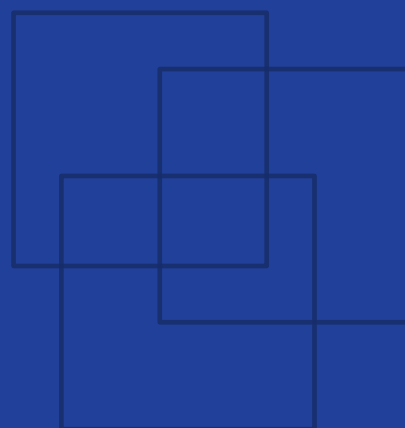




International
Labour
Organization

Eliminating bottlenecks

Production systems



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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 Eliminating bottlenecks is a training for garment manufacturers to improve their production systems. Participants will work identifying, analysing and eliminating bottlenecks to improve productivity. This module takes about 2 hours to complete.

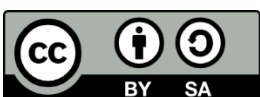
Upon completion of the training, participants should have:

- Understood what low productivity means and what bottlenecks are.
- Learnt how to detect bottlenecks in the production process by looking at common symptoms.
- Learnt how to analyse the root causes of bottlenecks.
- Discussed how to improve processes in the factory to eliminate bottlenecks.

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	On-time delivery rate (%)
Definition	The proportion (percentage) of placed orders being delivered (shipped) to the buyer on time over a certain period of time.
Purpose	To understand how well you plan production, set an on-time delivery improvement target, and begin to identify ways to improve production planning and control.
Calculation	$(\# \text{ of orders shipped on time} / \text{total} \# \text{ of orders shipped}) \times 100\%$
Frequency	Calculate monthly for all orders.
Responsible	Merchandiser / Shipping clerk

Indicator 2	Order cycle time / lead time (Days)
Definition	The average amount of time in days that it takes you to process an order, from receiving the confirmed order to shipping the order.
Purpose	To understand how efficiently your factory operates, set a target for improvement, and begin to identify ways to process orders faster in the factory.
Calculation	Record the order cycle time (or lead time) for each order, then calculate the average. Note: You can also calculate your production cycle time to understand how long it takes to produce an order. Record the production cycle time for each order (from start of cutting to order shipping), then calculate the average.
Frequency	Calculate for each order, then calculate the average at the end of each year.
Responsible	Merchandiser / Production planning



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 identifying and eliminating bottlenecks 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.

Ali is a new production manager at the HS factory. Lately, there have been many order delays. Workers do a lot of overtime, which makes them tired and costs the factory a lot of money. But, when doing an inspection, Ali sees many workers sitting idle, awaiting bundles in the sewing lines. According to records, there are also high amounts of re-cuts, and material waste is very high. Managers think that it is normal, and have not realized that these are all bottlenecks (problems) that lower productivity in the factory.

Ali decides to improve productivity by eliminating bottlenecks. First, he trains managers to identify bottlenecks in their department by looking at common symptoms of work stoppage and low productivity. Then, together with managers, supervisors and workers, Ali identifies the causes of each bottleneck. Then, they think of solutions to address each specific cause. As causes are related to quality and planning issues, Ali also works with the planning and quality departments to improve their processes and prevent the bottlenecks from taking place.

Thanks to these changes, bottlenecks have been eliminated, and managers can directly identify, analyze and solve problems before they get too serious. This improves productivity, reduces order delays, lowers the workload for workers and helps save money.

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

Table 1. Questions about Ali's situation

1. What problems has Ali identified? What impact do these problems have on the factory and its workers?

2. What does Ali do or change in order to solve these problems?

3. What are the results of Ali'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 what bottlenecks are and their impact on productivity.

Learning how to identify bottlenecks by detecting common symptoms of low productivity.

Learning how to analyze the causes of bottlenecks, and discussing common root causes.

Discussing how to eliminate bottlenecks in the factory by selecting solutions and improving processes.

Session 2

Overview



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

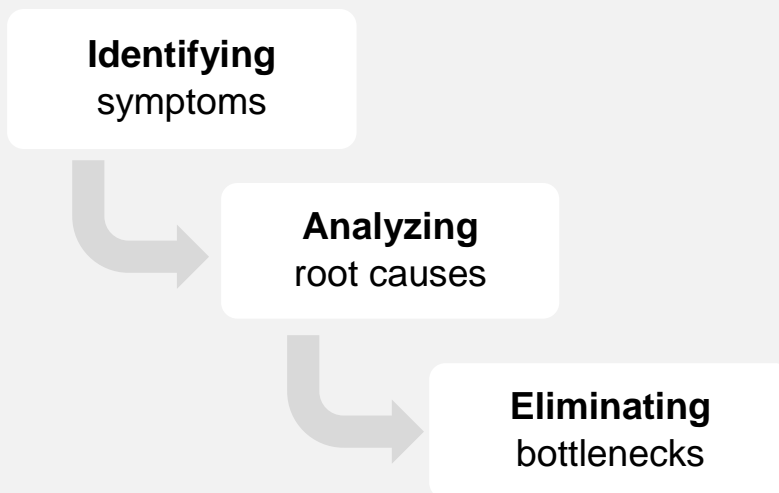


90 minutes



Learning manual, pens, and markers

This training module helps you improve your production systems by focusing on eliminating bottlenecks. Bottlenecks are problems in the production process that cause low or reduced productivity in the factory. Identifying and eliminating bottlenecks systematically is very important to improve and maintain factory productivity. Throughout this module, you will work on the three steps below.



First, you will discuss what bottlenecks are and how they impact productivity. Then, you will learn about common symptoms and root causes of bottlenecks. Finally, you will discuss how to eliminate bottlenecks by selecting solutions and improving basic processes in your factory.



To improve productivity, it is not enough to identify and eliminate bottlenecks. You must also work to improve processes systematically to prevent bottlenecks from happening. To learn more, ask for the “Improving processes” module.

Activities

Activity

2a



20 minutes

Understanding bottlenecks

Bottlenecks are problems in the production process that lower productivity. In this activity, you will discuss bottlenecks and their impact on productivity.



Instructions:

- 1) Have a participant read aloud the text box about bottlenecks below and make sure everyone understands.
- 2) Together, look at table 2, and for each situation, decide whether it is a symptom (sign) of bottleneck by putting a ✓ on the right. Then, compare your answers with the solutions at the bottom of the page.
- 3) Together, for each bottleneck identified in table 2, discuss: How might this bottleneck lower productivity?



Bottlenecks are problems in the production process that lower productivity by preventing the effective use of resources (labour, energy, materials, machinery, etc.). To improve productivity, you must:

- Identify symptoms (signs) of bottleneck as soon as possible.
- Identify its root causes correctly.
- Eliminate the bottleneck and think of how to prevent it from recurring.

Table 2. Understanding bottlenecks

Situations	Symptom of a bottleneck?
1. Poor material quality.	
2. Lack of new workers to recruit.	
3. High material waste.	
4. Poor maintenance practices.	
5. Lots of delays in order shipment and delivery.	
6. Overworked, stressed, fatigued employees.	
7. Poor planning and scheduling.	
8. High work-in-progress levels in the lines.	
9. Poor quality of garments produced.	
10. Lack of tools and machinery.	
11. Lack of skilled workers.	
12. Long lead times (slow production).	

Solutions: 3, 5, 6, 8, 9 and 12 are symptoms of bottlenecks

Activity

2b



20 minutes

Identifying symptoms

The first step of eliminating bottlenecks is to **detect symptoms** (signs) that there is a problem causing low productivity. In this activity, you will learn how to detect the symptoms of a bottleneck.



Instructions:

- 1) Have a participant read aloud the text box below, and make sure everyone understands.
- 2) Together, look at the word cloud of common symptoms in table 3. Then, discuss and decide which category each symptom belongs to by writing down its number in the corresponding column. Solutions are at the bottom of the page.
- 3) Together, discuss: Which of these symptoms do you often observe in your factory? Circle their number in table 3.



A bottleneck indicates that resources (people, materials, machines, energy) are not being used productively. To identify a bottleneck, you should observe four areas in your factory:

- 1) Workers
- 2) Materials
- 3) Machines
- 4) Energy







Having good record-keeping and productivity measurement systems helps identify bottlenecks. To learn more, ask for the “Measuring productivity” module.

Table 3. Symptoms of bottlenecks

Word cloud

1.	Idle workers (workers awaiting materials or bundles)	7.	Excess idle machinery (machinery not being used)
2.	High amount of rejects or re-works (poor quality)	8.	High energy (water, electricity, coal) costs
3.	Demotivated, tired workers	9.	High amount of material waste (damaged, scraps or leftovers)
4.	Late or rushed deliveries (shipments)	10.	Low worker output (amount of pieces per worker)
5.	Poor or uneven quality of garments produced	11.	High level of work-in-progress
6.	Spills or leaks of water, steam, oil and others	12.	Machines overloading or breaking down.

Four categories

Workers	Materials	Machines	Energy
			

Solutions: Workers: 1, 3, 10. Materials: 2, 4, 5, 9, 11. Machines: 7, 12. Energy: 6, 8.

Activity

2c



25 minutes

Identifying causes

Bottlenecks are problems in the production process that cause low productivity due to the inefficient use of resources. As for any problem, in order to solve it, you must first identify its **root cause(s)**. In this activity, you will learn how to identify the causes of a bottleneck.



Instructions:

- 1) Together, look at the list of common root causes in table 4. Then, look at the list of the common symptoms. For each symptom, discuss and identify potential root causes by writing down their number in the right column. Solutions are at the bottom of the page.
- 2) Together, in table 5, list four of the common symptoms of low productivity that you identified in your factory in the previous activity (2b step 3). Then, based on your production process, discuss: What could be their root cause(s)? Write them down in the right column.



To properly identify root causes, it is important to consult and involve workers, supervisors and managers from the relevant departments.

Table 4. Root causes of bottlenecks

Common root causes			
1.	Poor production scheduling and control	8.	Lack / excess of materials due to poor inventory planning
2.	Poor worker skills due to lack of training or bad recruitment	9.	Poor handling or storage of materials
3.	Lack of / too many workers due to poor capacity planning	10.	Poor quality inspection procedures
4.	Poor workspace (factory) layout causing loss of time	11.	Poor worker-manager relationships and communication
5.	Poor and / or unsafe working conditions	12.	Lack of tools and machinery due to poor operations planning
6.	Poor quality of raw materials	13.	Poor or no record-keeping system
7.	Lack of machinery maintenance and factory maintenance	14.	Any other causes that you may think of!

Symptoms	Root causes
1. Idle workers	1, 3, 8, 12
2. High amount of rejects / re-works	
3. Demotivated, tired workers	
4. High material waste	
5. Idle machinery	
6. Late or rushed deliveries	
7. High amount of work-in-progress	
8. Poor or uneven garment quality	
9. Machines breaking down	
10. Low worker output	

Solutions: 1) 1-3-8-12; 2) 2-6-7-9-10; 3) 5-11; 4) 8-9; 5) 7-12; 6) 1-3-8-12-13; 7) 1-3-8-12-13; 8) 2-6-10-13; 9) 2-7; 10) 2-4-5

Table 5. Your factory

Symptoms	Root causes

Activity

2d



15 minutes

Eliminating bottlenecks

Once you have identified root causes, you can select and apply solutions to **eliminate bottlenecks**. In this activity, you will discuss how to find and implement solutions to improve productivity.



Instructions:

- 1) Have a participant read aloud the scenario in table 6. Then, together, discuss the two questions in the table.

Table 6. Scenario

Scenario: Ali, a production manager, has noticed that there is a very high amount of re-work in the sewing lines. The work-in-progress level is also very high. Bundles pile up by some work stations. By discussing with sewing operators and supervisors, Ali has determined the cause for this problem. Machinery is old and not well maintained. It causes sewing defects and breakdowns. As operators have to do more re-work, work-in-progress levels have increased. This, with breakdowns, causes order delays.

1. What solutions would you suggest to eliminate this bottleneck? Think of at least 3.
2. Ali has thought of 5 different solutions. Which one(s) do you think is/are the best and why (circle them below)? Think about effectiveness and cost (in time and money).
 - Buy new machines to replace the old ones
 - Hire more workers to take care of the re-works
 - Repair machines
 - Train workers to carry out basic maintenance daily
 - Hire a full-time mechanic to take care of breakdowns and routine maintenance

Activity

2e



10 minutes

Improving processes

Having good, standardized **processes** in place to run the factory and production activities is a big step towards preventing common bottlenecks. In this activity, you will discuss processes in your factory.



Instructions:

- 1) Together, go through the list of important factory processes in table 7, and put a ✓ on the right if you have it in your factory.
- 2) Together, discuss: Which processes do you want to improve in your factory? Why?

Table 7. Important factory processes

Processes	✓
Production planning and scheduling process	
Production control process	
Quality control and assurance process	
Maintenance and housekeeping process	
Recruitment and training process	
Record-keeping process	
Materials storage and inventory process	
Machine management process	
Human resources (staff) management process	
Safety, health and welfare process	



It is important to work towards improving factory processes in a systemic way. To learn more, ask for the “Improving processes” module.



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 bottlenecks, analyse their causes and select solutions to improve productivity in your factory.

Identifying
symptoms

Analyzing
root causes

Eliminating
bottlenecks

In this session, you will think of ways to apply your new knowledge to better eliminate bottlenecks 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 eliminating bottlenecks as a next step for evaluating your own and implementing improvements.



Instructions:

- 1) Together, look at the list of best practices in table 8, and put a ✓ in the column on the right if you use these practices in your factory.

Table 8. Eliminating bottlenecks

Best practices	✓
1. Managers pay attention to common symptoms of bottlenecks in their departments, record it in a log sheet and address it as soon as possible.	
2. Managers work to analyse the causes of bottlenecks by consulting with other departments, workers, supervisors and factory management.	
3. Management finds solutions to address the root causes of bottlenecks, and selects the best solutions based on evaluated cost and impact.	
4. After selecting solutions, management drafts an action plan listing actions to take, by when, who is responsible and a review date to assess effectiveness.	
5. Factory management works to set up and improve important factory processes to prevent bottlenecks and address general productivity issues.	

Activity

3b



15 minutes

Your action plan

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



Instructions:

- 1) Together, fill in the action plan (table 9) 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 9. Eliminating bottlenecks – Action Plan

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

Eliminating bottlenecks

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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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