International Labour Organization

Cutting fabric

Cutting 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 Cutting fabric is a training for garment manufacturers to improve cutting room operations. Participants will work on efficient and safe cutting practices, and record-keeping. This module takes about 2.5 hours to complete.

Upon completion of the training, participants should have:

- Learnt about efficient and safe cutting practices for cutting fabric.
- Learnt how to use and fill-in daily cutting reports and cutting balance sheets for record-keeping in the cutting room.

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

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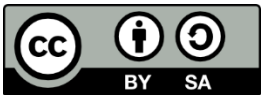

Guidelines for successfully using the training tool

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 cutting room series.

Indicator 1	**Re-cuts (%)**
Definition	The proportion of fabric used for re-cuts for each order (the amount of fabric used for re-cuts compared to the total amount of fabric used for the order).
Purpose	To understand how much of the fabric was used for re-cuts, to better assess quality and begin to identify how to improve quality in the cutting room.
Calculation	(# meters of fabric used for re-cuts / total # meters of fabric used for this order including re-cuts) x 100% This should also be calculated separately for re-cuts due to cutting defects and re-cuts due to other defects.
Frequency	Calculate for each cut order, then do a monthly average of all cut orders.
Responsible	Cutting room manager / Quality inspector

Indicator 2	**Fabric utilization (%)**
Definition	The proportion of total spread fabric that is actually used for garments. It is calculated for each cut (for each marker). The higher the most efficient.
Purpose	To understand how efficient your marker planning and cutting operations are, how much fabric gets wasted, and to begin to identify how to improve marker efficiency and reduce fabric waste.
Calculation	(Marker area used for garments in *sqm* / total fabric area in *sqm*) x 100% Marker area used for garments = Fabric (in sqm) actually used for garments Total fabric area = The total amount of fabric spread on the cutting table for a cut = Fabric length (mts) x Fabric width (mts)
Frequency	Calculate for each marker, then do a monthly average of all markers.
Responsible	Cutting room manager / Senior marker maker

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 cutting fabric adequately 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.

Ritthy is a new cutting room manager at the HS factory. He spots many problems. Fabric is cut using scissors or cutting machines. Scissors are difficult to use and leave rust marks on the fabric. When using cutting machines, operators do not wear gloves. As a result, there has been some serious accidents. Operators have not been trained on how to use the equipment properly, and often make cutting mistakes. Once a piece is cut, there is little that can be done to fix the mistake, and fabric is wasted. Lastly, there is no record of how many garment pieces are cut daily. This makes it hard to track production and know if and when the cut order has been completed. Sometimes, too few or too many pieces are cut, which is a loss in terms of both time and fabric.

Ritthy makes some changes. He organizes trainings for cutting operators on how to use and maintain cutting machines, and forbids untrained workers to use them. He also provides operators with metal mesh gloves. Then, he designs a daily cutting report form, and assigns the cutting supervisor to fill it in daily.

Thanks to these changes, less cutting mistakes are made, and accidents involving cutting blades are avoided. Ritthy can now track production and check whether daily targets are met, but also avoid cutting too much or too little. Workers feel safer, and are able to save both time and fabric.

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

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

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Session 2

Learning about the topic

Goals

Discussing cutting practices, and learning how to cut fabric and operate cutting equipment more efficiently.

Discussing your safety rules and procedures, and learning how to protect workers' health and avoid accidents.

Learning how to use daily cutting reports and cutting balance sheets for efficient record-keeping.

Session 2

Overview

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

100 minutes

Learning manual, pens, and markers

This training module aims to help you improve the way your cutting room operates by focusing on fabric cutting. Cutting is a very important part of production. If it is done well, there will be less defects occurring in the following processes. At the same time, once the fabric has been cut, very little can be done to fix serious mistakes and avoid waste. Cutting can be dangerous, and it is important to protect your workers from dangers and injuries. Throughout this module, you will work on the three steps below.

Cutting fabric **efficiently**

Cutting fabric **safely**

Recording cutting operations

First, you will discuss cutting and safety practices in your factory, then learn how to cut fabric more safely and efficiently, and how to use and fill-in a daily cutting report and a cutting balance sheet for record-keeping**.**

Activities

Activity
2a

20 minutes

Cutting fabric

Cutting is when the spread fabric is cut into “garment parts” (or “cut parts”). Larger parts are usually referred to as panels. Smaller parts are referred to by the part name (collar, cuff, pocket, and so on). In this activity, you will discuss how to cut fabric more efficiently.

Instructions:

1) Together, discuss:

- Which cutting tools do you use in your factory?
- How are cutting tools selected? Based on which criteria?

2) Together, look at the comparison between band, round and straight cutting knives in table 2, then discuss:

- Which type of tool can cut the most different shapes?
- Which type of tool is better for larger parts? For smaller parts? For complex parts?
- Which type of tool is the most precise and accurate? Which type is more productive (can cut the most layers)?

3) Have a participant read aloud the seven tips for cutting efficiently in table 3.

4) Together, read through table 4, and for each pair (line), tick the option you think is right (or the best one). The right answers are provided at the bottom of the page.

Table 2. Cutting knives	
 **Round portable knife**	- Rotating blade; Light, portable, easy - Can only be used to cut straight lines or gradual curves. - Can cut up to 4 inches; exists in small blades for thin lays. - The blade cuts the spread at an angle, so the top ply is cut before the bottom ply.
 **Straight portable knife**	- Vertical blade; Light, portable, easy - Can cut corners and curves very accurately. - Blades are 6-14 inches long; length can be adjusted to lay height. Usually 8 and 10 inch blades are used. The lay height must be at least 2.5 inches below the knife height. - All the pieces cut from the lay are identical.
 **Band knife**	- Vertical blade; Length can be adjusted to lay height. - Stationary machine: The blade moves vertically and the operator guides the plies against the blade. - Can cut smaller, complex pieces that require a lot of turning (e.g. collars). - Cannot cut directly from the lay; a block of parts needs to be cut from the lay first and brought to the operator. - More expensive, but helps to improve efficiency.

Table 3. Tips for cutting efficiently
1. Select cutting tool based on fabric type, part shape and size, lay height to be cut.
2. Adjust cutting speed to avoid edge fusing due to high temperatures.
3. Invest in solid cutting tables that can support the weight of the lay and cutting tools.
4. Cut the fabric exactly on the chalk line / drawn outline; not outside and not inside.
5. Knife and scissors blades must be kept clean (no textile fibers or yarns), sharp and well-maintained to maintain cutting efficiency.
6. Always cut while standing up. You can't cut at a correct angle if sitting. Make sure cutting operators get enough breaks to improve focus.
7. Tables must be clean and free of sticky tape, stickers, surface deterioration marks, or any other aspects that will damage the plies or obstruct the cutting motion.

Table 4. Cutting efficiently		
1.	☐ Select cutting tools based on order quantity and familiarity of use	☐ Select cutting tools based on fabric, shape, lay height, etc.
2.	☐ Invest in quality, sturdy cutting tables	☐ Use cheap tables to save money
3.	☐ Clean blades daily	☐ Clean blades after each cut
4.	☐ Cut while sitting	☐ Cut while standing
5.	☐ Adjust cutting speed to avoid high temperatures	☐ Use maximal cutting speed to be more productive
6.	☐ Do not sharpen tools to avoid injuries	☐ Sharpen to improve efficiency
7.	☐ Cut the fabric exactly on the line	☐ Cut the fabric outside the line
8.	☐ Use the longest blade possible	☐ Adjust blade length to lay height

Answers: 1. Fabric, etc.; 2. Invest; 3. After each cut; 4. Standing; 5. Adjust; 6. Sharpen; 7. On the line; 8. Adjust

Activity

2b

20 minutes

Cutting fabric safely

Cutting is the part of production during which **accidents** are most likely to happen. In this activity, you will discuss how to cut more safely.

Instructions:

1) Together, discuss:

- What safety rules are in place in your cutting room?
- Are workers provided with any safety equipment?
- Are workers trained on safety rules and practices? When?

2) Together, read through the list of good practices for cutting fabric safely in table 5, and put a ✓ in the column on the right if you do these things in your factory.

3) Together, look at the four pictures in table 6, then discuss: What is right or wrong in each of them? Solutions are provided below.

Table 5. Cutting safely

Good practices	✓
1. Always wear metal mesh gloves when using cutting knives.	
2. Do not store anything on, under and around the cutting tables to avoid trips and falls.	
3. Keep tables orderly, do not keep materials or tools lying on them when not in use to avoid injuries.	
4. Never sit or stand on the tables to avoid slips and falls or cutting injuries.	
5. Knives and scissors must be well-maintained to keep them safe to operate.	
6. Use “soft grip” tools (e.g. scissors) instead of covering handles with tape or fabric. This is also painful and slippery, which will lead to cutting mistakes.	
7. Turn off, lock or use the safety switch / guard on cutting equipment when not using them.	
8. Always cut the fabric away from yourself, never towards yourself.	

9. Keep your fingers away from the blade and out of its path.	
10. Make sure cutting tables are at an appropriate height so that workers do not need to bend down while cutting – this avoids neck and back injuries.	
11. Store replacement blades in a closed box, where they will not fall down and injure workers.	
12. Make sure only trained workers are allowed to operate equipment.	
13. Have workers wear a mask to protect them from dust and fumes coming from chemically treated fabrics.	

Table 6. Cutting safely

A

B

C

D

Solutions: A → see 1, 9; B → see 2, 4, (14); C → 5, 6, 13; D → 3, 10, 14

Activity

2c

30 minutes

Recording cutting with a DCR

The cutting manager should **record** daily how many garment pieces have been cut; style, size, and/or colour-wise. In this activity, you will learn how to use a daily cutting report (DCR) to record daily cutting operations.

Instructions:

1) Together, discuss:

- Do you record cutting tasks in your factory?
- If so, how often do you record? Using what document(s)?
- Do you record style, size, or colour-wise? Why?

2) Together, look at the daily cutting report in table 7, and make sure everyone understands. Pay attention: Cutting reports record the amount of full garments cut, not the amount of garment parts cut!

3) Have a participant read aloud the scenario in table 8. Then, use the information to fill in the blank cells of the report. The first Size (S) has been filled in to guide you.

4) Together, answer the four questions in table 9. Solutions are provided at the bottom of the page.

Table 7. Daily Cutting Report

Date		Feb 4, 2019 (Tuesday)		**Cutting manager**	Ritthy Pheang		
Order #	**Buyer**	**Style #**	**Size**	**Colour**	**Planned**	**Cut today**	**Balance**
57493	AC	TQ578	S	Black	200	200	0
57493	AC	TQ578		Navy	200	100	100
57493	AC	TQ578	M	Black			
57493	AC	TQ578		Navy			
57493	AC	TQ578	L	Black			
57493	AC	TQ578		Navy			
57493	AC	TQ578	XL	Black			
57493	AC	TQ578		Navy			
Total							

Table 8. Using daily cutting reports (DCR)

Scenario:
Ritthy, the cutting manager, fills in a style, colour and size-wise cutting report for today.

- For style TQ578, in size S, planned cut for today was 200 in Black, and 200 in Navy. Today, 200 were cut in Black, and 100 in Navy. So balance for Black S is 0, and balance for Navy S is 200 – 100 = 100.
- For style TQ578, in size M, planned cut for today was 400 in Black, and 400 in Navy. Today, 350 were cut in Black, and 400 in Navy.
- For style TQ578, in size L, planned cut for today was 400 in Black, and 400 in Navy. Today, 400 were cut in Black, and 300 in Navy.
- For style TQ578, in size XL, planned cut for today was 200 in Black, and 200 in Navy. Today, 200 were cut in Black, and 200 in Navy.

Table 9. Reading daily cutting reports (DCR)

1. How many pieces were cut today in Black, size M? Did it reach today's planned cut quantity for this colour and size?

2. How many pieces were cut today in Navy, size XL? Did it reach today's planned cut quantity for this colour and size?

3. How many pieces were planned to be cut today? How many pieces were actually cut?

4. How many pieces remain to be cut to complete this order?

A **DCR** should show planned cut, actual cut and balance, so that the reasons for not completing the daily planned cut can be identified, and solutions can be implemented to improve operations.

Solutions: 1. 350, No; 2. 200, Yes; 3. Planned cut = 24,000; Actual cut = 23,750; 4. Balance = 250.

Activity

2d

30 minutes

Using cutting balance sheets

The cutting manager should also **record** daily how many garment pieces have been cut so far for each style (sizes and colours), and how many remain to be cut to complete the order. In this activity, you will learn how to use a cutting balance sheet (CBS) to record the progress of a cut order.

Instructions:

1) Together, look at the cutting balance sheet in table 10. Size S has been filled in to give you an example.

2) Have a participant read aloud the scenario in table 11, and follow along using the CBS on the next page (column size S). Then, make sure everyone understands how to fill in a CBS.

3) Together, discuss: What is the difference between a DCR and a CBS? Tip: If you are not sure, look at the information box below.

4) Together, fill in the dark cells (balance & total) in the CBS in table 10. All the necessary information is in the table. Tip: If you are hesitating, re-read the scenario on the next page.

5) Together, answer the four questions in table 12. Solutions are provided at the bottom of the page.

A **DCR** helps you record how many garments were planned to be cut today in the different styles, how many were actually cut, and how many are left to be cut to reach today's goals.
A **CBS** helps you record how many garments need to be cut to complete the whole cut order for one single style, how many have been cut so far, and how many are left to be cut to complete the order. The order is completed when the Balance = 0.

Table 10. Cutting Balance Sheet

Style #	5494372	**Marker mode**	N/E/W
Buyer	A&C Textiles	**Multi / single size**	Multi
Fabric type	Solid, open-width	**Half / Open garment**	Open
Planned quantity	12,000	**Buyer allowance**	Up to 5% extra

Size	S		M		L		XL		**Total**	
Planned quantity	2,000		4,000		4,000		2,000		12,000	
Ratio	1		2		2		1		6	
Colour	Black	Navy	Black	Navy	Black	Navy	Black	Navy	Black	Navy
Quantity	1,000	1,000	2,000	2,000	2,000	2,000	1,000	1,000	6,000	6,000
Ratio	1	1	2	2	2	2	1	1	6	6

Cut #	**Date**	**Cut**	**S**			**M**			**L**			**XL**		
		Balance	**Black**	**Navy**	**-**	**Black**	**Navy**	**-**	**Black**	**Navy**	**-**	**Black**	**Navy**	**-**
Cut 1	May 2	Cut	200	200	-	400	400	-	400	400	-	200	200	-
		Balance	800	800	-			-			-			-
Cut 2	May 3	Cut	400	400	-	400	450	-	400	400	-	420	400	-
		Balance	400	400	-			-			-			-
Cut 3	May 4	Cut	400	400	-	400	400	-	400	400	-	400	400	-
		Balance	0	0	-			-			-			-
Cut 4	May 8	Cut	0	0	-	600	600	-	600	600	-	0	0	-
		Balance	0	0	-			-			-			-
Cut 5	May 10	Cut				200	200	-	200	200	-	0	0	-
		Balance						-			-			-
Cut 6	/	Cut												
		Balance												
Cut 7	/	Cut												
		Balance												
Cut 8	/	Cut												
		Balance												
Total			1,000	1,000	-			-			-			-

Table 11. Using cutting balance sheets (CBS)

Scenario:
Ritthy, the cutting manager, fills in a style, colour and size-wise cutting balance sheet after each cut.

For size S, the total planned cut to complete the order is 2,000. In this size, 1,000 should be cut in Black, and 1,000 should be cut in Navy.

- Using the DCR for Cut 1 (May 2), he knows that 200 pieces were cut in each colour. So, the balance for Cut 1 is 1,000 – 200 = 800 pieces in each colour.
- Using the DCR for Cut 2 (May 3), he knows that 400 pieces were cut in each colour. So, the balance for Cut 2 is 800 – 400 = 400 pieces in each colour.
- Using the DCR for Cut 3 (May 4), he knows that 400 pieces were cut in each colour. So, the balance for Cut 3 is 400 – 400 = 0 pieces in each colour. The cut order is completed!

Table 12. Reading daily cutting reports (CBS)

1. Which colour and size orders were completed after Cut 3?

2. How many pieces remain to be cut to complete this order after Cut 3?

3. In which colour-sizes combinations is there overcut?

4. After how many cuts was the style order completed?

Solutions: 1. S Black & Navy, XL Black & Navy; 2. 800 + 750 + 800 + 800 = 3,150; 3. M Navy, XL Black; 4. After 5 cuts

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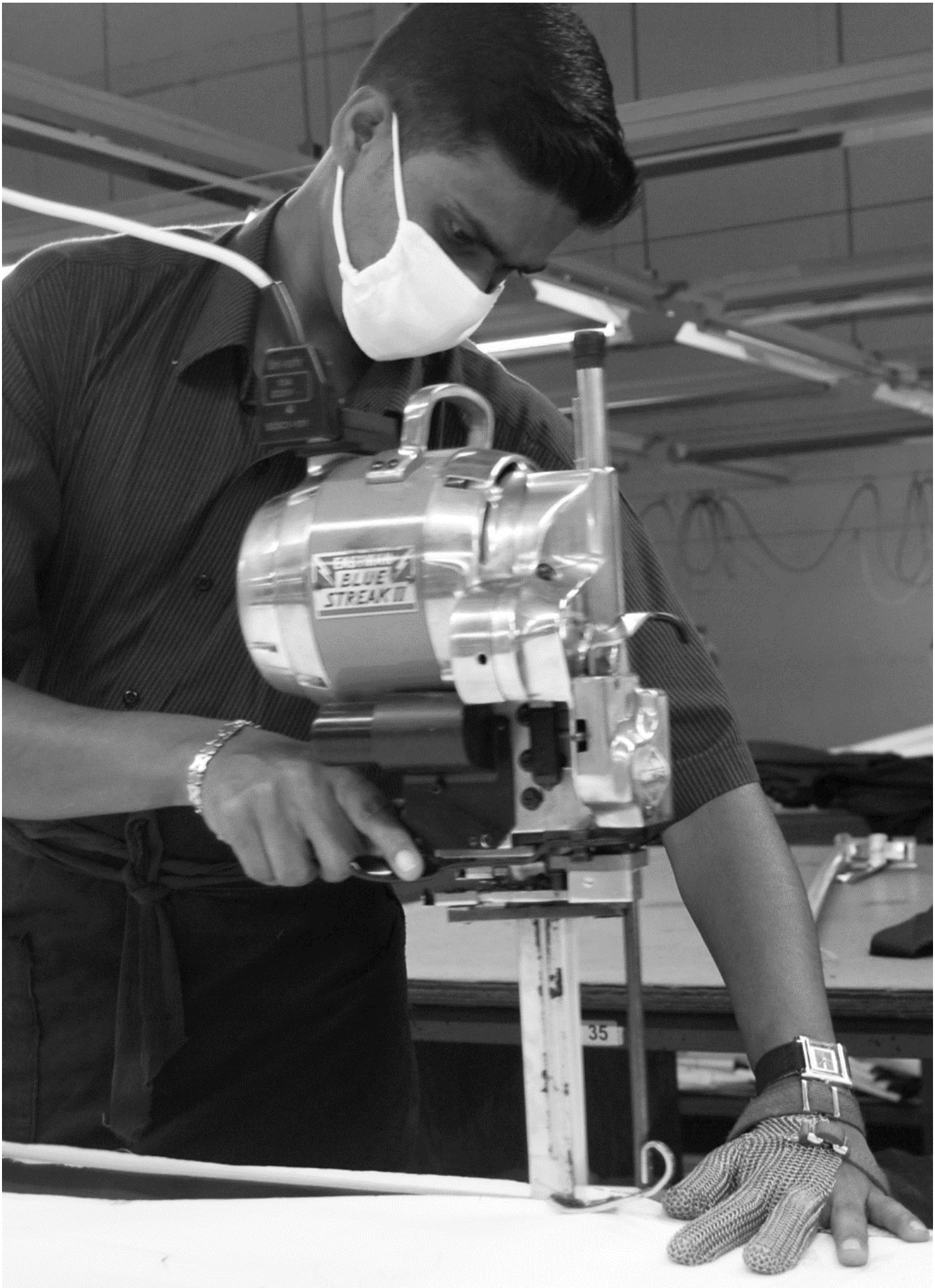
BLUE
STREAK
35

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 cut fabric more safely and efficiently, then record cutting operations.

Cutting fabric **efficiently**

Cutting fabric **safely**

Recording cutting operations

In this session, you will think of ways to apply your new knowledge to improve fabric cutting in your factory by reviewing best practices and drafting your own action plan.

A cutting balance sheet 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 cutting practices as a next step for evaluating your own and implementing improvements.

Instructions:

1) Together, look at the list of best practices in table 12, and put a ✓ in the column on the right if you use these practices in your factory.

Table 12. Cutting fabric

Best practices	✓
1. Cutting tools are selected based on the pattern shapes and size, fabric type, and lay height to be cut.	
2. Workers are trained in efficient cutting practices and on safety rules and procedures to protect them from harm.	
3. There are safety rules in place in the cutting room, first aid kits, and procedures for dealing with accidents. All accidents are recorded.	
4. Daily cutting reports are filled in every day to keep track of cutting room production and ensure daily targets are met.	
5. Cutting balance sheets are filled in every day to keep track of style-wise cut quantities and ensure targets are met and orders are completed.	

Activity

3b

15 minutes

Your action plan

In this activity, you will think of ways to apply your new knowledge to improve fabric cutting in your factory by drafting your own action plan.

Instructions:

1) Together, fill in the action plan (table 13) 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 13. Cutting fabric – Action Plan

Problem identified				
Solutions identified	**Action(s) to be taken**	**Person responsible**	**By when?**	**How will improvements be measured?**

Cutting fabric

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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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