International Labour Organization

Making an operation bulletin

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 Making an operation bulletin is a training for garment manufacturers to improve sewing room operations. Participants will work on analysing a style construction and calculating labour and machine needs in order to make an operation bulletin. This module takes about 2.5 hours to complete.

Upon completion of the training, participants should have:

- Learnt how to perform a style analysis.
- Learnt how to calculate SMV at target efficiency in order to identify labour and machine needs.
- Learnt how to record information in an operation bulletin format.

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

Authors: Alix Machiels, Sara Andersson, Charles Bodwell, Jayantha R. de Silva.

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% 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	**Work-in-progress (WIP)**
Definition	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.
Purpose	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.
Calculation	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.
Frequency	Calculate daily (for each line or all lines), then calculate a monthly average.
Responsible	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 better why making accurate operation bulletins 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 that lines are set based on the sewing manager and line supervisors' experience, without consideration of which machines should be selected, or calculation of exactly how many are needed. As a result, sometimes, during production, the supervisor realizes that the wrong machine has been assigned to the line, and garments are stitched incorrectly. Or, there are not enough machines for an operation that takes more time, which creates bottlenecks, and slows down production in the whole line.

To solve these problems, Sopheak creates a new system and template for style analysis and needs calculations. First, she lists all operations needed to construct a style, and selects the appropriate machine for each. Then, she calculates how long it takes on average to perform each operation at a defined level of efficiency, and how many machines are available in order to reach set production targets at this level of efficiency. All this information is recorded in a document called the operation bulletin.

Thanks to these changes, line supervisors know how many machines and which machines to select when setting lines. This avoids bottlenecks and delays, as well as mistakes in the sewing lines.

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

Understanding and discussing the sewing process, from planning to garment issuing.

Learning how to analyze a style in order to obtain an operation breakdown and select appropriate tools.

Learning how to calculate standard minute value (SMV) and machine needs.

Learning how to record information in an operation bulletin format.

Session 2

Overview

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

110 minutes

Learning manual, pens, and markers

This training module aims to help you improve the way your sewing room operates by focusing on operation bulletins (OP). An OP contains detailed information about operations for a specific style, and helps you plan and set lines in the sewing room. A well-made OP means that you can plan and organize production better and more accurately, which saves you time and money by avoiding bottlenecks and delays. Throughout this module, you will work on the three steps below.

Analyzing styles

Calculating needs

Recording information

First, you will review the entire sewing process. Then, you will learn how to analyse a style construction, estimate production time, calculate machine and labour needs, and finally, how to record this information in an operation bulletin format.

Activities

Activity
2a

15 minutes

The sewing process

Making an operation bulletin is the first step of the **sewing** (or stitching, or assembly) **process**. There are many other steps to follow before garments can be issued for washing or finishing, then packed and shipped. In this activity, you will discuss the sewing process.

Instructions:

1) Together, look at the steps of sewing in table 2, and put them in the right order from 1 to 10. Solutions are at the bottom of the page.

2) Together, discuss:

- Does your sewing process involve the same steps as in table 2? What is different?
- Is there anything that you should change in your sewing process to make it faster and more efficient?

Table 2. The sewing process

Steps	#
Developing a line sample and making a style analysis	1
Carrying out end-of-line inspections	
Recording production	
Setting up the sewing line (machinery, sewing aids, labour, training, etc.)	
Issuing garments for washing and / or finishing	
Conducting and tracking sewing operations	
Calculating production needs (machines, operators, time, etc.)	
Requesting and receiving materials (bundles and trims)	
Carrying out in-line inspections	
Planning and scheduling line operations (line planning)	

Solutions: 1, 8, 9, 4, 10, 6, 2, 5, 7, 3

Activity

2b

25 minutes

Analysing styles

The first step of making an operation bulletin is **style analysis.** A **line sample** is made by the line supervisor to obtain an **operation breakdown** (list of operations needed to assemble the garment) and to select stitches and sewing tools. In this activity, you will learn more about style analysis.

Instructions:

1) Together, discuss: In your factory, do you make line samples? Do you base style analyses on them? Why or why not?

2) Together, read through the steps for making a line sample in table 3, and put them in the right order by writing a number from 1 to 9 in the right column. Solutions are at the bottom of the page.

3) Together, look at the list of information in table 4, and put a ✓ in the right column if you think that it should appear on a style analysis. Solutions are at the bottom of the page.

4) Have a participant read aloud the text box below table 4. Then, together, practice doing an operation breakdown by discussing the two questions in table 5.

Table 3. Making a line sample

Steps	#
Obtain approved marking boards and sample from the sample room.	1
Evaluate whether additional sewing aids need to be purchased	
Note the operation sequence (operation breakdown) and important information such as machine type needed based on stitch class.	
If needed, request sewing templates (paper samples) from the sample room.	
Develop a line sample using original fabric and trims in a base size.	
During production, display the line sample in the sewing line for reference.	
Transfer the information to an operation bulletin format.	
Have the line sample checked and approved by the head of quality control.	

Solutions: 1, 4, 3, 7, 2, 8, 6, 5

Table 4. Style analysis	
Information	✓
1. Garment construction, with list of components	✓
2. List of all sequential sewing operations needed to assemble the garment	
3. Fabric colour and shade	
4. Thread colour, width, and consumption	
5. Time it takes to perform each operation	
6. Machine type needed based on seam and stitch class for each operation	
7. Fabric consumption	
8. Amount of sewing machines needed to perform each operation	
9. Needle size needed based on fabric type and thickness	
10. Order quantity for each size and colour	
11. Type and amount of work aids needed (presser feet, folders, etc.)	
12. Line layout (drawn on paper), and assigned operators	
13. Operator training needs	

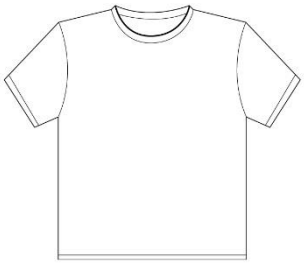
A line sample should be made and a style analysis carried out by the **line supervisor** of the line to which the style was assigned, **at least one week before line feeding**. Style analysis is an experimentation process. The line supervisor tries out different options, and selects the option that is best to obtain a quality, conform sample.

To learn more about the different types of seam and stitch classes, sewing aids and machines and how to correctly select them, ask for the “Assembling garments” module.

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

Table 5. Making an operation breakdown

1. Imagine that you are doing an operation breakdown for a basic short-sleeve t-shirt (image on the right). First, list or draw the sewing components of this style below.



Style #3678
Basic short-sleeved t-shirt

2. Now, think of all the operations needed to assemble this style, and list them below:

Activity

2c

25 minutes

Calculating SMV

After listing operations and selecting machines, the next step is to calculate how long each operation takes **(SMV – standard minute value)** in order to know how many machines and operators you will need in order to reach your production target. In this activity, you will learn how to calculate SMV.

Instructions:

1) Have a participant read aloud the information about SMV in table 6 and make sure everyone understands.

2) Together, discuss the three questions in table 7 and write down your answers. Solutions are at the bottom of the next page.

3) Have a participant read aloud the information about target efficiency in table 8 and make sure everyone understands.

4) Together, discuss the three questions in table 9 and write down your answers. Solutions are at the bottom of the next page. All numbers are for practice purposes only. They may not reflect the reality!

Table 6. Calculating the SMV

SMV (Standard Minute Value) is the amount of time (in minutes) that it takes a skilled operator to complete a specific operation. It is calculated by doing a time study.

How to do a **time study**?

1. Stand by an experienced operator, and use a stopwatch to calculate how long it takes to perform one single operation, from the very start (picking up the parts) to the very end.
2. Do this 5 to 10 times (more would be better).
3. Calculate the average (in seconds). This is called the “basic time”.
4. Add 22% for personal allowance (undoing bundles, stretching, getting up for a drink, etc.).
5. Divide by 60 to find the value in minutes.

You can keep records of SMV per operation in a document (paper or Excel) so that you don’t need to do a time study again next time you need the SMV for the same operation.

Table 7. Practice questions

1. After doing a time study for a side seam operation, line supervisor Vijay finds the following basic time (average operation time): 40sec. Then, he adds 20% for personal allowances. Help him calculate the SMV.

   40 + (40x20/100) = _____

2. What is the average duration (SMV) in minutes?

   _____ sec / 60 = _____ min

3. According to the SMV found by Vijay, how many shirts would be made in one hour?

   60 min / _____ = _____ shirts per hour

Table 8. Target efficiency

The SMV obtained through a time study is called a 100% efficiency SMV. That is because it supposes that workers are “100% efficient”, meaning that they work at the rate of a skilled and experienced worker all day long – which is not the case. So, you can set a **target efficiency** (for example 60%) and calculate SMV at this efficiency. The formula is:

SMV at target efficiency = SMV / target efficiency in %

The target efficiency that you set should be based on your experience and on measures of line efficiency calculated in the past.

Table 9. Practice questions

4. Vijay found the SMV for the side seam operation (0.80 min). She sets target efficiency at 60%, then calculates SMV at this efficiency.

   0.80 / (60/100) = _____min

5. At 60% efficiency, how many shirts would be made in one hour?

   60 / 60%SMV = _____ shirts per hour

6. Now that you have obtained SMV at target efficiency, what other information do you think you need in order to know how many machines you will need?

Solutions: 1. 48 sec; 2. 0.80min; 3. 60 / 0.8 = 75/hr.; 4. 1.33min ; 5. 60/1.33 = 45/hr.

Activity

2d

25 minutes

Calculating machine needs

Now that you have estimated SMV, you can move on to calculating how many machines (and thus operators) you will need. This information is important to help you set your line. In this activity, you will learn how to **calculate machine needs**.

Instructions:

1) Together, discuss and try to remember:

- What is SMV? What is a time study?
- What is target efficiency? What is line efficiency?

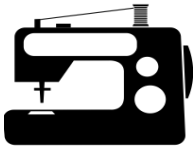
2) Have a participant read aloud the information in table 10 about calculating machine needs and make sure everyone understands.

3) Together, discuss: What happens if there are too few machines for one operation? If there are too many machines for one operation? Then, have a participant read aloud the text box below table 10.

4) Together, discuss the five practice questions in table 11. Solutions are at the bottom of the next page.

Table 10. Calculating machine needs

Based on your estimation of target hourly production (how many times you can carry out each operation within an hour), you can calculate how many machines you will need in order to sustain production. For this, you also need to set an **hourly production target**.



Hourly production target = Daily production target / # working hours

Then, you can measure **machine needs** using the following formula:

Machine number = SMV (at target efficiency) x hourly production target / 60

To obtain the number of machines, you need to round this number up or down. For example, if you obtain 1.3, round down to 1. If you obtain 1.8, round up to 2.

Calculating machine needs separately for each operation avoids setting too few or too many machines in the lines. When this happens, it causes bottlenecks. Production slows down, or work-in-progress accumulates in between two operators. To improve productivity, adding more workers to the line is not necessarily a good solution. Better-skilled workers are more productive, so you need fewer of them.

Table 11. Practice questions

1. According to capacity calculations, Sopheak has set the daily production target to 400 garments. If operators work 8 hours / day, what is the hourly production target?

2. Vijay calculates how many machines he will need for operation #9. SMV at target efficiency is 2min, and hourly production target is 50. How many machines does he need? Don't forget to round the number up (or down).

   2 x 50 / 60 = _____ machines = _____ machines

3. If Vijay needs 2 machines in order to reach the target hourly production at an efficiency rate of 60%, how many operators does he need for this operation?

4. Based on his calculations for each operation, Vijay finds the information below.
   - How many over lock (single needle) machines will be needed? ___
   - How many lock stitch machines will be needed? ___
   - How many flat lock (flatbed) machines will be needed? ___

#	Operations	Machine type	# of machines	# of operators
1	Shoulder join	Over lock	1	1
2	Neck rib tuck	Lock stitch	1	1
3	Neck join	Over lock	2	2
4	Label make	Lock stitch	1	1
5	Back neck binding	Flat lock	1	1
6	Front neck top	Flat lock	1	1
7	Back neck top	Lock stitch	2	2
8	Sleeve hem	Flat lock	1	1
9	Sleeve join	Over lock	2	2
10	Side seam	Over lock	3	3
11	Sleeve tuck	Lock stitch	1	1
12	Body hem	Flat lock	1	1

5. Daily production target is 400 pieces. The line is made up of a team of 25 workers for 17 machines. What is the number of pieces produced per worker? The number of pieces produced per machine?

   400 / 17 = _____ pieces per machine

   400 / 25 = _____ pieces per worker

Solutions: 1. 50 garments; 2. 1.6, so 2 machines; 3. 2 operators; 4. 17 machines & operators; 4. 8 over lock; 5 lock stitch; 4 flat lock; 5. 24 pieces per machine, 16 pieces per worker; 6. No, number of pieces/worker would go down.

Activity

2d

20 minutes

Recording information

Through the previous activities, you have learnt how to obtain and calculate all the information needed in an operation bulletin. The next step is to record all that information in a form for reference. In this activity, you will learn how to fill in an **operation bulletin**.

Instructions:

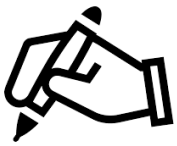
1) Together, discuss and try to remember all the steps that you went through in order to evaluate machine needs, and draw them in table 12.

2) Together, look at the operation bulletin format in table 13 and make sure everyone understands.

3) Have a participant read aloud the scenario in table 14. Then, use the information to fill in the shaded cells in the operation bulletin. Solutions are at the bottom of the next page.

Table 12. Looking back

Which steps did you go through in order to evaluate machine needs for a specific style order? Discuss and draw the steps below. Try not to look at the solutions!



Line sample (style analysis) → Selecting tools → Calculating SMV (time study) → Calculating SMV at target efficiency → Calculating hourly target production → Calculating machine and labour needs

Table 13. Operation bulletin

Style	#59726	**Prepared on**	28/06/19	**Target efficiency**	60%
Description	Basic short-sleeve t-shirt	**Prepared by**	Vijay	**Target / day**	400
Buyer	**J&A Garments Ltd.**	**Order qty.**	8,000	**Total SMV**	

#	Operations	Machine type	**SMV** at 100% efficiency	**SMV** at 60% efficiency	# of machines	# of operator
1	Shoulder join	Over lock	0.45	0.75	1	1
2	Neck rib tuck	Lock stitch	0.60	1.00	1	1
3	Neck join	Over lock	1.10			
4	Label make	Lock stitch	0.80	1.33	1	1
5	Back neck binding	Flat lock	0.75	1.25	1	1
6	Front neck top	Flat lock	0.90	1.50	1	1
7	Back neck top	Lock stitch	1.20			
8	Sleeve hem	Flat lock	0.80	1.33	1	1
9	Sleeve join	Over lock	1.15	1.92	2	2
10	Side seam	Over lock	1.95	3.25	3	3
11	Sleeve tuck	Lock stitch	0.60	1.00	1	1
12	Body hem	Flat lock	0.70	1.17	1	1
		Total				

Table 14. Scenario

Sopheak is filling in the operation bulletin for style #59726, and has already conducted the operation breakdown, and selected the best machine for each operation. Through time studies, Sopheak has obtained the SMV for each of the 12 operations. Daily production target is 400. A factory shift is 8 hours, so the hourly production target is 50 garments. Typical line efficiency is 60%. Help Sopheak calculate

- SMV at target efficiency
- machine and operator requirements for operations 3 and 7
- total SMV, total machine #, and total operator #.

Solutions: Operation #3 → 1.10 / 0.6 = 1.83; 1.83 x 50 / 60 = 1.52 → 2 machines, 2 operators. Operation #7 → 1.20 / 0.6 = 2.00; 2.00 x 50 / 60 = 1.67 → 2 machines, 2 operators. Total SMV = 11 (at 100%); 18.33 (at 60%); Total # of machines / operators = 17.

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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 how to carry out line planning and fill in an operation bulletin by analysing the style, calculating machine needs, and recording information.

Analyzing styles

Calculating needs

Recording information

In this session, you will think of ways to apply your new knowledge to improve style analyses and operation bulletins in your sewing room by reviewing best practices and drafting your own action plan.

An operation bulletin template is available online for you to print out and use in your own factory. To obtain it, contact your factory's FIT coordinator!

Activities

Activity
3a

5 minutes

Best practices checklist

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

Instructions:

1) Together, look at the list of best practices in table 14, and put a ✓ in the column on the right if you use these practices in your factory.

Table 14. Making an operation bulletin

Best practices	✓
1. There is an operation bulletin format that can be filled-in for each new style order for each line by line supervisors and/or sewing managers.	
2. Operation bulletins are used to plan and set lines.	
3. Operations bulletins contain an operation breakdown, appropriate machine types and amounts, and SMV for each operation.	
4. SMV is calculated through time studies and / or existing measurements.	
5. SMV is re-calculated at a target efficiency based on line efficiency estimations.	
6. A line sample is made to develop an accurate operation breakdown.	

Activity

3b

15 minutes

Your action plan

In this activity, you will think of ways to apply your new knowledge to make good operation bulletins in your factory by drafting your own action plan.

Instructions:

1) Together, fill in the action plan (table 15) 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 15. Making an operation bulletin – Action Plan				
Problem identified				
Solutions identified	**Action(s) to be taken**	**Person responsible**	**By when?**	**How will improvements be measured?**

Making an operation bulletin

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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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