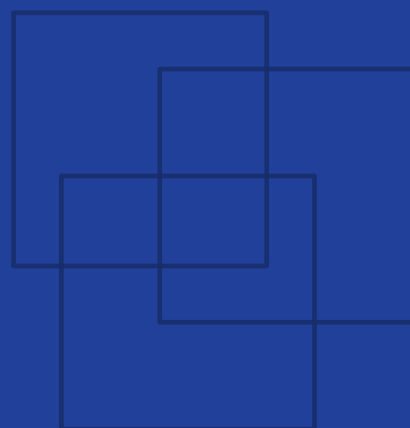




International
Labour
Organization

Washing garments

Finishing operations



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Factory Improvement Toolset

The Factory Improvement Toolset (FIT) is an innovative self-facilitated, activity-based learning approach designed by the International Labour Organization (ILO) to create more decent and sustainable employment. FIT supports manufacturers in global supply chains to improve productivity, competitiveness and working conditions by upgrading production systems and factory practices.

FIT has been developed to be a sustainable, time- and cost-efficient option for supporting factories to enhance productivity through improved business practices and working conditions. FIT focuses on areas of production improvement and actions to be taken specific to each participating factory. It can be utilized as stand-alone learning tools or to complement other training programmes.

With each module lasting no more than 2.5 hours, FIT enables factories to train personnel, whilst minimizing interference with production realities. The easy-to-use methodology makes it possible to rapidly scale the implementation to reach a large cohort of trainees across multiple production facilities.

Working in small groups, participants review real-life situations and engage in discussions to determine improvements to be made in factory without an external trainer or specialist. This self-facilitated, activity-based and highly participatory learning approach positions participants as both student and teacher and makes the toolset self-tailored to the needs and interests of each group.

About this module

This FIT module on Washing garments is a training for garment manufacturers to improve finishing operations. Participants will work on receiving and washing garments efficiently, safely and with quality. This module takes about 2.5 hours to complete.

Upon completion of the training, participants should have:

- Understood the washing and finishing processes, and different types of washing.
- Learnt how to ensure quality and minimize defects before, during and after washing.
- Discussed how to better protect workers' health and the environment.

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 in the FIT finishing operations series.

Indicator 1	Defect per hundred units - DHU (%)
Definition	The amount of defects found in average per 100 inspected pieces or garments. The lower the DHU, the higher the quality in your factory. It can be calculated separately for each line, or for all lines together.
Purpose	To understand quality in your finishing room, set a quality improvement target, and begin to identify ways to reduce defects and improve garment quality.
Calculation	$(\text{total \# defects found} / \text{total \# of pieces or garments inspected}) \times 100\%$ <p>Notes:</p> <ul style="list-style-type: none"> • It is better to calculate this separately for in-line and end-line inspections. • If only the end-line calculation is taken but in-line inspection is also recorded, add defects found in in-line and end-line, however, do not add up garments inspected at in-line (only take the end-line count).
Frequency	Calculate daily (for each line or all lines), then calculate a monthly average.
Responsible	Finishing room manager / Line supervisor / Quality checker

Indicator 2	Shipment audit passing rate (%)
Definition	The proportion (percentage) of shipment audits (or buyers' audit) that your factory passed on the first trial (the first time the audit was conducted).
Purpose	To understand the quality of your production operations, set a quality improvement target, and begin to identify ways to improve garment quality in the factory.
Calculation	$(\text{\# of shipment audit passed the xth time} / \text{total \# of shipment audits}) \times 100\%$ <p>Note: $\# \text{ of shipment audits passed} = \# \text{ of shipment audits passed on the first trial (the first time the audit is conducted)}$ Similarly, the factory must also calculate the shipment audits passed 2nd time and so on</p>
Frequency	Calculate monthly.
Responsible	Finishing room manager / Shipping clerk



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 good washing practices is important for 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.

Rani is a new finishing manager at the HS denim factory. She oversees all finishing operations. When inspecting the washing unit, she finds several safety issues. The floor is constantly wet from spilt water. There are bottles of chemicals in the corners. Workers handle them without gloves. Rani discusses water consumption with the washing manager. She is surprised at how high it is. Water is not re-used, and waste water is disposed into the nearby river. Last, when inspecting garments, Rani finds many washing defects, such as bleach stains, broken seams, and others. Defects need to be repaired and sometimes re-worked, which costs both time and money to the factory.

To cut costs and improve quality and safety, Rani makes several changes. First, she reviews washing processes with the washing manager. Together, they set guidelines to avoid defects and improve safety. All workers now wear protective equipment such as masks, gloves, boots, etc., whenever necessary. Chemicals are stored safely in a separate ventilated room. Only store workers can extract and transport chemicals. Finally, rain water is collected, and water is re-used whenever possible. Water that cannot be re-used is disposed of only after having been treated. Leaks are repaired, and workers trained to use less water.

Thanks to these changes, workers feel safer and healthier. Accidents are avoided. Overall quality increases, and water consumption decreases. This saves the factory a lot of time and costs. Rani uses savings to buy new washing machines.

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

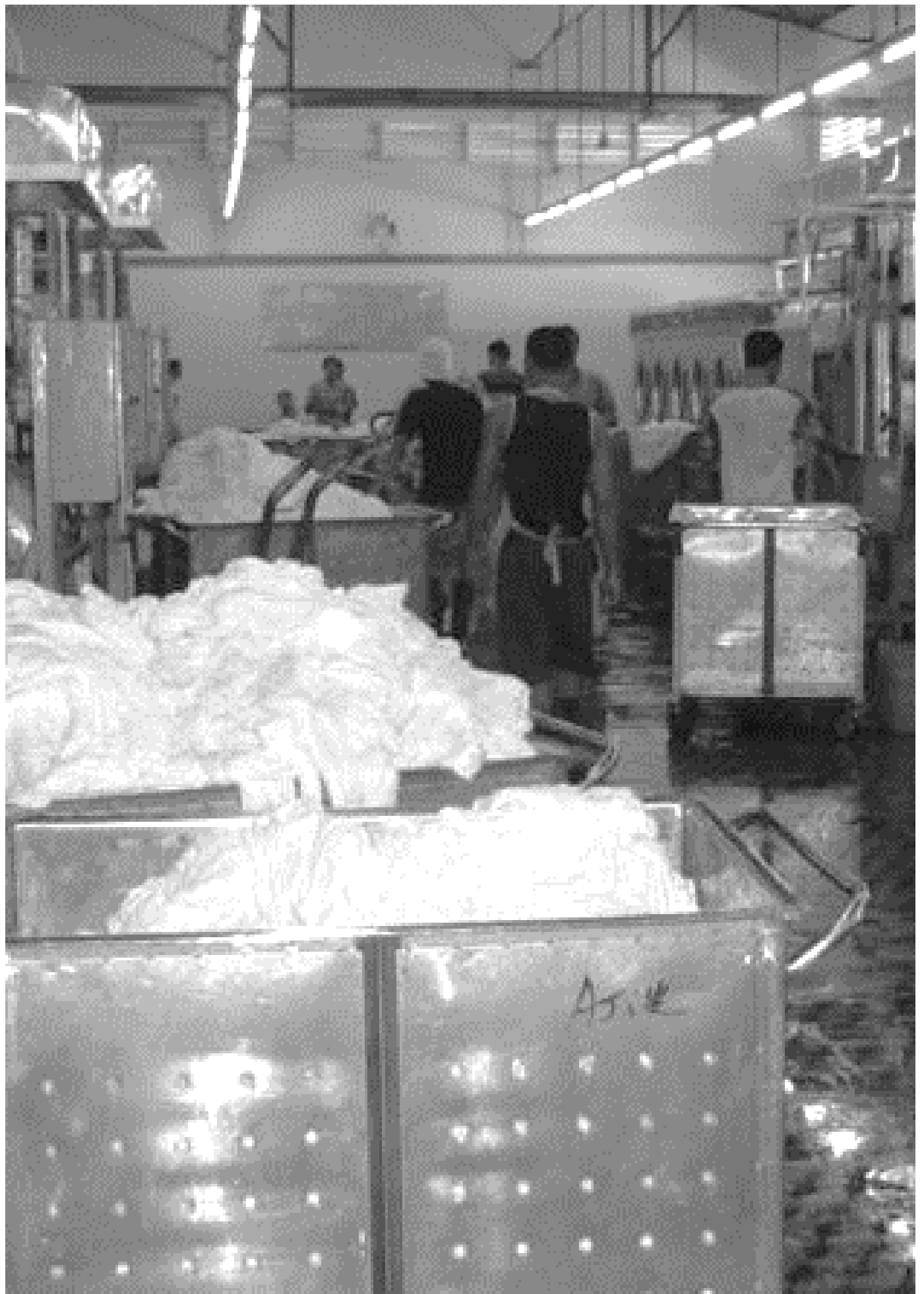
Table 1. Questions about Rani's situation

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

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

3. What are the results of Rani'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 the finishing process in relation to washing, and discussing your own finishing operations.

Discussing different types of washing and understanding their properties.

Discussing common defects and how to prevent them to improve quality.

Identifying good washing practices to protect your workers and the environment.

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 helps you improve your finishing operations by focusing on garment washing. Garment washing, the first step of finishing, is sometimes optional, but can be requested by buyers depending on their requirements. To avoid defects, damage or accidents, it needs to be carried out appropriately and safely. Throughout this module, you will work on the three steps below.

Understanding **washing**

Ensuring **quality**

Ensuring **safety**

First, you will discuss the finishing process in your factory. Then, you will learn more about washing procedures and types of wash, and identify ways to maintain garment quality during washing. Finally, you will discuss the dangers of washing and best practices to protect workers and the environment.

Activities

Activity

2a



20 minutes

Understanding washing (1)

Washing, the first step of garment finishing, is a process during which garments are washed and dried, for quality or look purposes. It is optional, depending on garment type and buyer requirements. In this activity, you will discuss washing activities.



Instructions:

- 1) Together, look at the list of finishing operations in table 2, and put them in the right order. Solutions are at the bottom of the page.
- 2) Together, discuss the three questions in table 3.
- 3) Together, discuss: In your factory, do you send garments to a washing plant or do you have a washing unit? Why?

Table 2. Finishing garments

Stain removal, Folding, Dispatching (shipping), Washing, Needle detection, Tagging, Cartoning, Button attaching, Warehousing, Ironing, Final inspection & alterations, Packing, Receiving garments from sewing, Checking & thread cutting.

#	Operation	#	Operation
1		8	
2		9	
3		10	
4		11	
5		12	
6		13	
7		14	

Solutions: Receiving, Washing, Checking & thread cutting, Needle detection, Button attaching, Stain removal, Final inspection, Ironing, Tagging, Folding, Packing, Cartoning, Warehousing, Dispatching.

Table 3. Understanding washing

1. Why is garment washing carried out before the final inspection?

2. Why is button attaching carried out after garments are washed?

3. Why is washing carried out before stain removal?



To learn more about other finishing operations such as ironing, inspection and others, ask for the “Finishing garments”, “Final checking”, “Packing garments” and “Dispatching garments” modules.

Activity

2b



25 minutes

Understanding washing (2)

Washing can be required for many different purposes. There are many different types of wash. A wash is either chemical or mechanical (without chemicals). In this activity, you will learn more about different types of wash.



Instructions:

- 1) Together, look at table 4, and tick ✓ in the column on the right if you wash garments for these purposes in your factory.
- 2) Together, look at the list of common chemical / mechanical washes in table 5 and discuss whether each is used for denim (or canvas), other fabrics or both by ticking ✓ in the right column(s).
- 3) Together, discuss: Which wash types are used in your factory? Circle them in the table.
- 4) Together, discuss the four questions in table 6. Solutions are at the bottom of the page.

Table 4. Why wash garments?

Purposes	✓
1. To stabilize garment shrinkage.	
2. To give the fabric a faded look.	
3. To give the fabric a coloured or tinted look.	
4. To create a certain look (whiskering, sanding, brushing, etc.).	
5. To soften the garment.	
6. To remove spots, dust and dirt.	
7. To remove germs.	
8. To remove starch applied during manufacturing.	
9. To remove chemicals applied during manufacturing.	

Table 5. Types of washing

Chemical (wet) washing	Denim	Others
1. Normal wash: Adding detergent and softener to remove dust, dirt and soften the fabric.		✓
2. Enzyme wash: Adding enzymes to create a soft, sanded look.		
3. Stone wash: Adding porous stones to the wash to create abrasion marks and fading effects.		
4. Acid wash: Adding stones soaked with potassium permanganate to the wash to create abrasion and a more faded, vintage look.		
5. Bleaching: Adding bleach to create a faded or whitened look.		
6. Caustic wash: Adding very corrosive acid for a higher cleaning power.		
7. Super white wash: Adding whitening agents for a super white look.		
8. Over-dye / Tinting: Adding dyes to create a coloured or tinted look.		
9. Pigment wash: Adding chemicals to obtain light colour fading.		
Mechanical (dry) washing	Denim	Others
1. Sandblasting: Blasting sand on an area to create abrasion or fading.		
2. Hand scraping: Scraping fabric to create a faded look or abrasion.		
3. Whiskering: Creating permanent whiskers or creases by abrasion.		
4. Grinding: Rubbing edges to create a worn out, frayed look.		
5. Destroying: Tearing, ripping or cutting the fabric on purpose.		
6. PP spraying: Spraying potassium permanganate to create fading.		

Solutions: 1. Others, 2. Denim, 3. Denim, 4. Denim, 5. Denim, 6. Others, 7. Both, 8. Both, 9. Others, 10. Denim, 11. Denim, 12. Denim, 13. Denim, 14. Both, 15. Denim.

Table 6. Selecting washing types

1. Which types of washing are most likely to cause unwanted damage to garments (yellowing, corrosion, seam tear, twisting, etc.)?

2. Which types of washing are most harmful to your workers' health?

3. Which types of washing are most polluting and harmful to the environment?

4. Are you using damaging, dangerous, polluting washing types in your factory?



Potassium permanganate (PP) and **sand blasting** are extremely risky. They should not be used, and are banned by many buyers.

- **PP** causes serious health damage, such as skin burning, loss of vision, kidney damage and death.
- **Sand blasting** causes serious damage to the respiratory and cardiac system, and eventually death.

Enzyme wash is currently the safest and least polluting option for denim washing.

Solutions: 1. Bleaching, acid wash, caustic wash, stone wash. 2. Sandblasting & PP spraying. 3. Bleaching, sandblasting, PP spraying, acid wash, caustic wash.

Activity

2c



25 minutes

Ensuring quality

Washing and drying are required to achieve **quality**, but can also be a source of defects. Washing processes differ from one style to the other, but measures can be taken to prevent defects. In this activity, you will learn more about how to maintain quality during washing.



Instructions:

- 1) Together, look at the list of measures to prevent defects in table 7, then, for each measure, decide when to take them by putting a ✓ in the corresponding column. Solutions are at the bottom of the page.
- 2) Together, read through the list of 10 common washing defects in table 8. Then, discuss: Are any of these defects common in your factory? If not, do you encounter other defects?
- 3) Together, discuss how each defect in table 8 can be prevented, then write down the numbers of the corresponding measures from table 7 in the column on the right. Solutions are at the bottom.
- 4) Together, discuss: If you send garments to washing plants, how could you coordinate with them to prevent washing defects?

Table 7. Preventing defects

Measures	Pre-washing	Batching & loading	Washing & Drying
1. Only wash similar garments together.			
2. Use thicker thread.			
3. Use appropriate amount of softener.			
4. Incorporate shrinkage in markers.			
5. Tumble dry only suitable garments.			
6. Avoid excessive abrasion (e.g. stone).			
7. Ensure thorough, sufficient drying.			
8. Use better quality fabric and thread.			
9. Use appropriate rotation speed.			
10. Do not overload the machines.			

11. Use appropriate water temperature.			
12. Use fabric with better colour fastness.			
13. Use a correct chemical concentration.			
14. Use an appropriate cycle time.			

Table 8. Common washing defects

Washing defects	Measure
1. Broken / unraveling stitches: Seams break and get undone.	
2. Excessive shrinkage: Garments shrink more than expected.	
3. Discoloration: Garment parts lose their colour.	
4. Colour bleeding: Lighter garment parts absorb another colour	
5. Yellowing: Garments turn yellowish instead of white or faded.	
6. Corrosion: Fabric / seams are damaged due to excessive acidity.	
7. Excessive abrasion: Holes or damages caused by abrasion.	
8. Twist: Seams and fabric get twisted during washing / drying.	
9. Hand feel: Rough or waxy hand feel.	
10. Humidity: Garments stay humid and can even turn moldy.	



Whenever possible, defects should be re-worked. Sometimes, **damaged parts** can be replaced. Instead of using fresh fabric, use end bits (leftover fabric), or good components from other damaged garments. To learn more, ask for the “Final inspection” module.



To avoid unexpected defects, it is good practice to **test-wash** a fabric swatches (blanket) before washing the whole batch. This is done after fabric rolls are received, before cutting, and can help determine shrinkage, colour bleeding, etc.

Solutions 1): Pre-washing: 2, 4, 8, 12. Batching & loading: 1, 10. Washing & drying: 3, 5, 6, 7, 9, 11, 13, 14. Solutions 3): 1) 2-8-6-9-13. 2) 4-9-11-14. 3) 1-10-11-12-13. 4) 11-12-13. 5) 13-14. 6) 13-14. 7) 6-9. 8) 5-9. 9) 3. 10) 7.

Activity

2d



20 minutes

Protecting workers

Many of the chemicals, tools or methods to wash garments can be very harmful to your **workers' health**. In this activity, you will learn more about how to keep the washing room safe for workers.



Instructions:

- 1) Together, brainstorm all the hazards your workers may be exposed to when washing garments, and list them in table 9.
- 2) Together, go through the list of good practices for protecting your workers' health in table 10, and put a ✓ on the right if you apply it in your factory. Then, discuss: What changes should you make to ensure your workers' safety during washing?

Table 9. Protecting workers

What hazards are your workers exposed to when washing garments? List your ideas below. Example: Breathing in chemical fumes from the wash.



There are two very important ways to protect workers during washing:

- Ensuring safe wash methods and adequate protection (PPE)
- Ensuring safe chemical storage

Table 10. Ensuring safety

Good practices	✓
1. Do not use harmful practices such as sandblasting.	
2. Assess how harmful chemicals can be replaced with less toxic options.	
3. Clearly separate flammables (left - red) and corrosives (right - yellow).	
4. Label chemicals to indicate dangers and precautions (e.g. “flammable”).	
5. On each container, display the Material Safety Data Sheet (MSDS) in the local language. MSDS can be requested from the supplier or found online.	
6. Around each chemical storage section, build a spill container (with sand for example). Do not leave containers open.	
7. Store chemicals in a well-ventilated room, indicate danger and restrict access. Do not store more than what you need to avoid accumulation.	
8. Install fire extinguishers outside the chemicals storage room.	
9. Assign workers to running and maintaining the chemicals store. Only they should be allowed to extract chemicals and hand them out.	
10. Provide safe containers for extracting chemicals from the store, and ensure they are transported safely.	
11. Quantities taken in or out of the chemical stores should be carefully recorded by a designated worker, together with the type of chemical and date.	
12. Equip your workers with necessary protective equipment (mask, gloves...). There should be a designated area to store PPEs when not in use.	
13. Train your workers in using protective equipment appropriately and handling chemicals safely.	
14. Provide fresh water for immediate rinsing in case of eye or skin contact.	
15. Display posters on safe handling, and what to do in case of accident.	
16. Ensure good ventilation to dispel fumes and chemical dust.	

Activity

2e



20 minutes

Protecting the environment

Many of the chemicals, tools or methods to wash garments can be very harmful to **the environment**. In this activity, you will learn more about how to avoid water pollution and waste.



Instructions:

- 1) Together, discuss: How can washing operations damage the environment and harm people who live nearby?
- 2) Together, look at the list of good practices in table 11, and put a ✓ on the right if you do it in your factory. Then, discuss: What changes should you make to better protect the environment during washing?

Table 11. Avoiding pollution and waste

Good practices



- | | |
|--|--|
| 1. Collect rainwater to be used for wet washing processes. | |
| 2. Reuse water for different operations whenever possible. | |
| 3. Do not dispose of waste water (that contains chemicals) into rivers or water bodies as it is likely to harm the environment and local dwellers. | |
| 4. Set up a water treatment plant (alone or with other factories) to treat water before discharging or re-using it. This is now <u>mandatory</u> in most countries! | |
| 5. Before discharging water, it must be checked for acceptable levels of biochemical oxygen demand (BOD) and chemical oxygen demand (COD) even after the water has been treated. | |
| 6. Make sure that a minimum amount of water is used for each washing. | |
| 7. Measure water utilisation weekly to track changes and find ways to lower it. | |
| 8. Assess whether you could use machines that consume less water. | |
| 9. Check for leakages regularly and repair whenever one is found. | |

10. Avoid water spills to the floor as chemicals may seep in, and workers may slip and hurt themselves.	
---	--

11. Train workers on reducing water use and put up posters as reminders.	
--	--



There are two key ways to protect the environment during washing:

- Ensuring wasted water does not contaminate the environment
- Minimizing water use and wastage



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 washing types and procedures, and how to maintain quality while protecting the environment and your workers' health.

Understanding **washing**

Ensuring **quality**

Ensuring **safety**

In this session, you will think of ways to apply your new knowledge to improve garment washing 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 washing garments 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. Washing garments

Best practices	✓
1. The washing manager understands different types of wash and knows how to select the most appropriate type to fulfil buyers' requirements.	
2. The factory does not use unsafe washing practices such as PP spraying and sandblasting.	
3. Measures to prevent defects from occurring are systematically identified and applied before washing starts, in coordination with washing plants.	
4. Garment samples (fabric swatches) are test-washed before proceeding to washing the whole batch.	
5. Workers are given necessary PPE and use it. Chemicals are stored safely.	
6. The factory / washing plant ensures that the acceptable levels of BOD & COD are achieved before disposing water outside the factory.	

Activity

3b



15 minutes

Your action plan

In this activity, you will think of ways to apply your new knowledge to improve garment washing 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. Washing garments – Action Plan

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

Washing garments

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 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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