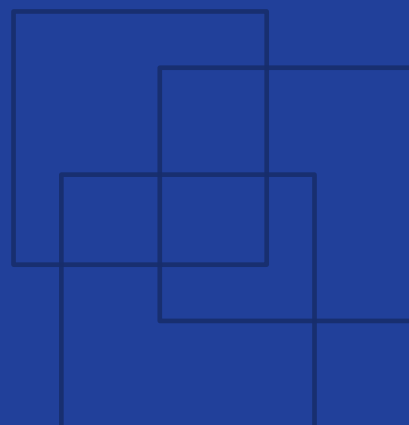




International  
Labour  
Organization

# Using the bundle system

Sewing room operations



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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 Using the bundle system is a training for garment manufacturers to improve sewing room operations. Participants will work on implementing the bundle system and improving their line layouts and material flow. This module takes about 2.5 hours to complete.

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

- Learnt about bundle production systems, their advantages and disadvantages.
- Analysed line layouts and discussed criteria for selecting / adapting an appropriate layout.
- Compared options for transporting materials and identified the best options for themselves.

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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.

<b>Indicator 1</b>	<b>Target achievement (%)</b>
<b>Definition</b>	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.
<b>Purpose</b>	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.
<b>Calculation</b>	$(\# \text{ pieces produced today} / \text{daily production target}) \times 100\%$ Notes: The daily target should be based on the SMV, and line efficiency discounted. Target = $(\text{working hours} \times 60 / \text{SMV}) \times \text{line efficiency} \%$
<b>Frequency</b>	Calculate daily (for each line or all lines), then calculate a monthly average.
<b>Responsible</b>	Sewing room manager, Line supervisors

<b>Indicator 2</b>	<b>Work-in-progress (WIP)</b>
<b>Definition</b>	The amount of pieces that have not been completed yet, and are being sewn or waiting in between two work stations. It is calculated separately for each line, or for all lines together. Very low and very high WIP are both signs that lines are not well balanced.
<b>Purpose</b>	To understand how efficiently your sewing lines operate and how well the lines have been balanced, and begin to identify how to better balance sewing lines and improve their efficiency.
<b>Calculation</b>	Total # of pieces fed to the line – Total # of pieces sewn by the line Notes: Total # of pieces fed or sewn refers to the total # of pieces fed or sewn for one specific order, in one specific line.
<b>Frequency</b>	Calculate daily (for each line or all lines), then calculate a monthly average.
<b>Responsible</b>	Sewing room manager & line supervisors





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 why using the bundle system 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. In this factory, workers fetch bundles from a storage area in the middle of the room, perform an operation, and then bring them to another operator. Lines are very long and follow a straight line. So, workers need to walk all the way around the line to access the storage area. Bundles are usually made up of parts for 20 shirts and are quite big. They are transported by hand and stored on the floor next to work stations. As a result, parts often get lost or dirty. It also takes up operators' working space and sometimes even the aisle if bundles pile up, blocking the path.

To solve these problems, Sopheak decides to switch to a new system, in which bundles are fed to the start of the line, then passed from one operator to the next sequentially, rather than picked up and brought back to a storage area. The maximum bundle size is reduced to 10 shirts each. Each line now has two rows, which shortens the total length, and materials are pushed from one operator to the next on a center table.

Thanks to these changes, material handling time is greatly reduced. Cut parts get lost less easily and stay clean. Workers have more space to work and exit their station, and aisles stay clear. It is also easier for supervisors to keep track of production and to move around the sewing room to supervise operators.

- 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 different production systems and understanding their advantages and disadvantages.**

**Understanding line layouts and how to select one that suits your factory's needs.**

**Comparing ways to transport materials (bundles) and identifying best options for your sewing lines.**

## Session 2

# Overview



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



120 minutes



Learning manual, pens, and markers

This training module aims to help you improve the way your sewing room operates by focusing on the bundle system. Today, the progressive bundle system is often considered the most efficient and cheapest option for garment factories. Line layouts and material transportation along the line should be adapted to it, in order to maximize efficiency, avoid mistakes, allocate workers and arrange work stations more logically. Throughout this module, you will work on the three topics below.

Understanding the **bundle system**

Adapting your **line layout**

Transporting **bundles**

First, you will learn about two common bundle systems and compare their disadvantages and advantages. Then, you will discuss line layouts, and how to select the option that best suits your needs. Finally, you will compare different ways to transport bundles along the line based on your layout.



# Activities

Activity

## 2a



30 minutes

## The bundle system

A production system is the way a garment is assembled in your factory. There are several production systems. The most common one is the **bundle system**. In this activity, you will learn about different production systems, their advantages and disadvantages.



### Instructions:

- 1) Together, look at table 2 describing two types of bundles. Then, discuss: Do you use bundles in your factory? Which type?
- 2) Together, read the explanations about two commonly used bundle systems in table 3, then circle the type of bundle (piece / set) that you think is used in this system on the right. Solutions are at the bottom of the page.
- 3) Together, look at table 4 listing advantages and disadvantages. For each, discuss and decide which system(s) it is an advantage / disadvantage of by putting a ✓ in the corresponding column. Solutions are at the bottom of the page.
- 4) Together, based on the table, discuss:
  - Which system is / are the fastest and most efficient?
  - Which system requires most planning and organization?
  - Which system makes production tracking and control easier?
- 5) Have a participant read aloud the text box below table 4, then discuss: Which system do you think is best suited to your factory?



A **bundle** is a stack of cut components. Each bundle has a ticket (style, size, shade, etc.), to identify its content. Workers untie a bundle, perform their operation, re-tie the bundle, and pass it on to the next operator. To learn more about bundling in the cutting room, ask your facilitator for the “Preparing for sewing” module.

Table 2. Types of bundles

**Piece bundle**

One bundle contains a stack of the same pieces (such as collars). The maximum recommended is 10 pieces (up to 25 for smaller garments). Consecutive fabric layers are bundled together after cutting. Example: Layers 1 to 10 → Bundle 1; Layer 11 to 20 → Bundle 2; etc.



**Set bundle**

One bundle contains a set of all different pieces needed to make several garments (maximum 10, up to 25 for smaller garments). So, set bundles are bigger than piece bundles. Cut parts cut from the same layer are bundled together in the cutting room.

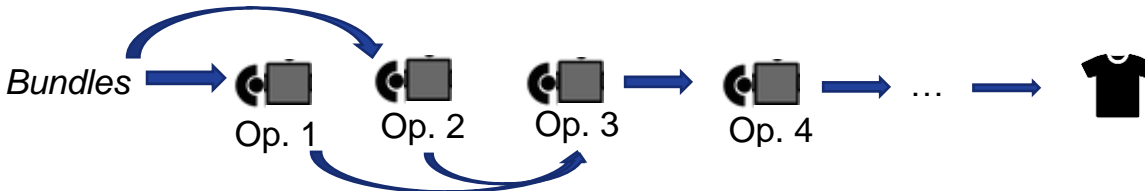


Table 3. Bundle systems

**Bundle systems**

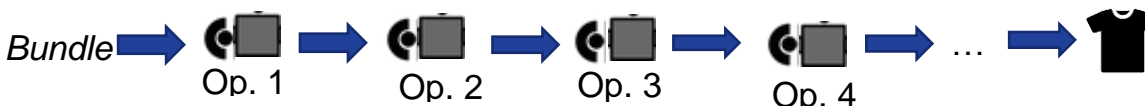
**Bundle**

**Conventional Bundle System (CBS):** There is a bundle storage area at the back of each line. Helpers bring bundles of different pieces to different operators who perform the corresponding operation on all pieces of the bundle, until all bundles are eventually merged into garments.



Piece / Set

**Progressive Bundle System (PBS):** Bundles are fed to the start of a line. Each operator performs one type of sewing operation (for example, attaching the collar), then passes the bundle on to the next operator, who performs another operation.



Piece / Set

Solutions: CBS → piece bundle; PBS → set bundle.

Table 4. Advantages and disadvantages

Advantages & disadvantages	CBS	PBS
Example: Operators only need to learn one single operation, so training time and costs are reduced.	✓	✓
1. Cut parts get mixed or lost easily because bundles are quite large (made up of many parts).		
2. Bundles are smaller, less space is needed to store them in the lines during production.		
3. More helpers / facilitation may be needed to carry the bundles around the lines (so, higher labour costs).		
4. It is easier for line supervisors to identify bottlenecks and balance the line on time.		
5. A lot of planning is needed. It is not very flexible (not very adapted for short-run production or frequent style changes).		
6. It is easier to track and control production by tracking parts and bundles from the cutting room all the way to finished garments.		



The **progressive bundle system** is the most common, and often the best choice. It is less time-consuming and more efficient than the conventional bundle system. But, it requires more planning and good organization, and makes production control more complex. You should pick what you think is best for your factory's needs and situation.

Activity

# 2b



30 minutes

## Line layouts

A **line layout** is the way sewing work stations are arranged to form one sewing line. Layouts should always be adapted to your production / factory needs and should be changed if it is not the case. In this activity, you will compare different types of layouts in detail.



### Instructions:

- 1) Together, look at the four different types of layouts in table 5. Then, discuss: What type of line layout(s) is / are used in your factory?
- 2) Together, look at the advantages and disadvantages in table 6, and decide which layout (I/L/U/S) it corresponds to by writing the letter down on the right. Solutions are at the bottom of the page.
- 3) Together, discuss: Which layout(s) can be used with a progressive bundle system? With a conventional system?
- 4) I-lines (the most common layout) can be set in many different ways. Together, look at table 7 and discuss the advantages and disadvantages of each option. Write down your ideas in the table.

Table 5. Types of line layouts


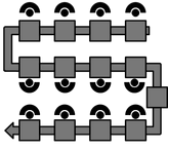
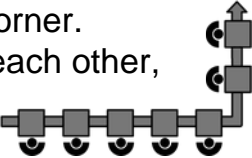
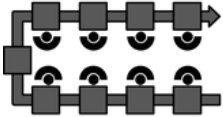
Types of layouts	(Dis)advantages
<p><b>I-line:</b> Workstations are arranged in a straight line. Workers are most often seated one behind the other.</p> 	<p><b>S-line:</b> Stations are arranged into straight lines broken by loops. Enough space is preserved to allow for easy access.</p> 
<p><b>L-line:</b> Workstations are arranged as a straight line with one corner. Workers can be next to each other, or one behind the other.</p> 	<p><b>U-line:</b> Operators sit inside the U, and materials are supplied (loaded) from outside the U.</p> 

Table 6. Advantages & disadvantages

Advantages & disadvantages	Layout
<ul style="list-style-type: none"> <li><span style="color: blue;">+</span> Easier to supervise; Workers can move between stations if needed.</li> <li><span style="color: blue;">-</span> Someone has to load materials from outside.</li> </ul>	
<ul style="list-style-type: none"> <li><span style="color: blue;">+</span> Convenient for long lines; Takes up less space than straight lines.</li> <li><span style="color: blue;">-</span> Needs good planning (space allocation and worker position).</li> </ul>	
<ul style="list-style-type: none"> <li><span style="color: blue;">+</span> Stations are easy to access from both sides (for bundles, operators).</li> <li><span style="color: blue;">-</span> If the line is too long, it creates a barrier for workers.</li> </ul>	
<ul style="list-style-type: none"> <li><span style="color: blue;">+</span> Stations are easy to access from both sides <u>except at the corner</u>.</li> <li><span style="color: blue;">-</span> If the line is too long, it creates a barrier for workers.</li> </ul>	



The 4 types of layouts can all be used with both bundle systems (PBS and CBS).

Table 7. I-lines

Type of I-line	Advantages <span style="color: blue;">+</span>	Disadvantages <span style="color: blue;">-</span>

Solutions: U, S, I, L

## Activity

# 2c



30 minutes

## Adapting a line layout

In the previous activity, you compared line layouts, their advantages and disadvantages. In this activity, you will focus on discussing other criteria that are relevant when **adapting a line layout** to your needs.



### Instructions:

- 1) Together, read through the list of things to consider when selecting a line layout in table 8. Then, for each, decide whether it is important and why by putting a ✓ in the corresponding column. Solutions are at the bottom of the next page.
- 2) Have a participant read aloud the text box below. Then, draw your own line layout(s) in table 9, showing stations, aisles, operators and material storage points (racks, bins, etc.).
- 3) Together, discuss your drawing: Do you think your current layout suits your needs? Why, or why not? If not, what would you change?



There isn't one good layout. A **good layout** is a layout that suits your needs, taking into account what your sewing room looks like, how it operates, what it produces, etc.

Table 8. Adapting a line layout

Things to consider	Yes	No
1. Space utilization (not taking up too much space).		
2. Type of garments that your factory produces / machines needed.		
3. How materials are transported along the line.		
4. How experienced your operators are		
5. Length of the line (number of workstations and operators).		
6. Minimizing material transportation time before, during, after sewing.		
7. Total number of supervisors in the sewing room.		
8. Type of fabric used to make the garments.		
9. The production system that you use and the size of the bundles.		
10. Operators have enough clear space (no material / bin / etc.) to leave their station in case of emergency.		
11. Operators have enough space to perform an operation well.		
12. Typical order sizes.		
13. The factory layout (where other rooms are located).		



To reduce material transportation time, it is best if the line **starts** close to where materials are received (cutting room/storerrooms) and **ends** close to where garments are sent for the next process (finishing room). So, the type of layout you select can also depend on the factory plan.

Solutions: 1. Yes, 2. Yes, 3. Yes, 4. No, 5. Yes, 6. Yes, 7. No, 8. No, 9. Yes, 10. Yes, 11. Yes, 12. No, 13. Yes

## Table 9. Your layout

Draw your layout below, indicating work stations, operators, materials, aisles, etc.



Activity

# 2d



30 minutes

## Transporting bundles

When selecting a layout, you should also pay attention to your **material handling system (MHS)**, which is how materials (bundles) are transported along the line. A good MHS reduces transportation time, movement and handling time. In this activity, you will discuss and compare different handling systems.



### Instructions:

- 1) Together, discuss: How are bundles transported along the sewing lines in your factory? Is it convenient? Why, or why not?
- 2) Have a participant read aloud the information in table 10. Then, together, discuss: What are the advantages and disadvantages of in-line finishing? Is it suitable for your factory?
- 3) Together, go through different types of handling systems in table 11. Then, discuss: What are the advantages and disadvantages of each system? Write down your answers in the table.
- 4) Have a participant read aloud the scenarios in table 12. Then, together, discuss: What type of layout and handling system would you pick and why? Write or draw your answer in the space provided.

Table 10. In-line finishing

In the **in-line finishing production system**, finishing is done directly in the sewing lines (by adding the necessary workstations). These activities include: Checking (inspection), ironing, folding, tagging and packing.

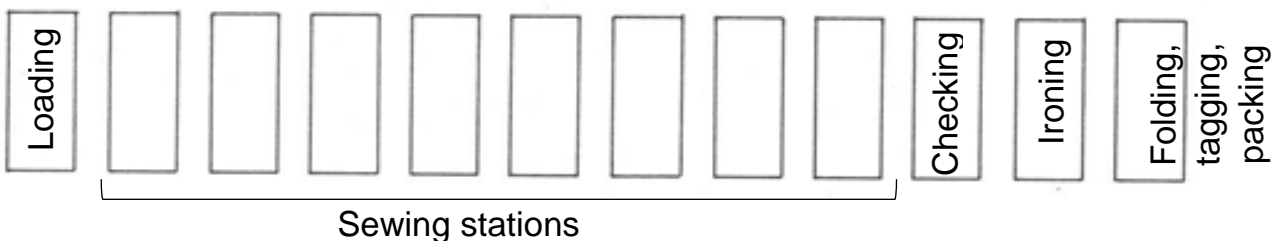


Table 11. Material handling systems (MHS)

System	Advantages	Disadvantages
<p><b>Overhead system:</b> Cut parts are hung on clips attached to an overhead rail, and transported between stations on the rail.</p>		
<p><b>Side table:</b> A table is placed on the side of the line (row). Operators pick the bundles off the table and place them back on after they have carried out their operation.</p>		
<p><b>Centre table:</b> A table is placed in between two rows. Operators pick the bundles off the table and place them back on after they have carried out their operation.</p>		
<p><b>Trolleys / Rails:</b> Bundles are loaded on wheeled trolleys which are rolled from one worker to the other along the line. Hangers on rails can be used for longer items.</p>		
<p><b>Bins / Baskets:</b> Bundles are loaded on bins (or baskets) and passed from one operator to the next. Ideally, they should not be placed on the floor.</p>		



When selecting a layout and material handling system, think about your workers' **health & safety**. Example: With center tables, workers need to turn and drag materials, which can damage their back.

Table 12. Scenarios

**Scenario 1**

Factory A uses the progressive bundle system. The sewing lines are quite long (in-line finishing system). The sewing room is not very long.

- Which layout should the sewing room manager select?
- Based on the chosen layout, which material handling system would you choose?

Write down or draw your ideas below.

**Scenario 2**

Factory B uses the conventional bundle system. The sewing lines are not very long. The sewing room is quite large.

- Which layout should the sewing room manager select?
- Based on the chosen layout, which material handling system would you choose?

Write down or draw your ideas below.



## 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 different bundle systems, line layouts, and material handling systems along the lines.

Understanding the  
**bundle system**

Adapting your **line layout**

Transporting  
**bundles**

In this session, you will think of ways to apply your new knowledge to apply the bundle system 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 using the bundle system as a next step for evaluating your own and implementing improvements.



#### Instructions:

- 1) Together, look at the list of best practices in table 13, and put a ✓ in the column on the right if you use these practices in your factory.

Table 13. Using the bundle system

Best practices	✓
1. The bundle system is used in your sewing room – conventional or progressive, based on your needs.	
2. The line layout suits production needs and factory layout, or is modified as needed if it is not the case.	
3. The material handling system suits the bundle system and line layout used in your sewing room, or is modified as needed if it is not the case.	
4. The material handling system used in the factory minimizes material transportation / handling time and worker fatigue in the sewing room.	
5. Workers are consulted to help managers evaluate whether the line layout and material handling system are convenient and reduce material handling time and worker fatigue.	

Activity

# 3b



15 minutes

## Your action plan

In this activity, you will think of ways to apply your new knowledge to implement or improve the bundle system in your factory by drafting your own action plan.



### Instructions:

- 1) Together, fill in the action plan (table 14) 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 14. Using the bundle system – Action Plan**

<b>Problem identified</b>				
<b>Solutions identified</b>	<b>Action(s) to be taken</b>	<b>Person responsible</b>	<b>By when?</b>	<b>How will improvements be measured?</b>

# Using the bundle system

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