International Labour Organization

Material productivity

Production systems

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 Material productivity is a training for garment manufacturers to improve their production systems. Participants will work on identifying drivers of material waste, applying measures to reduce waste, and selecting practices for efficient material use. This module takes about 2 hours to complete.

Upon completion of the training, participants should have:

- Discussed the importance of material productivity and how to evaluate it in the factory.
- Learnt about common drivers of material waste and how to identify them.
- Discussed important waste reduction measures to address each driver of waste.
- Learnt about good production practices to use materials more efficiently in the factory.

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

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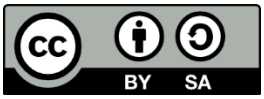

Guidelines for successfully using the training tool

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 topic of this FIT module.

Indicator 1	**Material waste (Kg)**
Definition	The amount of material (fabric, thread, trims, cardboard, packaging, etc.) wasted in your factory over a certain period of time (such as one month).
Purpose	To understand how much material gets wasted in your factory, set a material waste reduction target, and begin to identify ways to reduce material waste in the factory.
Calculation	Pick up all material waste and store it in different bins (fabric, trims, others) in each production room (sampling, cutting, sewing, finishing, packing), then weigh it daily or weekly and record the quantities.
Frequency	Calculate and record monthly.
Responsible	Department managers & Designated administrative staff

Indicator 2	**Cut-to-ship ratio**
Definition	The amount of pieces shipped compared to the amount of pieces cut for a specific order. If the ratio is less than 1, it means less pieces were shipped than what was cut. The ideal ratio is 1 or higher (if extra shipped is allowed).
Purpose	To understand how efficiently your factory processes orders and how many pieces are missing or kept as surplus, and identify ways to consistently cut the ordered quantity by improving production planning and quality in the factory.
Calculation	Total quantity shipped / total quantity cut Notes: Quantity cut should be expressed in # of garments, not in # of cut parts!
Frequency	Calculate for each order, then calculate a yearly average of all orders.
Responsible	Merchandiser

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 improving material productivity 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.

Mina is a new Factory manager at the HS factory. Mina has noticed that the factory spends a lot of money on materials. In fact, about 70% of costs are for fabric. When inspecting each department, Mina sees several other issues. A third of the space in the stores is occupied by untagged leftover materials. There are also many boxes of unshipped excess garments or garments rejected due to defects. In the cutting room and the sewing floor, there are lots of fabric bits, thread and trims lying around on the floor and on tables. Mina concludes that materials are used inefficiently. This costs the factory a lot of money.

Mina decides to make changes to use materials more efficiently and reduce material waste. First, with managers and workers in each department, she identifies the main causes of material waste in the factory. Together, they agree on new measures to address each cause and reduce waste. Mina thinks that this is not enough and that materials must be used more efficiently in all production areas. She discusses operations in each department, and new practices are adopted to increase efficiency and save materials.

Thanks to these changes, less material is wasted before and during production, and materials are used more efficiently. The factory produces more garments while using less fabric, and reduces material costs dramatically.

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

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

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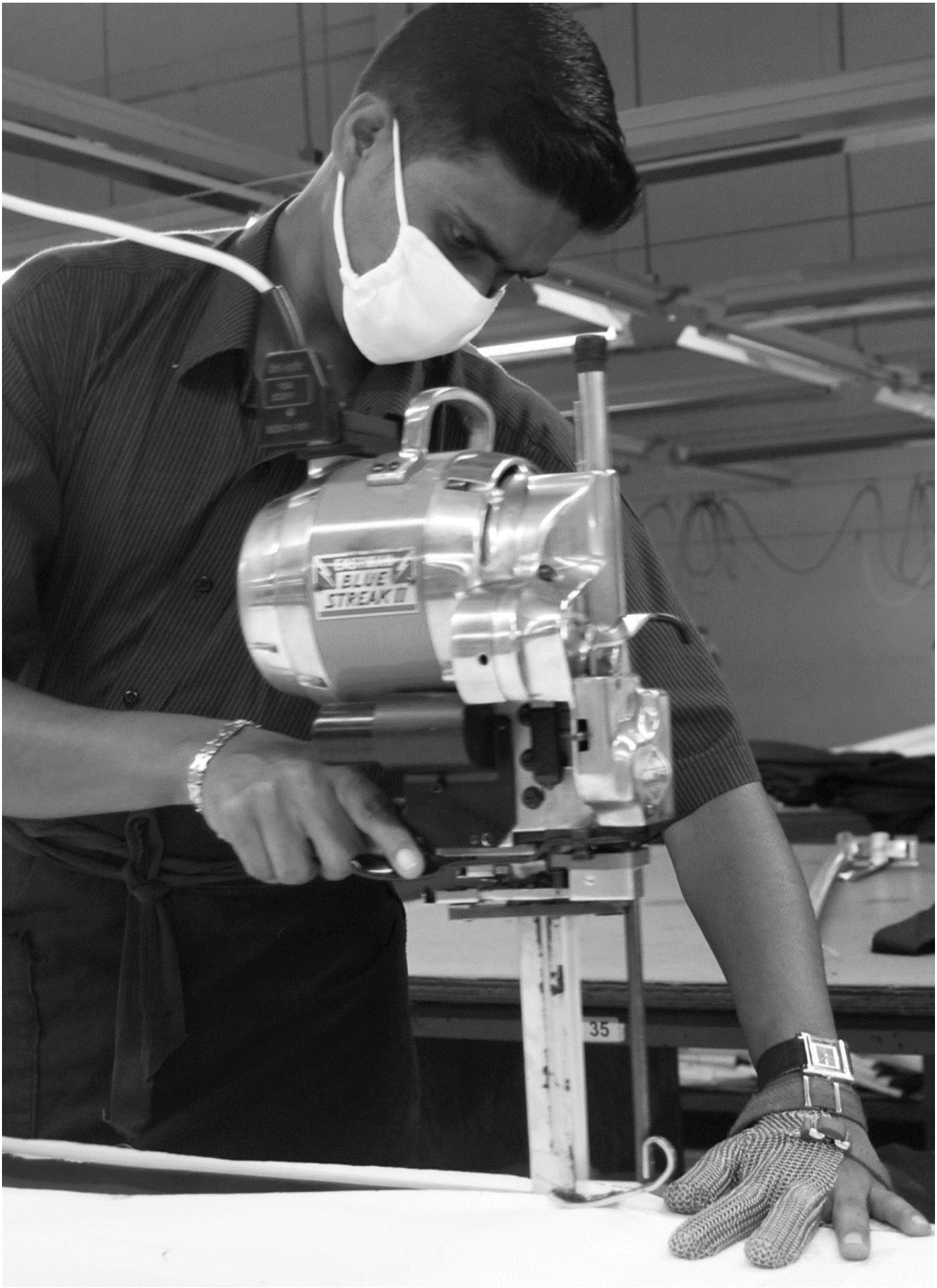
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STREAK II

Session 2

Learning about the topic

Goals

Understanding what material productivity is and why it is important for the factory.

Identifying common drivers of material waste in your factory.

Discussing and selecting important measures to address common drivers of material waste.

Learning about good production practices for using materials more efficiently in each department.

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 helps you improve your production systems by focusing on material productivity. Material productivity shows how efficiently your factory uses materials to produce garments. Higher material productivity helps you save material costs and produce more garments with less material by reducing material waste and using materials more efficiently. Throughout this module, you will work on the three steps below.

Identifying **drivers of waste**

Selecting **waste reduction measures**

Adopting more **efficient practices**

First, you will discuss material productivity. Then, you will learn about common drivers (causes) of material waste, and select measures to reduce it. Finally, you will discuss production practices which help factories use materials more efficiently.

Activities

Activity
2a

20 minutes

Understanding material productivity

Material productivity is about how to use as little material as possible to produce as many garments as possible (while maintaining buyers' approved requirements and specifications). In this activity, you will discuss material productivity.

Instructions:

1) Have a participant read aloud the text box below. Then, discuss: How much do you spend on materials yearly and what proportion of your costs does this represent?

2) Together, look at the symptoms of low material productivity in table 2, and put a ✓ on the right if you see it in your factory. Then, discuss: Is your material productivity is high or low? Why?

Material costs are often the highest (up to 70% of total costs). Higher material productivity means using less material to make more garments. So, higher material productivity helps you reduce material costs. To calculate the proportion of costs that materials occupy, use this formula: (total material costs / total factory costs) x 100%

Table 2. Material productivity

Symptoms of low material productivity	✓
1. Materials costs are high and represent a large portion of total costs.	
2. There is a lot of material waste that needs to be thrown away every day.	
3. There are bits of fabric and thread or trims lying around on the floor.	
4. There is a lot of leftover or unused material in the stores.	
5. There are lots of re-cuts and rejects after cut parts / garment inspections.	
6. There are lots of rejects after raw material inspections.	
7. The factory ships much less garments than garments cut for each order.	
8. Marker efficiency is very low (less than 70%).	

Activity

2b

20 minutes

Drivers of waste

To increase material productivity, you need to start saving materials by reducing **material waste**. In this activity, you will learn about common drivers (causes) of material waste.

Instructions:

1) Together, go through table 3 and decide for each problem whether or not it is a driver (a cause) of material waste by writing Yes or No in the right column. Then, compare your answers with the solutions at the bottom of the page.

2) Together, discuss: Which drivers of waste happen or are present in your factory? Circle their number in table 3.

To identify drivers of waste in your factory, it is useful to measure different indicators of waste such as total material waste (Kg), fabric/thread/marker utilization (%) and order-to-ship or cut-to-ship ratio. To learn more, ask for the “Measuring productivity” module!

Table 3. Drivers of waste	
Common problems	**Yes / No**
1. Raw materials are of poor quality or defective.	
2. There is a lot of unused / leftover fabric.	
3. The factory orders too much material.	
4. Staff turnover is high.	
5. There is a decrease in orders.	
6. Incoming fabric widths vary from roll to roll.	
7. Materials are not issued properly.	
8. Style orders require a lot of fabric.	
9. Materials are stored poorly.	
10. Materials are tagged wrongly – or not tagged at all.	
11. Material usage is not calculated and optimized.	
12. Materials are expensive.	
13. There are not enough cutting and sewing machines.	
14. Material is wasted due to production defects.	
15. Working conditions are poor.	
16. Quantities cannot be shipped due to poor quality / planning.	

Drivers of material waste can be broken down in three categories.

1. Quality issues (raw materials or during production).
2. Poor processes and practices (storing, tagging, issuing, etc.).
3. Poor planning (of material usage and quantities to order).

Solving these issues by improving quality, processes and planning can already help you increase material productivity a lot! To learn more, ask for the “Production planning” and “Improving processes” modules.

Solutions: 1. Yes, 2. Yes, 3. Yes, 4. No, 5. No, 6. Yes, 7. Yes, 8. No, 9. Yes, 10. Yes, 11. Yes, 12. No, 13. No, 14. Yes, 15. No, 16. Yes.

Activity

2c

25 minutes

Waste reduction measures

Once you have identified main drivers of material waste, you can start **selecting measures** to reduce waste in your factory. In this activity, you discuss and select measures to reduce your material waste.

Instructions:

1) Together, look at the waste reduction measures in table 4. Then, discuss, and put a ✓ on the right if you do it in your factory.

2) Together, decide which measures could best address each driver of waste by writing down the number of the measure(s) next to each driver in table 5. Solutions are at the bottom of the page.

3) Together, discuss: Based on the drivers of waste identified in your factory (previous activity), which measures do you think you should apply to reduce your material waste? Circle their number in table 4.

Table 4. Common measures

Measures for waste reduction	✓
1. Store materials with care and in a systemic way.	
2. Record leftover fabric quantities, tag and store them for later use.	
3. Calculate material consumption during planning and use it for ordering.	
4. Draw markers to match fabric widths.	
5. Calculate fabric & thread consumption (during production) for each order.	
6. Monitor and evaluate material supplier performance.	
7. Issue materials with care and in a systemic way.	
8. Draw short or mini markers with leftover fabric to avoid wasting it.	
9. Inspect incoming materials and report defective quantities.	
10. Tag incoming and leftover materials with care and in a systemic way.	
11. Record shipped quantities and compare with ordered and cut quantities.	
12. Inspect cut parts and sewn garments and report defective quantities.	

Table 5. Selecting measures	
Drivers of waste	**Measures**
1. Raw materials are of poor quality or defective.	6, 9
2. There is a lot of unused / leftover fabric.	
3. The factory orders too much material.	
4. Incoming fabric widths vary from roll to roll.	
5. Materials are not issued properly.	
6. Materials are stored poorly.	
7. Materials are tagged wrongly – or not tagged at all.	
8. Material usage is not calculated and optimized.	
9. Material is wasted due to production defects.	
10. Quantities cannot be shipped due to poor quality / planning.	

Solutions: 1) 6-9, 2) 2-8, 3) 3, 4) 4, 5) 7-10, 6) 1-10, 7) 10, 8) 5, 9) 7-12, 10) 3-9-11-12

Activity

2d

25 minutes

Adopting efficient practices

To improve material productivity, it is not enough to apply measures to reduce material waste. You must also work actively towards using materials **more efficiently**! In this activity, you will discuss practices for using materials more efficiently throughout production.

Instructions:

1) Together, discuss: In which production operations do you think you waste the most material and could use materials more efficiently? Then, have a participant read aloud the text box below.

2) Together, look at the list of good practices for efficient material use in table 6 and put a ✓ on the right if you do it in your factory.

3) Together, based on your answers to step 1), discuss, then select five new practices that you would like to implement in your own factory. Circle their number in table 6.

There are opportunities for reducing waste and using materials more efficiently in each production department. However, the most crucial one (the department where the most fabric can be saved) is the cutting room (more efficient marker planning and cutting operations).

Table 6. Practices for efficient material use

Sample room & Storeroom	✓
1. Develop samples and patterns strictly according to buyer specifications, with similar – if not the same – fabric.	
2. Check all samples (counter & line samples) for sewing allowances and have them approved by the head of Quality before issuing pattern boards.	
3. Inspect at least 10% of incoming materials before storing them. Maintain detailed records on the type and quantity of defects found.	
4. Unload materials carefully in a covered area. Store materials on pallets or racks (never on the floor).	
5. Maintain a precise material inventory showing balance and fabric widths, which can be shared with other departments.	

6. Check the stores weekly for dampness, mould and pests. Ensure that it is kept clean and in order, and that materials are not exposed to sunlight.	
Cutting room	✓
7. Draw markers using approved size sets (pattern boards) from the sample room only.	
8. Draw longer, wide, multi-size markers to use fabric more efficiently.	
9. Calculate fabric utilisation and marker utilisation for each order. Have these numbers approved by Merchandising before cutting.	
10. Always relax fabric long enough before cutting to ensure cutting quality and avoid inaccuracies or defects later on.	
11. During laying, pay attention to details such as edge control, stripes alignment, lay height, clamping or pinning, etc. to preserve quality.	
12. Maintain inspection records listing the types and quantities of defects for laying, cut parts & panels inspection, and bundle inspection.	
Sewing & finishing room	✓
13. Train operators to trim threads to 1cm or the minimal requirement to waste less thread.	
14. Keep work-in-progress in special bins only to avoid it getting lost or parts going loose.	
15. Reserve specific areas for storage of bundles and / or sewn garments. Do not store materials anywhere else.	
16. Do not allow workers to use fabric for personal use or for example for cleaning machines.	
17. Keep the rooms and tables clean and do not allow any food inside to avoid fabric getting stained.	
18. Compare the amount of pieces shipped with the amount of pieces sewn to understand how much material was wasted between sewing and shipping.	

The **FIT programme** offers a series of modules to help you improve efficiency and reduce waste in each production department. Talk to your FIT facilitator to obtain the list of modules and select modules corresponding to areas or processes that you want to improve.

PFAFF

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 identify drivers of waste and select new measures and practices to reduce material waste and use materials more efficiently.

Identifying **drivers of waste**

→ Selecting **waste reduction measures**

→ Adopting more **efficient practices**

In this session, you will think of ways to apply your new knowledge to improve material productivity in your factory 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 improving material productivity as a next step for evaluating your own and implementing improvements.

Instructions:

1) Together, look at the list of best practices in table 7, and put a ✓ in the column on the right if you use these practices in your factory.

Table 7. Material productivity

Best practices	✓
1. The factory measures material productivity using different calculations and observations and strives to improve it.	
2. Management identifies the main drivers of material waste in the factory.	
3. Management selects and implements measures to reduce waste based on the drivers of waste identified.	
4. Management works towards using materials more efficiently by adopting better production practices – especially in the cutting room.	

Activity

3b

15 minutes

Your action plan

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

Instructions:

1) Together, fill in the action plan (table 8) 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 8. Material productivity – Action Plan

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

Material productivity

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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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