby's nightwear. This standard does not require additional labelling on the product. General product safety directive of European Union restricts the presence of certain heavy material in packaging of children's clothing, including lead, mercury, chromium, and others.

  EN 14682 – Cords and drawstrings on children's clothing, **EN 14878 Textiles** – Burning behaviour of children's nightwear – Specification and **ASTM F1816-97** – Standard Safety Specification for Drawstrings.

- Similarly, UK has The Nightwear (Safety) Regulations 1985, for children's clothing.The United Kingdom's **BS 4578 Standard** devises test methods for hardness and air permeability for infants' pillows.

- The Washington Children's Safe Products Act (CSPA) requires manufacturers or importers of children's products to report to the Department of Ecology of Washington, before placing in the market products that contain chemicals that are included on the "List of Chemicals of High Concern to Children".

- Similarly, State of Vermont Act 188 also stipulates that manufacturers or importers of children's products should report to the Health Department when these products contain chemical.
- substances recorded in the "**List of Chemicals of High Concern to Children".**

b. Flammability or Fire Safety Standards

Countries like UK, Ireland, Netherland and Switzerland have specific legal requirements regarding apparel flammability. Flame retarding chemicals are used to avoid fabric flammability but this again is restricted under REACH, Hence a manufacturer / exporter has to check both REACH and Flammability guidelines for textile and apparel products.

There are national standards concerning the flammability of textile and apparel products in several countries. For ex: Standard for protective clothing, standard for protective gloves for firefighters, fire safety standard for bedding, standard for protective clothing with limited flame spread properties etc.

c. Standard for Personal Protective Equipment

CE stands for"European Conformity" and is an administrative marking which indicates conformity with health, safety and environmental protection.While exporting Personal Protective Equipment (PPE) to European Union, exporter is required to comply with the specific safety standards for the design, manufacturing, material use, testing and user instructions concerning PPE. The exporter is required to affix CE marking to indicate that the product is in line with the PPE safety requirements.CE marking is required only if one or more of the 25 CE marking directives cover the products being exported.

d. Biocide related regulations

If biocides are added to textiles to protect it from pests or bacteria, it must comply with the Biocidal Product Regulation (BPR) as well as REACH.

vi. Labelling Requirements

With an aim to inform the consumer about the kind of apparel they are buying, it is required to affix a label to the product. It also educates the consumer about the material content, country of origin / 'Made in', product care, washing instructions, etc.

According to EU Textile and clothing regulation, products have to be labelled or marked before they are made available in the market for sale.

As per a Notification issued by the Ministry of Commerce on November 24, 2000, all pre-packaged products (intended for direct retail sale

only) imported into India must carry the following declarations on the label: • name and address of the importer • generic or common name of the commodity packed • net quantity in terms of standard unit of weights and measurement (in metric) / size if garment • month and year of packing in which the commodity is manufactured, packed or imported, and the maximum retail sales price (MRP) • fibre content Footwear: Similar guidelines are applicable to footwear, which includes sizing and listing which standards are used. India follows the British size system for footwear. India has a voluntary Eco-Labelling scheme known as 'Eco-mark', which provides for easy identification of environment-friendly products. Criteria for the Eco-mark have been set for 16 product categories, including textiles and leather.

Following are some key points of labelling requirements:

a. Full fibre composition must be mentioned on the label of textile products. For example, Silk, wool, Nylon, Polyester, Cotton, Spandex etc. There is no mandatory standard for mentioning thefibre composition in most countries. However it is suggested as best practice to show the percentage of each fibre on the label. As per the mandatory labelling guidelines for textile and apparel products under the **Textile Labelling Act (TLA) of Canada**, it is mandatory to disclose fibre content information expressed in percentages by mass and the dealer identity information on the label.

Fig.: 6.6 – Fibre Content and Country of Origin label

b. Non-textile parts of animal origin must be clearly mentioned in the label (such as fur or leather)

c. The label should not contain abbreviations with the exception of mechanized processing codes.

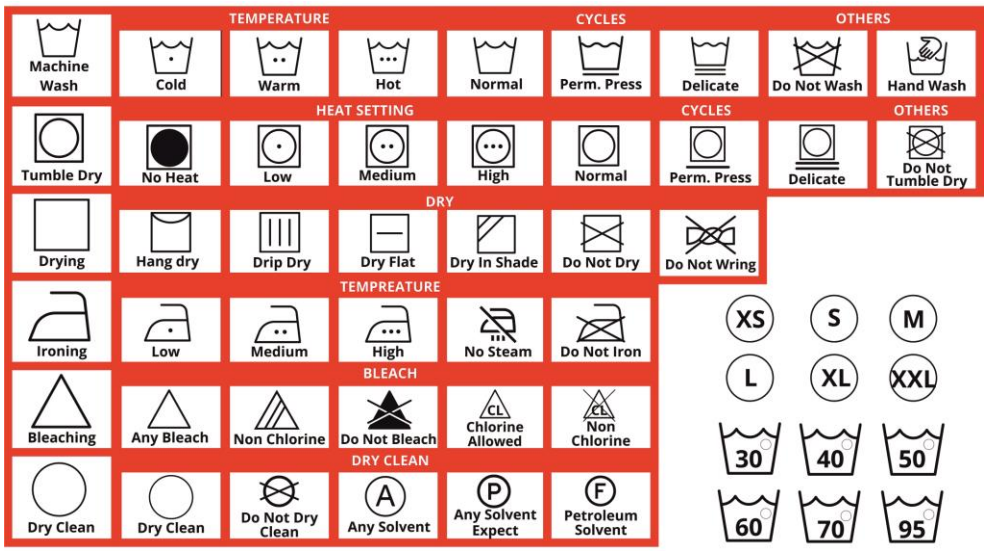


Fig.: 6.7 – Care Labels Symbols

d. Care instruction label is not mandatory under EU textiles regulation. However, if an exporter wishes to include them, care must be taken to use symbols as acceptable in the importer country.

Fig.: 6.8 – Care Labels

An ideal care instruction label must include information on:

- General care and warnings
- Washing
- Drying
- Ironing
- Dry-cleaning

e. Country of Origin is not a mandatory standard for exporting to most countries, however if an exporter wishes to include, it should be clearly labelled and should not be deceptive. For example, a product imported from China, must not be labelled as 'Made in India'.

Fig.: 6.9 – Brand, Size and Fibre Content Labels

f.Apparel products must carry a durable, legible, easily visible and accessible label, either on the product or on its packaging. Language of the label is preferably the language of the country of importer. For example, while exporting to Germany, the preferred language should be German. For apparels to be sold in Canadian markets, the care label should be in both English and French.

g. Size mentioning is not obligatory but expected on labels. Australia has defined size standards apparels too, which are:

- **AS 1344-1997**: Size coding scheme for women's clothing- Underwear, outerwear and foundation garments
- **AS 1954:1976**: Size coding scheme for men's clothing(including multiple fitting outerwear and industrial wear)
- **AS 1182:1997**: Size coding scheme for infants' and children's clothing- Underwear and outerwear

vii. Intellectual Property Rights (IPR)

Intellectual property (IP) is a legal concept which refers to creations of the mind for which exclusive rights arerecognized. Under intellectual property law, owners are granted certain exclusive rights to a variety of intangible assets, such as musical, literary, and artistic works; discoveries and inventions; and words, phrases, symbols, and designs. Common types of intellectual property rights include copyright, trademarks, patents, industrial design rights, trade dress, and in some jurisdictions trade secrets. Illegal copy of registered apparel trademarks or design is considered as infringement to IPR. While selling own designs or apparels under a trademark, an exporter must make sure that no Intellectual Property Rights are being violated. Similarly if designs are provided by the buyer, they will also be liable in case it is found to violate any IPR.

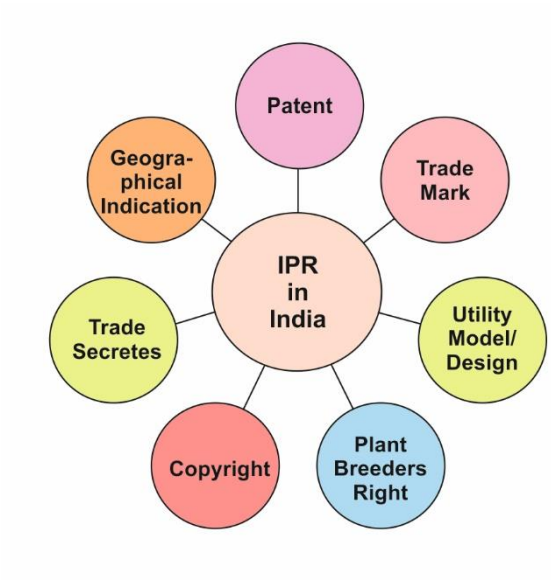


Fig.: 6.10 – IPR in India

2. VOLUNTARY STANDARDS

In addition to mandatory standards (including legal and non-legal), there are many services that buyers implicitly expect or at least highly appreciate if an exporter intends to do business with them.

A voluntary consensus safety standard (also known as a "non-government consensus standard") is a safety standard for consumer products that establishes consumer product safety practices recommended to be followed by product manufacturers, distributors and sellers.

Buyers set their own standards for products. The exported products must comply to such standards along with the mandatory standard requirements. These standards can be based on the end use of the product or may be based on the product processing etc.. Such standards and implemented by the buyer to meet their business goals of desirable quality product and desirable manufacturing for the product. These standards are different for different buyers.

For example:- The EU has a voluntary standard for Textiles known as **The Burning Behaviour of Children's Nightwear**, which helps in complying with the GPSD.

CUSTOMER SPECIFIC REQUIREMENTS MANDATED AS A PART OF WORK PROCESS

As we have country specific regulations in this sector for export of textiles and apparel related products, similarly, there could be few customer / company specific requirements / regulations, which exporter / manufacturer needs to fulfil in order to do business with that customer.

Following are few basic types of customer specific requirements

1. Restricted Substances Lists (RSLs)

Apart from REACH guidelines, many fashion brands and retailers have created their own list of restricted substances, which they impress upon their suppliers to follow. Such company specific Restricted Substances Lists may be stricter than REACH. Suppliers intending to work with these firms are required to comply with these customer specific RSL along with other Country specific regulations.

Customer Specific Standards are often based on **Zero Discharge of Hazardous Chemicals (ZDHC)** guidelines on safe chemicals use.

2. Product design and development

Generally buyers have their own design team and provide new designs to suppliers. However, suppliers or manufacturers can also maintain their design team and suggest the buyers about new designs ideas. Buyers will always appreciate new designs, materials or production methods to make them stand out in the market and have a competitive edge over other brands.

3. Garment Care Preferences

Most customers prefer an easy handling fabric which can be hand washed or machine washed and easy to care.

4. Smaller Lead Time

Some apparel brands/buyers work on fast fashion concept and prefer a supplier / manufacturer who can work on deadlines and smaller lead time.

5. Complexities

Factories usually try to get easier work order based on available fabric, simple designs and large lead time. However, brands in order to stand out in the market might ask for complex designs and innovative fabrics. To work with such buyers / brands and to supply those with their specific requirements could be difficult. Also manufacturers / exporters are required to be flexible with workmanship, Minimum Order Quantity (MOQ) and price.

6. Location of Factory in GSP

As per EU's Generalised System of Preferences (GSP) there are around 71 countries worldwide which are preferred over on listed countries to manufacture and export to EU buyers. EU Buyers are also benefited with removal of import duties. Thus, buyers might have specific requirements for manufacturer from a country listed in GSP.

Activities

Activity 1

Visit a Garment export unit and make a report on Country specific regulations which they follow.

Materials Required:

1. Writing Material
2. Ruler
3. Adhesive

Procedure:

1. Make a visit to any nearby garment export unit.
2. Enquire about the countries where they export their product.
3. Enquire and prepare a report about the country specific regulations being followed for any export order.

Check Your Progress

A. Fill in the Blanks –

1. _____ stands for Registration, Evaluation, Authorization and Restriction of Chemicals.
2. _____ is an administrative marking which indicates conformity with health, safety and environmental protection.
3. With an aim to inform the consumer about the kind of apparel they are buying, it is required to affix a _____to the product.
4. ZDHC stands for _____.
5. GSP stands for _____.

B. Write short answers for the following:

1. Explain 'Restricted Substances List'.
2. Give few examples of Children's clothing standards.

C. Write long answers for the following:

1. What are customer specific requirements?
2. Explain any 3 country specific mandatory regulations.

Session: 3 Ethical Compliance and Related Documents

INTRODUCTION

Indian Garment industry is getting attention from consumers, social workers, welfare organisations and branded international buyers. Many international buyers are demanding their manufacturers / suppliers to comply with their 'Code of Conduct' and 'Code of Ethics' while placing an order.

Adherence to quality standards and employee satisfaction has become important parameters for measuring the organisation's performance. Manufacturers and organisations comply with regulations and codes, not only out of a need to act generously, but also for survival in a globally competitive environment.

In the light of growing competition among exporting countries and increasing demand for products that meet internationally recognised standards, it is essential for the manufacturers / suppliers to improve their safety and health compliance code and provide proper working environment in their factories.

Several countries have also developed various international compliance standards on health and safety compliance. Exporters should follow these compliance codes to survive in the global market. Moreover, regular practice of compliance with code of conduct would ensure higher price of products, less employee turnover rate, smooth industrial relation as well as global image & reputation.

In a consumer market, brand name and reputation are most critical assets. Companies should adopt Ethical compliance code to protect their goodwill in the market. The Indian garment industry needs to be tough on compliance rather than competing with other developing countries manufacturing cheaper garments.

WHY CODE OF ETHICS IS REQUIRED?

Code of Ethics represents an organisation's self-made constitution / regulation which aim to provide general behavioural guidelines. Such guidelines are generally towards safe working conditions, prohibition of child labour, environment protections, work hours and wage rate control, equality and discrimination issues, labour safety standards, bribery and corruption, unfair practices etc.

Codes of Ethics are generally not as detailed as Code of Conduct. Code of Ethics represents an organisation's culture and values. Large organisations usually have a dedicated department of Corporate Social Responsibility to take care of ethical practices of the organisation. Also it is a great tool for the organisation or the Brand to portray and improve brand image to the customers.

By following such ethical practices, it is conveyed that the brand is dedicated towards high quality products, comply with legal requirements and undertakes to protect the environment. Such message boost customers' confidence in the brand and products quality. Brands speak loud about their ethics and value on their websites and promotion campaigns to educate the customers and stand out in the market.

Attention to working conditions and labour related issues is also required as most of the buyers outsource their requirements from countries with lower wage rates in order to cut down on costs. But such manufacturer might not be following ethical and fair practices related with labour and environment. Hence, buyers link their code of ethics to work orders for manufacturers and compel them to respect all the labour and environment related guidelines which the buyer company believes in.

These ethics are required for:

- Increasing national competitiveness in terms of social compliance
- Increasing competitiveness of small scale manufacturers
- Reducing burden on manufacturers

In India, the **Apparel Export Promotion Council (AEPC)** is committed towards legal compliance and ethical business practices and encourages members / exporters to comply with all applicable laws and regulations of the country, to meet all the **International Compliance Standards**.

Further, the council has designed a garment factory compliance program 'DISHA' (Driving Industry towards Sustainable Human Capital Advancement) that aims to spread awareness regarding the importance of compliance among Indian garment exporters.

Some of the important compliance codes in Indian garment industry are listed below.

Fig.: 6.11 – Code of Ethics

1. Working Hour and Wage Rate Compliance

- Garment factory must ensure that employees should get at least minimum wages according to the domestic law and as per the time spent by them in the industry.
- Employer should pay equal wages to both men and women employees, for performing the same work or work of a similar nature.
- Worker employed for more than nine hours on any day or for more than 48 hours in any week, should be entitled to wages at premium legal rates for such overtime work.
- Every worker should be given one holiday (for a period of 24 consecutive hours) in a week. Whenever a worker is required to work on a weekly holiday, he is to be allowed a compensatory holiday for each holiday so lost.
- Every worker is to be allowed at least half an hour rest interval after a maximum working of 5 hours at a stretch.
- Overtime work should be voluntary for employees and should be supported by legally required rate of compensation for such overtime period.
- No worker should be employed below the age of 14 as per guidelines of International LabourOrganisation.
- There should not be any sort of forced labour whether in the form of prison labour, indentured labour, bonded labour or otherwise.

2. Workplace and Work Environment Compliance

- Organizations should ensure proper ventilation, sufficient light and air to provide the employees with standard working environment.
- Indian garment industries should provide the workers with comfortable sitting chair with back support and proper leg space.
- All employees should be treated with dignity and respect. No employee should be subject to any physical, sexual, psychological or verbal harassment or abuse.
- Right of employees to form association and collective bargaining should be respected and recognized. No employee should be subject to any sort of harassment, intimidation or retaliation for engaging in association or collective bargaining.

3. Non-discrimination compliance

- Organizations should not discriminate employees on the basis of physical characteristics, beliefs and cultural characteristics. All the terms and conditions of employment should be based on an individual's ability to do the job. They should provide equal employment

opportunities for all employees and associates irrespective of the employees' race, colour, religion, age, sex, creed, national origin, marital status, etc.

- Women workers should receive equal remuneration, including benefits, equal treatment, equal evaluation of the quality of their work, and equal opportunity to fill all positions as male workers.
- Women workers who avail maternity leave, should not face dismissal or threat of dismissal or loss of seniority or deduction of wages, and should be allowed to return to their former employment at the same rate of pay and benefits.

4. Health and Safety Compliance in Indian Garment Industry

- Employees should not be exposed to hazards, including glues and solvents, which may endanger their safety, including their reproductive health.
- No employee should work on machines without adequate training, knowledge and supervision.
- Industries should comply with international standard code, such as ISO(Indian Standards Organisation) or importing countries standard code to become competitive in international markets.
- Wiring should be in good condition with no broken junctions or wires sticking out at the end.
- Eye-wear and face shields should be provided in areas with danger of sparks, glare, hazardous liquids and excessive dust.
- Ear plugs or muffs should be given in places with excessive noise such as generator rooms and rooms with embroidery machine.
- Headgear and protective shoes are necessary for workers involved in loading and unloading operations.
- Factories should have effective fire extinguisher with proper usage instructions.

Activities

Activity 1

Visit a Garment export unit and make a report on Code of Ethics which they follow.

Materials Required:

1. Writing material

2. Ruler
3. Adhesive

Procedure:

1. Make a visit to any nearby garment manufacturing unit.
2. Enquire about the countries where they export their product.
3. Enquire and prepare a report about the Code of Ethics being followed.

Check Your Progress

A. Fill in the Blanks :

1. Adherence to _____and employee satisfaction has become important parameters for measuring the organisation's performance.
2. _____represents an organisation's self-made constitution / regulation which aim to provide general behavioural guidelines.
3. Large organisations usually have a dedicated department of _____to take care of ethical practices of the organisation.
4. _____is committed towards legal compliance and ethical business practices.
5. Organizations should not _____employees on the basis of physical characteristics, beliefs and cultural characteristics.

B. Write short answers for the following –

1. Explain 'Code of Ethics'.
2. Explain in brief about workplace and work environment compliance in a garment unit.
3. Discuss about wage rates and working hour's compliance for workers in a garment unit.

C. Write long answers for the following-

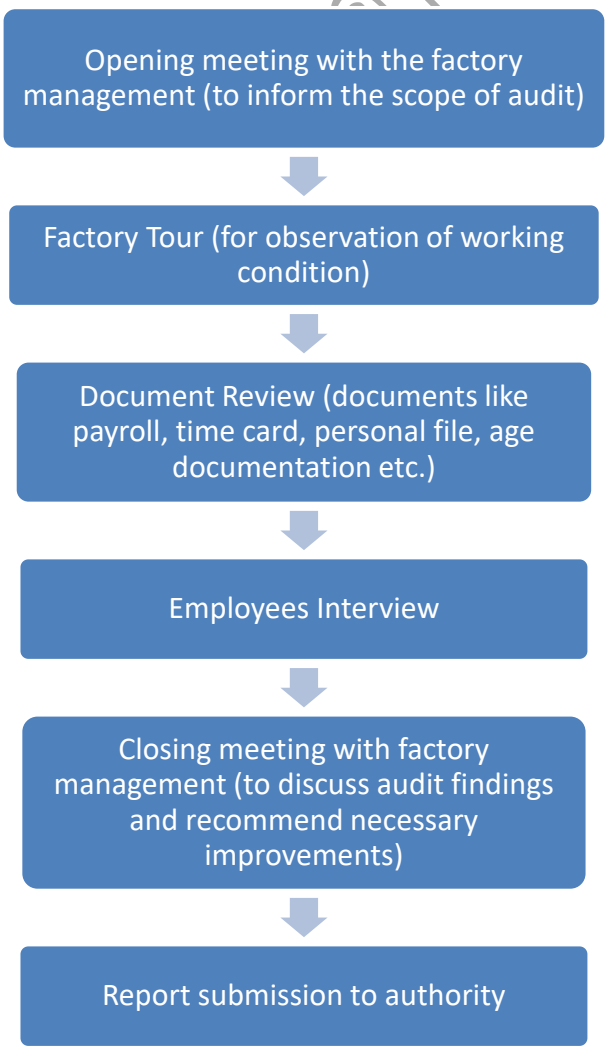
1. Write short note on compliance code guidelines for Indian Garment Industry.
2. Explain Health and Safety compliance in Indian Garment Industry.

Session: 4 Documentation and Reporting of Compliance Deviation

Social compliance deals with employee's health and safety, their legal rights and working environment from social perspective. To make a factory compliant to such national or International standards, it needs to follow local labour law and international social compliance requirements. Social compliance audit is generally related to child labour, forced labour, health and safety, abuse and discrimination, disciplinary practices, working hours, remuneration, freedom of association, management systems, etc.. Social compliance is a vital part of the apparel industry because it has an impact on a company's reputation and business.

IDENTIFICATION AND REPORTING OF ANY POSSIBLE DEVIATION

Social compliance audits conducted as per the Code of Ethics of different buyers are based on the following steps:



CORE LABOUR STANDARDS

COMPLIANCE CLUSTERS	COMPLIANCE POINTS
1. Child Labour	• Child Labourers • Documentation and Protection of young workers • Hazardous works and other worst forms
2. Discrimination	• Gender • Other grounds • Race and Origin • Religion and Political opinion
3. Forced Labour	• Bounded Labour • Coercion • Forced Labour and overtime • Prison Labour
4. Freedom of Association and collective Bargaining	• Collective bargaining • Freedom to Associate • Interference and discrimination • Strikes • Union Operations
5. Compensation	• Minimum wages • Overtime wages • Method of payment • Wage information, use and deduction • Paid leave • Social security and other benefits
6. Contrasts and Human Resources	• Employment contracts • Contracting procedures • Termination • Dialogue, Discipline and Disputes
7. Occupational safety	• OSH Management systems

and health	• Chemicals and hazardous substances • Workers Protection • Working Environment • Health services and First Aid • Welfare facilities • Workers Accommodation • Emergency preparedness
8. Working Time	• Regular Hours • Overtime • Leave

These are 8 major compliance cluster which are divided into compliance points. These points are required to be checked during audit. The audit checklist may vary from organisation to organisation but a suggestive checklist is shown below:

a. Checklist for Child labour and young workers:

1. Employer having a reliable system to check age of worker before hiring.
2. Employer complying to guidelines regarding fitness of worker
3. Maintenance of a register of workers below 18 years of age
4. Workers below 18 years of age performing work which is hazardous by nature.
5. Workers engaged for more than permissible working hours.
6. Engagement of employer in child labour.

b. Checklist regarding wages and working hours:

1. Workers are paid their wages on time
2. Worker's wages are paid correctly as per norms and minimum standards.
3. Women workers are paid for maternity leaves.
4. Workers are paid correctly for annual leaves
5. Workers are paid correctly for festival holidays.
6. Workers are paid correctly for sick leaves.
7. Workers are paid correctly for casual Leaves.

8. Workers are paid correctly for duration of work stoppages.
9. An accurate pay-roll record is maintained by the employer.

c. Checklist for social security and other benefits:

1. Employer has provided compulsory group insurance for workers?
2. Employer pays correct compensation in case of worker's death.
3. Workers are paid correct compensation for work related accidents and diseases.
4. Employer has established a Provident Fund and deposit employer's share for workers as per norms.
5. Festival bonuses are paid to workers as per norms.
6. Workers are provided with wage slips.
7. Any unauthorized deduction is not made by employer from worker's wages / salary.

d. Checklist for worker working with chemical and hazardous substances:

1. Workers engaged for working with chemical or hazardous substances are effectively trained.
2. Employer has taken action and precaution to prevent exposure to chemicals or hazardous substances.
3. All chemicals or hazardous substances are properly labelled.
4. Employer maintains an inventory of chemicals and hazardous substances at workplace.
5. All chemicals and hazardous substances are properly stored.
6. Availability of adequate washing and cleaning facility in case of exposure to hazardous substances.
7. Employer possesses license for storage and use of chemicals.

e. Checklist for emergency preparedness:

1. Workers are trained for firefighting and rescue.
2. Availability of emergency exit window and doors.
3. Availability of alternative stairs.
4. Availability of firefighting equipment.
5. Availability and functioning of fire detection and alarm system.
6. Emergency exists and escape routes are clearly marked.

7. All flammable materials are safely stored.
8. Possible sources of ignition are appropriately safeguarded.
9. Periodic emergency drills are conducted.

f. Checklist for Health services and first aid:

1. Availability of required health facility and staff.
2. Employer complying with medical check-ups of workers.
3. Workers are trained for first-aid and first-aid team is formed.
4. Availability of readily assessable first-aid boxes.

g. Checklist for welfare activities:

1. Availability of adequate day care facility
2. Availability of adequate lunch room / canteen.
3. Availability of adequate rest rooms
4. Availability of adequate washing facility
5. Availability of clean and safe drinking water
6. Accessible toilets and washrooms.

h.Checklist for working environment:

1. Noise levels are acceptable.
2. Temperature and ventilations are acceptable.
3. Workplace is clean and tidy.
4. Workplace is adequately lit.

PROCEDURE TO FOLLOW IN CASE OF DEVIATION

After the compliance audit, in case of any deviations are recorded, the auditor prepares a **Corrective Action Plan (CAP)**. Such plans are reviewed periodically and worked upon to avoid deviations before next audit.

Following are the aims of CAP:

1. To identify the most important shortcomings
2. To understand the root cause of the shortcomings
3. To assign a responsible person
4. To propose corrective action
5. To reach goals within time

In order to ensure that suggestions of CAP are implemented, follow-up audits are done as soon as a number of improvements are achieved. Third party audits can also help the manufacturer / exporter to get better suggestions and audit reports.

Exit meeting with management

The exit meeting with management takes place at the end of the factory visit. The aims of the exit meeting are:

- To get management on board to implement the process- to improve labour practices.
- To present the main audit findings to management, check whether management agrees with the findings and ask a response from their end with respect to findings thereby unveiling the possible causes of the problems which are identified.
- To propose corrective action plans for improvements, discuss with management whether improvements are feasible and within timeframe.
- To present main audit findings to factory level trade union representatives or elected worker representatives.

Activities

ACTIVITY 1

Visit a garment manufacturing unit and make a report on Corrective Action Plan which they follow in case of compliance deviation.

Materials Required:

1. Writing material
2. Ruler
3. Adhesive

Procedure:

4. Make a visit to any nearby garment export unit.
5. Enquire about the countries where they export their product.
6. Enquire and prepare a report about the Corrective Action Plan followed in case of compliance deviation.

Check Your Progress

A. Fill in the Blanks:

1. _____compliance deals with employee's health and safety, their legal rights and working environment from social perspective.
2. Social compliance audits are conducted as per the _____of different buyers.
3. These are ___ major compliance cluster which are divided into compliance points.
4. After the compliance audit, in case of any deviations are recorded, the auditor prepares a _____.

B. Write short answers for the following –

7. Explain in brief the process of auditing compliance standards in a garment unit.
8. What precautions are to be taken by a Garment unit where chemicals or hazardous substances are used?
9. What are the guidelines regarding employment of child labour and young workers?

C. Write long answers for the following-

3. What procedure to be followed in case of any deviation in compliance with standards?
4. How should a garment unit be prepared for emergency?

ANSWER KEY

MODULE 1

SESSION 1

Fill in the blanks

1. Anthropometry
2. Body
3. CB (Center back)
4. Width
5. body type, weight, body measurements

SESSION 2

Fill in the blanks

1. Work tickets
2. Mass apparel
3. Item bundling
4. Ticketing
5. Batch Mark Label

MODULE 2

SESSION 1

Fill in the blanks

1. Quality control
2. Raw material sourcing, finished products
3. Quality management
4. Inspection
5. Rejection

SESSION 2

Fill in the blanks

1. Blue-print
2. Trims, accessories

True/False

1. False
2. False
3. True

SESSION 3

Fill in the blanks

1. In-line
2. roaming, roving
3. in-line inspection report

MODULE 3

SESSION 1

Fill in the blanks

1. seams
2. durability
3. Yarn
4. washing

Multiple choice questions

1. (a) Fabric
2. (a) Fabric dye
3. (a) Formation of fibre balls on fabric surface
4. (d) Accessories

SESSION 2

Fill in the blanks

1. Sewing
2. Stitches per inch
3. In-line checkers
4. Critical, major,minor
5. Puckering
6. Stain

SESSION 3

Fill in the blanks

1. 27
2. Traffic light system
3. Tolerance
4. Inspect, sort

SESSION 4

Fill in the blanks

1. Report
2. Reporting
3. Potential, current

MODULE 4

SESSION 1

Fill in the blanks

1. Safety
2. Fire
3. Running
4. Disconnection

5. Smoke, fumes

SESSION 2

Fill in the blanks

1. Motivates
2. Deep
3. Disinfectants
4. Degreaser
5. Regular

SESSION 3

True/false

1. False
2. True
3. False
4. True
5. True

SESSION 4

Fill in the blanks

1. Communication
2. Tone , method
3. Machine operating
4. Sensitive protective
5. Repairs, modifications, maintenance

MODULE 5

SESSION 1

Fill in the blanks

1. Health, security
2. Fire extinguishers
3. Emergency
4. Oily
5. Proper sanitary facilities

SESSION 2

Fill in the blanks

1. Emergency
2. Physical injury
3. Workstation
4. Chair
5. Breaks

True/false

1. False
2. True
3. False
4. False
5. True
6. True
7. True
8. False

SESSION 3

Fill in the blanks

1. Hazard
2. Identification
3. Entanglement
4. First aid
5. Assembly points

Identify and name the safety signs

1. Wet floor
2. Smoking ban sign
3. Hazardous substance
4. Flammable substance

SESSION 4

Fill in the blanks

1. Supervisor
2. Emergency response
3. Emergency
4. Exit door

Module 6

SESSION 1

Fill in the blanks

1. Audit
2. Compliance audit
3. Financial
4. On-site

SESSION 2

Fill in the blanks

1. REACH
2. CE
3. Label
4. Zero discharge of hazardous chemicals
5. Generalised system of preferences

SESSION 3

Fill in the blanks

1. Quality standards
2. Code of ethics
3. Corporate social responsibility
4. Apparel export promotion council (AEPC)
5. Discriminate

SESSION 4

Fill in the blanks

1. Social
2. Code of Ethics
3. 8
4. Corrective action plan (CAP)

GLOSSARY

Pattern: A pattern is a guide which is used to cut parts and components of a garment from fabric for sewing operations.

AQL: Accepted quality level or AQL is the minimum accepted quality lever pre-decided by the buyer.

Lab-dip: Alab-dip is a small specimen of dyed fabric or yarns prepared for colour approval.

Hydraulic systems: it is a system that works by employing a pressured fluid to function and accomplish duties.

Drilling machine: These machines in the apparel industry are those machines which are used to cut the drill marks in the garment pieces. These drill marks are used to identify the position of buttons, darts, pockets etc..

Debris: scattered pieces of waste material.

List of Credits

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