International Labour Organization

# Stitching garments

## Sewing room operations

Factory Improvement Toolset

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# Factory Improvement Toolset

The Factory Improvement Toolset (FIT) is an innovative self-facilitated, activity-based learning approach designed by the International Labour Organization (ILO) to create more decent and sustainable employment. FIT supports manufacturers in global supply chains to improve productivity, competitiveness and working conditions by upgrading production systems and factory practices.

FIT has been developed to be a sustainable, time- and cost-efficient option for supporting factories to enhance productivity through improved business practices and working conditions. FIT focuses on areas of production improvement and actions to be taken specific to each participating factory. It can be utilized as stand-alone learning tools or to complement other training programmes.

With each module lasting no more than 2.5 hours, FIT enables factories to train personnel, whilst minimizing interference with production realities. The easy-to-use methodology makes it possible to rapidly scale the implementation to reach a large cohort of trainees across multiple production facilities.

Working in small groups, participants review real-life situations and engage in discussions to determine improvements to be made in factory without an external trainer or specialist. This self-facilitated, activity-based and highly participatory learning approach positions participants as both student and teacher and makes the toolset self-tailored to the needs and interests of each group.

## About this module

This FIT module on Stitching garments is a training for garment manufacturers to improve sewing room operations. Participants will work on the topics of seams & stitches and sewing operations. This module takes about 2 hours to complete.

## Upon completion of the training, participants should have:

- Understood different types of seams and stitches, sewing machines and production aids.
- Understood how to go about selecting seams, stitches, machines and aids.
- Learnt about good practices for performing sewing operations.

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The **Factory Improvement Toolset** of the **International Labour Organization (ILO)** are developed and provided by the ILO's **Enterprises Department**.

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# Guidelines for successfully using the training tool

## Read out-loud

The FIT tool is designed for participants to take turns reading the instructions in the modules out loud to the group. At least one member of the group should be selected in the beginning of the session to take this responsibility.

## Work as a group

Always work in groups of 5-7 during a FIT session. The programme will not be successful if participants work independently or do not collaborate with each other.

## Be active

Encourage everyone in the group to actively contribute to the discussion. Ensure that no group member dominates the discussion or does not participate at all.

## Monitor the time

Select one member of the group to monitor the time for each activity and remind the group when it is time to move to the next exercise.

## Complete the action plan

Complete the action plan at the end of the session. This will help ensure that FIT results in improvements in the factory. Review the plan a while after the session to make sure that actions in the plan has been completed accordingly.

# Icons

A set of icons is used throughout the modules to provide easy to recognize reference points for different tasks within each session and activity.

## Read out loud

One member of the group should read out loud to the rest of group.

## Knowledge link

Knowledge and skills are linked to other FIT learning resources and support.

## Time allotted

Indicates how much time each sessions and activity should take.

## Supplies needed

Indicates that supplies may be necessary to complete the session.

## Begin step-by-step instructions

Indicates that the step-by-step instructions for an activity are beginning.

## Think about it

Indicates additional information for the participants to think about.

# Measuring your performance

Measuring operational efficiency is a key aspect of running a productive factory. The box(es) below guides you in understanding which measurement indicator(s) can be used to measure and evaluate the performance of your factory in relation to the topics covered by the FIT sewing room series.

| **Indicator 1** | **Target achievement (%)** |
|---|---|
| **Definition** | The percentage of the daily production target that was achieved (that was actually sewn in terms of good production). It can be calculated separately for each line, or for all lines together. The closer to 100%, the better. |
| **Purpose** | To understand how efficiently each sewing line operates, how realistic production targets are, and begin to identify how to improve efficiency in the sewing room. |
| **Calculation** | (# pieces produced today / daily production target) x 100%<br>Notes: The daily target should be based on the SMV, and line efficiency discounted. Target = (working hours x 60 / SMV) x line efficiency % |
| **Frequency** | Calculate daily (for each line or all lines), then calculate a monthly average. |
| **Responsible** | Sewing room manager, Line supervisors |

| **Indicator 2** | **Defect per hundred units - DHU (%)** |
|---|---|
| **Definition** | The amount of defects found in average per 100 inspected pieces or garments. The lower the DHU, the higher the quality in your factory. It can be calculated separately for each line, or for all lines together. |
| **Purpose** | To understand quality in your sewing room, set a quality improvement target, and begin to identify ways to reduce defects and improve sewing quality. |
| **Calculation** | (total # defects found / total # of pieces or garments inspected) x 100%<br>Notes:<br>• It is better to calculate this separately for in-line and end-line inspections.<br>• If only the end-line calculation is taken but in-line inspection is also recorded, add defects found in in-line and end-line, however, do not add up garments inspected at in-line (only take the end-line count). |
| **Frequency** | Calculate daily (for each line or all lines), then calculate a monthly average. |
| **Responsible** | Sewing room manager / Line supervisor / Quality checker |


BUFFER

Session 1

# Business case study

## Goals

**Preparing you for the type of discussions you will have with other group members throughout the learning module and understanding the benefits of being exposed to different perspectives.**

**Understanding better why planning, preparing and carrying out sewing operations with precision is important in the factory.**

Session 1

# Overview

**One member should read the full session out loud to the rest of group**

**15 minutes**

**Learning manual, pens, markers and poster paper**

A business case study presents a real-life situation for learners to reflect on and discuss with other group members. By discussing the case, students learn from others' ideas and perspectives, and develop an understanding of the topic at hand within the workplace.

**One group member reads the case study out loud**

**The whole group discusses the case study**

**Everyone develops a deeper understanding of the topic**

# Activities

Activity

1

15 minutes

## Case study review and respond

The case study below presents a situation that could happen in real life.

### Instructions:

**1)** As a group, listen to one member read the case study below while following along in your learning module.

Sopheak is a new sewing room manager at the HS garment factory. She notices several issues with sewing operations in the lines. Line supervisors don't perform a style analysis (don't make a line sample) before production, so they are not familiar with stitching and machine needs. Work aids are not used at HS factory. Parts are not marked to guide operators. This makes line-setting and production time longer, and operators make more mistakes due to lack of guidance. Besides, operators have not been trained in avoiding common quality issues such as thread tension, which lowers the overall quality. Most machines don't have a needle guard, which has gotten several operators injured.

To solve these problems, Sopheak changes the sewing planning process. Now, all line supervisors carry out a style analysis ahead of starting production. They do this using specific forms, listing the operation sequence with appropriate stitches, machines, work aids and needle size. Sopheak purchases presser feet and commonly used folders in bulk for a good price. Then, at her request, line supervisors take a half day to train their sewing team in avoiding common quality issues, and sewing safely.

Thanks to this, a lot of time is saved during line-setting and production. Operators are more productive, and make less mistakes. Quality improves, and accidents rarely happen.

**2)** Together, discuss Sopheak's situation by answering the three questions in table 1 on the next page.

| Table 1. Questions about Sopheak's situation |
| --- |
| 1. What problems has Sopheak identified? What impact do these problems have on the factory and its workers? |
| 2. What does Sopheak do or change in order to solve these problems? |
| 3. What are the results of Sopheak's solutions for the factory and its workers? |

This page has been intentionally left blank and can be used for note taking.

Session 2

# Learning about the topic

## Goals

**Learning about seam and stitch classes and how to select the appropriate class.**

**Understanding sewing machines, needle size and work aids, their importance and how to select them.**

**Learning how to prepare parts for sewing by marking in a more structured and efficient way.**

**Discussing good sewing practices and brainstorming ways to preserve quality throughout the process.**

Session 2

# Overview

**One member should read the full session out loud to the rest of group**

**90 minutes**

**Learning manual, pens, and markers**

This training module aims to help you improve the way your sewing room operates by focusing on stitching operations. Before actual sewing, selecting the right seams, stitches, machines and aids is critical to avoid reworks and production delays. Then, good sewing techniques are crucial to ensure garment quality and conformity. Throughout this module, you will work on the three topics below.

**Seams & stitches**

**Sewing tools**

**Sewing operations**

First, you will start by learning more about different types of seams and stitches, and how to select them. Then, you will move on to discussing different types of sewing machines, needles and work aids, and how to select them. Finally, you will learn more about to sew garments in a safer and more productive way while ensuring superior quality.

# Activities

Activity
**2a**

25 minutes

## Seams & stitches

**A seam** is the way two pieces of cut fabric are joined along a seam line. They form the structure of a garment. **A stitch** is the pattern according to which threads are interlaced to create a seam. Stitches have different depths, thickness, and length. In this activity, you will discuss seams and stitches and how to select them.

## Instructions:

**1)** Together, look at the most common seam classes in table 2, and match each one with its corresponding picture. Solutions are at the bottom of the page.

**2)** Together, discuss the two questions in table 3.

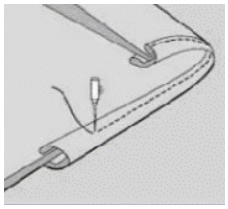
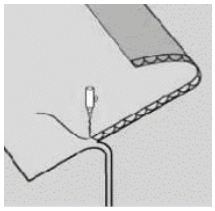
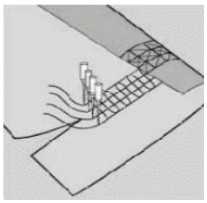
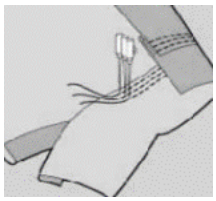
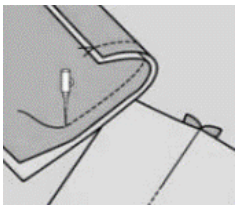
**3)** Together, look at the most common stitch classes in table 4, and match each one with its corresponding picture. Solutions are at the bottom of the page.

**4)** Together, discuss:

- Who selects the seam class in your factory, and how?
- Who selects the stitch class in your factory, and how?

**Good seams** are strong, durable, securely fastened and must look continuous in appearance. The quality of the seam largely depends on thread quality, so it is important to select the right thread. The seam class should be selected based on the operation to perform and the type of fabric.

## Table 2. Seam classes

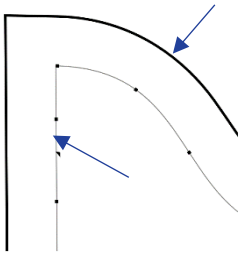
|  A |  B |  C |  D |  E |
|---|---|---|---|---|

| Seam class | Letter |
|---|---|
| 1. **Superimposed seam:** Two or more pieces of fabric are sewn together. Fabric ends are in the same direction. | |
| 2. **Lap seam:** Two or more pieces of fabric overlap each other. Plies are in opposite directions. Lap seams are very strong. | |
| 3. **Bound seam:** A piece of fabric is sewn around the edge of a garment to finish the edge. | |
| 4. **Flat seam:** Two pieces of fabric are joined precisely at their edges. Flat seams are less thick. | |
| 5. **Edge finishing:** The edge of the fabric (hem) is sewn and held so that the yarns of the fabric cannot easily open. | |

## Table 3. Seams

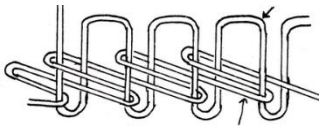
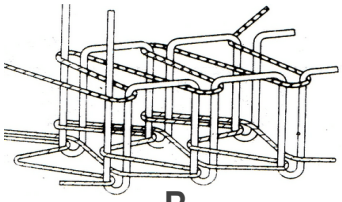
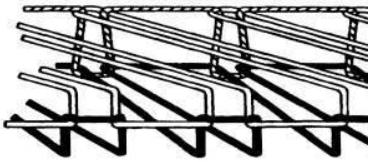
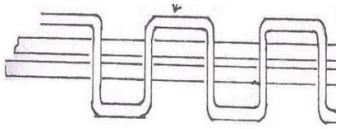
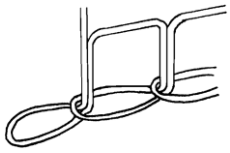
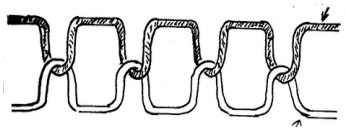
1. What is a good seam (a quality seam)? Brainstorm, then list all the properties you can think of below.

2. What is a seam line? What is a seam allowance? How do you select the seam allowance? Tip: Look at the image below



Solutions: 1. E; 2. D; 3. A; 4. C; 5. B.

## Table 4. Stitch classes

| | | |
|---|---|---|
|  A |  B |  C |
|  D |  E |  F |

| Seam class | Letter |
|---|---|
| 1. **Class 100 – Chain stitch:** Single needle. The thread intertwines with itself. It is more elastic, but gets unstitched easy. | |
| 2. **Class 200 – Hand-made stitch:** Single needle. Usually made by hand or with a special machine. Cannot be used for long sewings. | |
| 3. **Class 300 – Lock stitch:** Two threads intertwine with each other. Both sides look the same. It is quite strong. Most widely used class. | |
| 4. **Class 400 – Multi-thread chain stitch:** One or more threads. More secure and elastic than class 300. Widely used for knitted garments. | |
| 5. **Class 500 – Overedge chain stitch:** More than two threads. Used only for edge finishing seam, and knitted garments. High thread consumption. | |
| 6. **Class 600 – Cover / flatlock stitch:** Three or more threads intertwine. Used for flat seams. Very high thread consumption. | |

Each **class of stitch** has different variations (e.g. 101, 203, etc.). The stitch class should be selected based on the seam class, garment style and fabric type. Then, you can select the appropriate sewing machine based on the selected stitch class and operation to perform.

Seam, stitch and machine selection should be done when making an operation bulletin (style analysis + operation breakdown). To learn more, ask for the “Making an operation bulletin” module.

Solutions: 1. E; 2. D; 3. F; 4. A; 5. C; 6. B.

Activity

# 2b

25 minutes

## Sewing machines

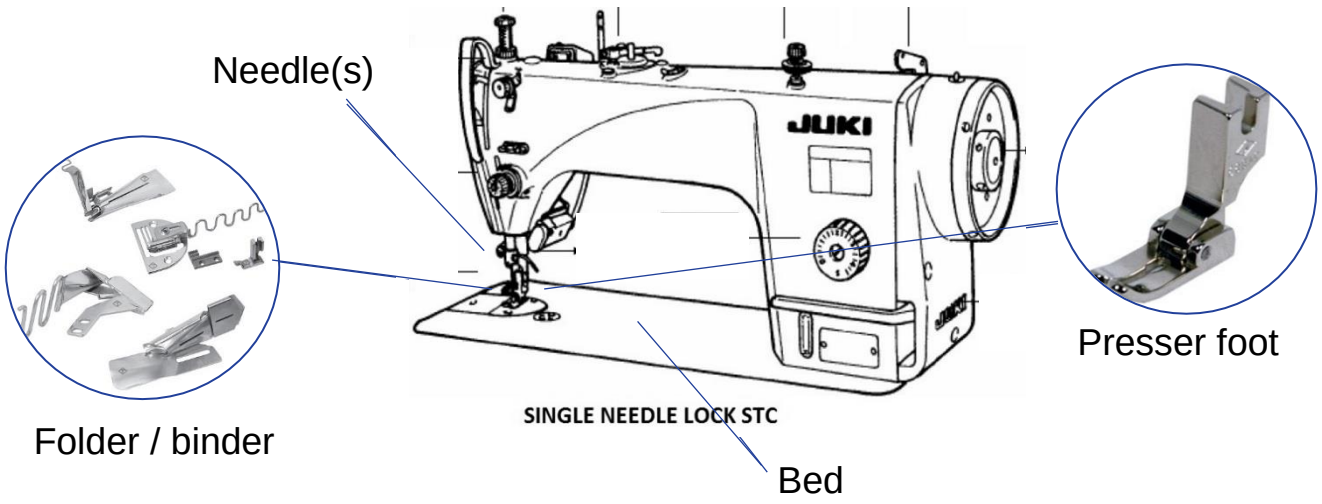
Once you have carefully selected seams and stitches, you can move on to choosing the appropriate **sewing machines**. This is usually done when the line supervisor carries out the style analysis, and is very important to ensure quality. In this activity, you will learn more about sewing machines and needle size and how to select them.

## Instructions:

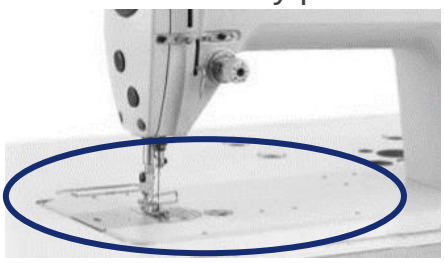
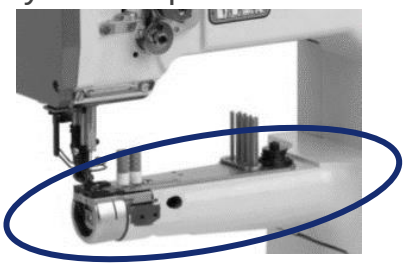
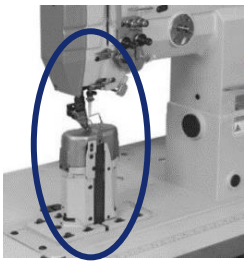
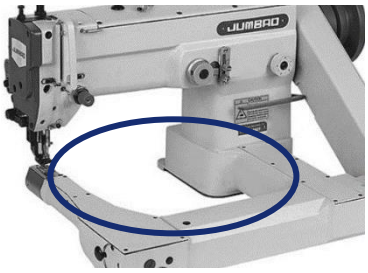
**1)** Sewing machines should be selected based on the fabric, style to be sewn, and stitch type. Together, look at the image below, then at table 5. Then, discuss:

- What kind of sewing machines do you use (explain bed type, needle # and stitch class)?
- Who selects sewing machines in your factory, and how?

**2)** Together, look at table 6 on the next page, then discuss: How do you usually select needle size?




Seam, stitch, machine, needle size and work aid should be selected when the line supervisor makes a line sample and carries out a style analysis, about 10 days before production starts. To learn more, ask for the “Making an operation bulletin” module.

| Table 5. Sewing machines | | | |
|---|---|---|---|
| **By bed type** | **Flat bed:** Most commonly used. Can be used for any part.  | | **Cylinder bed:** Allows you to easily rotate cylindrical parts such as cuffs.  |
| | **Post bed:** With small elevated sewing area to attach smaller parts.  | | **Off the arm:** Rare. Used to close long cylindrical parts (e.g. trousers out seam).   |
| **By needle / thread** | **Single** needle (Lockstitch, 3T OL) | **Double** needle (Lock stitch, 4T OL, 5T OL) | **Three** needles (6T OL) |
| **By stitch class** | **Lock stitch:** For lock stitches. It is the most common type of machine. | | |
| | **Overlock stitch:** For overedge, overlock chain,. | | |
| | **Chain stitch:** For chain stitches. | | |
| | **Flatlock stitch:** For flatlock stitches or in knit fabric sewing for certain operation). It is less common. | | |

| Table 6. Needle size | | | |
|---|---|---|---|
| **USA** | **EU** | **Fabric weight** | **Fabric type** |
| 8 | 60 (.06 mm diameter) | Very light | Fine silk / lace, Chiffon, Organza, etc. |
| 9 | 65 | | |
| 10 | 70 | | |
| 11 | 75 | Light | Silk, Spandex, Lycra, Synthetics, etc. |
| 12 | 80 | | |
| 14 | 90 | Medium | Cotton, Velvet, Linen, Wool, Jersey, etc. |
| 16 | 100 | Heavy | Denim, Leather, Canvas |
| 18 | 110 | Very heavy | Heavy denim, heavy canvas |
| 20 | 120 | Extra heavy | Extra heavy fabric |

Activity

**2c**

**20 minutes**

## Work aids

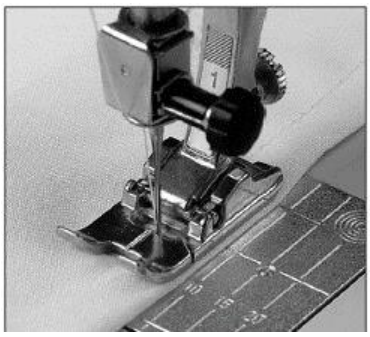
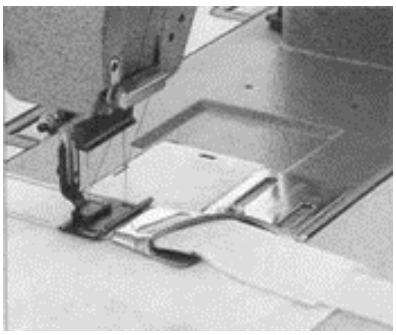
**Work aids** are another type of sewing tools. They help you improve sewing quality, and also productivity, by reducing operator movements and thus operation time. They can be found in sewing machine stores, or purchased online. In this activity, you will learn more about work aids and how to select them.

## Instructions:

**1)** Together, look at table 7 explaining four important work aids, then discuss: Do you use work aids in your factory? If so, which ones, and how are they selected?

**2)** Together, discuss the two questions in table 8.

**Table 7. Work aids**

| Presser feet | Folders (binders) |
|---|---|
| Used to hold the fabric in place and avoid it slipping around. There are different types of presser feet, for different operations (zipping, button attachment, hemming, embroidery, etc.). | Used to make feeding easier and more consistent. It helps you keep the fabric folded so that the operator does not need to hold it at needle point. There are different types of folders, for different seams and fabric types (thickness). |
|  |  |
| *Example: All-purpose presser foot* | *Example: Hemming folder* |

| Edge guide | Compensating feet |
| --- | --- |
| Used to help sew straight lines faster and with more precision. There are different types of guides. They can be attached to a presser foot, or to the sewing machine bed.<br>  <br>*Example: Edge guide for flat-bed sewing machines.* | Used to sew a straight even stitch along the edge of the fabric (edge stitch). There are compensating feet for the right side and the left side, depending on which is needed.<br>  <br>*Example: Compensating foot (Left)* |

| Table 8. Which tools? |
| --- |
| 1. Line manager Geetha makes a line sample to perform a style analysis for style #5978. What information does she need to obtain from her style analysis? |
| 2. Based on Geetha's operation breakdown, operation #8 is hemming. The item to be sewn is a basic cotton t-shirt. Help Geetha select seam class, stitch class, machine, needle size, and work aids. |

Activity

**2d**

20 minutes

## Assembling garments

Once parts have been prepared, you can move on to **assembling** cut parts into garments. In this activity, you will discuss best sewing practices, and how to ensure quality throughout the process.

## Instructions:

**1)** As a group, read through the list of good practices in table 9 for different stages of the sewing process, and put a ✓ in the column on the right if you do it in your factory.

**2)** Have a participant read aloud the list of four common sewing quality issues in table 10. Then, together, brainstorm ways to avoid these issues, and write down your ideas in the column on the right.

**Table 9. Assembling garments**

| **Good practices** | ✓ |
|---|---|
| **Planning** (style analysis) | |
| 1. Seam & stitch class and sewing thread are carefully selected for the style (operations to perform) and fabric type through a style analysis. | |
| 2. The sequence of seams & stitches has been determined before sewing starts through a style analysis. | |
| 3. Machine type and settings are carefully selected depending on the type of seams, stitches, thread and fabric type during the style analysis. | |
| 4. Work aids are carefully selected depending on the type of operation to perform and fabric type during the style analysis. | |
| **Preparing** | |
| 5. Before sewing, the operator ensures he/she correctly recognizes the operation that needs to be performed and has the required level of skill. | |
| 6. Before sewing, the operator ensures he/she correctly identifies the seam line, which is parallel to the outer edge, at a predetermined distance (seam allowance) from it. | |
| 7. Before sewing, the operator ensures that the sewing machine is correctly set (spi, needle size, work aids, enough thread, etc.). | |

| Sewing | |
|---|---|
| 8. Fabric is guided towards the needle, along the seam line. | |
| 9. The fabric is guided along the sewing line at a speed which is aligned with the speed of the sewing machine. | |
| 10. When fabric is rotated, the operator should not rotate his/her body or arms to match the alignment. | |
| 11. The fabric is fed to the machine (guided towards the needle) from the inside to the outside (away from the operator), never towards the operator. | |
| 12. All sewing machines have a needle guard (small wire attachment that prevents the operator's fingers from getting too close to the needle) and it is never removed. | |

**Table 10. Maintaining quality**

| Quality issues | How to prevent? |
|---|---|
| **Thread tension:** If tension is too low or too high, stitches are not formed correctly, and threads can break. | |
| **Feeding speed:** If fabric is fed too fast or too slowly, it causes defects such as missed stitches, seam puckering and others. | |
| **Compressive force:** If the fabric is held down too strongly or not strongly enough, it causes the fabric to slip or get stretched, and stitches are not formed correctly. | |
| **Needle penetration force:** If it is too high or too low, it creates defects where the needle penetrates the fabric, such as tearing, friction, slipping, or others. | |

Session 3

# Action items

## Goals

**Summarizing and revising the new knowledge gained.**

**Identifying concrete applications of the new knowledge that benefit your factory.**

Session 3

# Overview

**One member should read the full session out loud to the rest of group**

**20 minutes**

**Learning manual, pens, and markers**

Throughout this module, you gained new knowledge on seams, stitches, sewing machines, production aids and how to select them; then discussed how to perform sewing operations systematically and with quality.

**Seams & stitches**

**Sewing tools**

**Sewing operations**

In this session, you will think of ways to apply your new knowledge to improve the way garments are stitched in your sewing room by reviewing best practices and drafting your own action plan.

# Activities

Activity
**3a**

5 minutes

## Best practices checklist

In this activity, you will review best practices for garments stitching as a next step for evaluating your own and implementing improvements.

### Instructions:

**1)** Together, look at the list of best practices in table 11, and put a ✓ in the column on the right if you use these practices in your factory.

**Table 11. Stitching garments**

| Best practices | ✓ |
|---|---|
| 1. Sewing operations, seams and stitches, machines, work aids and needle size are determined in advance through a style analysis. | |
| 2. Seams, stitches, machines, work aids and needle size are selected based on the operations to perform, taking into account fabric type and thickness. | |
| 3. Operators are trained in understanding markings properly and using them to carry out their operation. | |
| 4. Operators are consistently trained in good and safe sewing practices. | |
| 5. Potential sewing quality issues are identified for each style and precautions taken to avoid them. | |

Activity

**3b**

**15 minutes**

## Your action plan

In this activity, you will think of ways to apply your new knowledge to improve garment stitching in your sewing room by drafting your own action plan.

## Instructions:

**1)** Together, fill in the action plan (table 12) on the next page. Identify a key problem that you want to solve and write down the solutions you identified while working on this module.

| Table 12. Stitching garments – Action Plan | | | | |
|---|---|---|---|---|
| **Problem identified** | | | | |
| **Solutions identified** | **Action(s) to be taken** | **Person responsible** | **By when?** | **How will improvements be measured?** |
| | | | | |
| | | | | |
| | | | | |
| | | | | |

# Stitching garments

The Factory Improvement Toolset (FIT) is an innovative self-facilitated, activity-based learning approach designed by the International Labour Organization (ILO) to create more decent and sustainable employment. FIT supports manufacturers in global supply chains to improve productivity, competitiveness and working conditions by upgrading production systems and factory practices.

FIT is being piloted in Asia under the regional Decent Work in the Garment Sector Supply Chains in Asia project funded by the Government of Sweden.

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