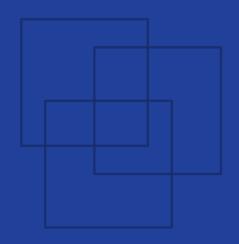


Sampling & pattern-making

Sample room 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

The FIT module on Making counter samples is a training for garment manufacturers to improve sample room operations. Participants will work on making more accurate base patterns, counter samples, size sets, pattern boards and holding pre-production meetings. This module takes about 2 hours to complete.

Upon completion of the training, participants should have:

- Discussed and understood the full sampling process.
- Learnt to make accurate, quality base patterns and counter samples.
- Understood the principles of grade rules and discussed different grading techniques.
- Discussed the steps to be taken before production, such as approving pattern boards and holding pre-production meetings.

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

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

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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.



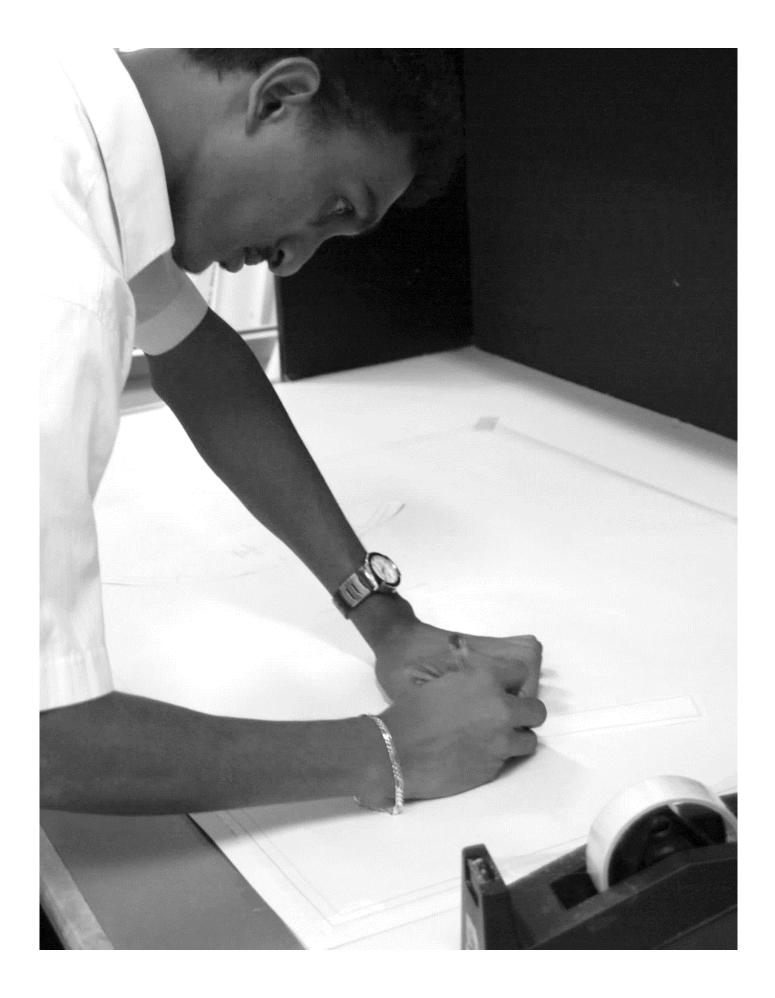
Measuring your performance

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 series on sample room operations.

Indicator 1	Average sample turnaround time (Hours)		
Definition	The average number of hours that it takes for you to produce a new sample (for a new style). It can also be calculated in hours.		
Purpose	To understand how efficient your sampling and pattern-making operations are, and begin to identify how you could improve efficiency.		
Calculation	Simply record the number of hours it takes to make each new sample (for a new style), then calculate the average at the end of each month.		
Frequency	Calculate monthly.		
Responsible	Sample room manager / Master sample maker		

Indicator 2	Sample hit rate (%)		
Definition	The proportion of samples that you get right the first time (that are accepted by buyer the first time) over a period of time – not including style changes by buyer		
Purpose	To understand the quality of your counter samples and pattern-making processes, and begin to identify how you could improve quality. The closer to 100% the better.		
Calculation	(# samples right the first time / total # samples made) x 100%		
Frequency	Calculate monthly.		
Responsible	Sample room manager / Master sample 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 making good counter samples is important in the factory.

Session 1

Overview



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



15 minutes



Learning manual, pens, markers and poster paper



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



Case study

The case study below presents a situation that could happen in real life.

2. Instructions:

1) As a group, listen to one member read the case study below while following along in your learning module.

Elda is a new sample room manager at the HS garment factory. She spots several problems. Patterns are developed directly in all sizes without any verification. Sewing allowances are not always added to patterns. All sizes are constructed from one same base size, which results in crooked parts. Overall, patterns are not accurate and lack quality. As a result, Merchandising is unable to calculate fabric consumption accurately and order the right fabric quantities. Sometimes they order too much, which wastes money, sometimes too little, which causes production delays. Errors are only found after sewing, and finished garments are then either totally rejected or sold as second quality items at lower prices.

Elda decides to make some changes. She creates a sampling unit which makes samples for each style based on each basic pattern. Samples are then checked for quality, and patterns are adjusted based on the results. Grading now takes place only after the basic pattern has been adjusted. Elda also trains sample room workers to grade incrementally rather than from the same base size.

Thanks to these changes, patterns are now more accurate, and so are size sets for each style. This wastes less fabric. The cutting room can requisition the right amount of fabric needed. Defective cut parts or finished garments do not need to be rejected. Although the process is longer, it saves workers' time by ensuring that they do not work for nothing.

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



Table 1. Questions about Elda's situation

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

- 2. What does Elda do or change in order to solve these problems?
- 3. What are the results of Elda'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

Discussing and understanding the sampling process.

Discussing how base patterns are made, and how to use specification sheets to make accurate base patterns.

Learning how to make quality counter samples, use them to adjust base patterns, and vice versa.

Understanding grade rules and comparing the two main manual grading techniques.

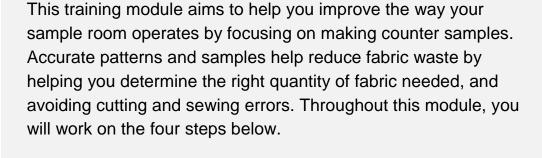
Discussing steps preceding production, including approving and storing pattern boards as well as holding pre-production meetings.

Session 2

Overview



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





90 minutes



Learning manual, pens, and markers

Making base patterns

Making counter samples

Making size sets

Preparing **production**

First, you will start by reviewing the sample room process in your factory, then continue to work on the four steps above by learning more about specification sheets, good pattern-making and sampling practices, grading techniques, and the steps leading to production, including pattern boards preparation and pre-production meetings.



Activities

Activity



The sampling process

The **sampling** process involves several steps, from receiving tech packs from the buyer, to issuing pattern boards. In this activity, you will discuss the sampling process.



- 1) Together, read through the steps of the complete sampling process in table 2, and put them in the right order from 1 to 10. Solutions are at the bottom of the next page.
- 2) Together, discuss: Does your sampling process involve the same steps as in the table below? What is different?



Table 2. The sampling process

Steps	#
The counter sample and size set of samples are sent to the buyer for approval.	
Pattern boards are developed in one base size, then in all sizes.	
Pattern boards are approved by the sample room manager (or quality manager). He/she places "Original" and "Approved" chops and his/her signature.	
The base pattern is graded. A sample size set (e.g. S, M, L, XL) is developed.	
A base pattern is developed in one base size (e.g. M).	
The Pattern Maker calculates consumption and seeks approval from Merchandising for fabric consumption.	
Specification sheets (tech packs) and samples are received from buyers.	
Based on the buyer's comment, the counter sample size set are adjusted until the buyer approves.	
Based on the base pattern, a counter sample is developed (with the actual fabric or a similar fabric).	
Set 1 of pattern boards is stored in the sample room (master board set). Set 2 is issued to the cutting room (pattern board), and Set 3 (marking / finishing boards) is issued to the sewing line(s).	



2b



Making a base pattern

Pattern-making is using the information given in specification sheets to make an outline on cardboard (pattern board). A **base pattern** is usually made for each style in one base size, then used to make a counter sample. In this activity, you will discuss the importance of base patterns, and learn how to use specification sheets to make one.

Instructions:

- 1) Together, discuss: How can accurate base patterns help you...
 - Reduce fabric waste and avoid production errors?
 - Make better counter samples?
- 2) Together, discuss the five questions in table 3. Write down your answers in the space provided.
- 3) Have a participant read aloud the text box on the next page. Then, together, look at the specification sheet in table 4, and discuss: Does this sheet give you all the information needed to help you make a good base pattern? What else could be included?
- **4)** Together, read through the list of good practices for using specification sheets in table 4, and put a ✓ in the column on the right if you do these things in your factory.

Table 3. Making base patterns

- 1. Who is responsible for making base patterns in your factory?
- 2. Which tools are used for making patterns? Why?
- 3. Where are base patterns made in your factory? Which department / room is responsible for it?
- 4. What is the base size in use in your factory? Why? Is it the same for all patterns?
- 5. How could you learn how to make more accurate (base) patterns besides from taking this training?





Specification sheets (or tech packs) are documents which contain the sketch of a specific garment design, together with important information such as style ratios, designs, measurements, special comments, folding and packing instructions. They are provided by the buyer to the manufacturer at the start of the order process.

Apparel Tech Pack www.onlineclothingstudy.com Style No Created by Date Description H/S Crew Neck Te 11/6/2014 Garment Measurement Sheet asurement set: 01 UOM: CM (Note: Measurements are not approved. Ensure to use approved measurement for bulk) XXS XS S M L XL (+/-) LENGTH OF BACK ON CENTER 48 00 51 00 54 00 58.00 62 00 66 00 LENGTH OF SHOULDERS ON BACK 34.00 31.00 32.50 36.00 38.00 40.00 37.00 39.00 41.00 44.00 47.00 50.00 44.00 1/2 WIDTH OF BOTTOM 37.00 39.00 41.00 47.00 50.00 1/2 WIDTH OF SLEEVE 2 CM UNDER ARM HOLE 13 50 14 50 15 50 17 00 18 50 20.00 1/2 WIDTH OF BOTTOM SLEEVE 12.50 13.00 13.50 14.20 14.90 15.60 LENGTH OF SLEEVE FROM 1/2 NECK HOLE 28.00 30.00 32.00 34.00 36.00 38.00 WIDTH OF NECK HOLE 15.90 16.50 17.00 17.50 DEPTH OF BACK NECK HOLE 2.50 2.50 2.50 7.10 2.50 7.40 DEPTH OF FRONT NECK HOLE 6.10 6.30 6.50 6.80 HEIGHT OF COLLAR / RIB WIDTH 2.00 2.00 2.00 2.00 2.00 2.00 1/2 MINIMUM NECK HOLE WIDTH, AFTER 26.50 27.00 27.50 28.20 28.90 29.60 STRETCHED

13.75

15.00

16.00

17.00

18.00

Table 4. Using specification sheets

Good practices

LENGTH OF SLEEVE FROM SHOULDERS

√

1. Do not forget to incorporate fabric shrinkage in patterns (for wash garments) if it has not been specified on the specification sheet.

12.50

- 2. Do not forget to incorporate sewing allowances in patterns if it has not been incorporated in the specification sheet.
- 3. Post the specification sheets on the relevant sewing line board so that all workers who need them can access the most up-to-date information.
- 4. Make sure the quality control unit also receives specification sheets.
- 5. Train all workers on understanding and using specification sheets.
- 6. Store specification sheets in Excel/Word/PDF format as well so that they can be tracked and shared easily between departments.



2c



Making counter samples

Once the base pattern is finalized, a **counter sample** is developed based on it. This counter sample can be used to adjust the base pattern until both counter samples and base patterns are completely accurate. It is later sent to the buyer for approval. In this activity, you will learn how to make quality counter samples.



- 1) Together, discuss the following questions:
 - Who is in charge of making counter samples? Where is sampling carried out?
 - Do you adjust base patterns based on the counter sample?
 Why or why not?
- 2) Together, read through the list of good practices in table 5, and put a ✓ in the column on the right if you do these things in your factory. Then, try to think of other good practices, and add them to the table.

Table 5. Counter samples

Good practices	✓
 Counter samples should be developed using the actual fabric, or a similar one if it is not available. 	
 The base pattern should be adjusted based on the counter sample, and a new counter sample should be made based on the adjusted base pattern. This operation should be renewed until you are sure that the counter sample meets buyer specifications. 	
 Counter samples should be checked for sewing allowances and conformity to specifications. 	
Counter samples should be checked on mannequins/models to make sure the look is consistent with the specification sheet.	
5. Counter samples should be checked for shrinkage if appropriate.	
Counter samples should be approved by the Quality department / the person in charge of quality control before being sent to the buyer.	
7.	
8.	
9.	
10.	



Activity 2d



Grading patterns

Once base patterns and counter samples are finalized, you can move on to **grading** (the process of making additional patterns – one for each size needed). Often, measurements for all sizes are provided by the buyer in the specification sheets. In this activity, you will learn more about grade rules and grading techniques.

Instructions:

- 1) Patterns are graded (increased or decreased in size) following specific grade rules. Together, look at the grade rule table in table 6, then discuss the following questions:
 - Do you use grade rules in your factory? Who sets the rules?
 - What are measurement points?
- 2) Together, fill in the four sentences in table 6 based on the grade rule table. Then, have a participant read aloud the text box on the next page.
- 3) There are two main manual grading techniques: (1) Cut and spread, and (2) Pattern shifting. Together, look at the images in table 7, and have a participant read aloud the steps. Then, discuss:
 - Do you use any of these two techniques in your factory?
 - Which technique is easier? Which is more accurate?
 - Which technique do you think is better and why?

Table 6. Grade rules

	Grade rule between sizes Misses 4 - 18							
Measurement Point	4	6	8	10	12	14	16	18
Bust	+/- 1	+/- 1	+/- 1	+/- 1	+/- 1.5	+/- 1.5	+/- 1.5	+/- 2
Waist	+/-1	+/- 1	+/- 1	+/- 1	+/- 1.5	+/- 1.5	+/- 1.5	+/-2
Hip	+/-1	+/- 1	+/- 1	+/-1	+/- 1.5	+/- 1.5	+/- 1.5	+/- 2
CB waist length	+/- 1/4	+/- 1/4	+/- 1/4	+/- 1/4	+/- 1/4	+/- 1/4	+/- 1/4	+/- 1/4
CB skirt length	+/- 1/4	+/- 1/4	+/- 1/4	+/- 1/4	+/- 1/4	+/- 1/4	+/- 1/4	+/- 1/4
Sleeve length from shoulder	+/- 1/4	+/- 1/4	+/- 1/4	+/- 1/4	+/- 1/4	+/- 1/4	+/- 1/4	+/- 1/4

Fill in the following four sentences:

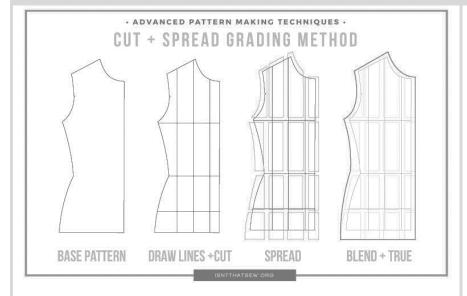
- 1. When grading a base pattern in size 8 to size 10, ___inch is added to the bust.
- 2. When grading a base pattern in size 8 to size 6, ___ inch is removed from the waist.
- 3. When grading a pattern in size 14 to size 16, ____ inch is added to the hip.
- 4. When grading a pattern in size 6 to size 4, ____ inch is removed from the skirt length.



When grading patterns, you will get more accurate results by going up or down in the sizes **incrementally** (8 to 10 to 12 or vice versa), than by using one base size for all (8 to 12, 8 to 14, etc.). This makes grade rules very useful.

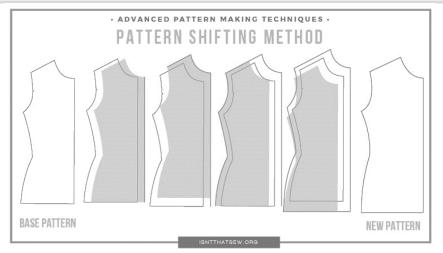
Table 7. Grading techniques

Technique



Steps

- (1) Draw lines on the base pattern joining the measurement points.
- (2) Cut along the lines.
- (3) Spread the cut pieces according to grade rules (+1, -1, etc.)
- (4) Draw along the cut pieces, and blend to create the new size.



- (1) Lay the base pattern on paper.
- (2) Shift the base pattern horizontally or vertically according to grade rules (+1, -1, etc.) to create the new size.



Activity 2e 10 minutes

Making pattern boards

There are still many steps to go through once the base pattern has been graded and before production can start, including obtaining your buyer's approval, holding a pre-production meeting and **making pattern boards**. In this activity, you will learn more about this process.



- 1) Together, discuss: In your factory...
 - What happens once the base pattern has been graded?
 - What happens once the size set is finalized?
- 2) Together, read through the list of operations for making pattern boards in table 8, and put them in the right order from 1 to 8. Solutions are at the bottom of the page.

Table 8. Making pattern boards	
Steps	#
The counter sample and size set of samples are sent to the buyer for approval.	
After approval, pattern boards are developed in one base size, then in all sizes.	
Pattern boards are approved by the sample room manager (or quality manager). He/she places "Original" and "Approved" chops and his/her signature.	
A sample size set (e.g. S, M, L, XL) is developed based on the graded patterns.	
The samples are adjusted based on the graded patterns. This operation is renewed until you are sure that the sample size set meets buyer specifications.	
The base pattern is graded into all necessary sizes.	
Based on the buyer's comment, the base pattern, counter sample and size set are adjusted until the buyer approves.	
One set of pattern boards is stored in the sample room (the master board), one set of pattern boards is sent to the cutting room (to be used where markers are drawn manually and for reference for both manual and CAD marker making), and one set of marking / finishing boards is sent to the sewing line(s) on which the garment is to be produced.	



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

Activity



Pre-production meetings

Sample makers have a strong responsibility to help ensure quality during both sampling and production processes. As such, they should work closely with the production and quality teams, for example during pre-production meetings. In this activity, you will learn more about pre-production meetings, their importance and how to conduct them.



Instructions:

- 1) Have a participant read aloud the information on pre-production (PP) meetings in table 9. Then, together, discuss:
 - Do you conduct PP meetings in your factory?
 - If so, who takes part in them, and what is discussed?
- 2) Together, look at the list of sampling information in table 10, and put a \checkmark in the right column if you think that it should be shared during PP meetings. Then, think of other things that should be shared, and add them to the table. Solutions are at the bottom of the page.

Table 9. Pre-production meetings



What? Meeting to discuss the style based on the tech pack. **Why?** To make sure everyone understands the style, identify possible problems or difficulties, agree on procedures, assign responsibilities, etc.

When? After the buyer has approved the counter sample for a specific style.

Who? The quality team, the production team (production manager or different department heads), and the Master Sample Maker.



Table 10. Sharing information at the PP meeting

Information	Share?			
1. Any important information that was not included in the tech pack.				
Any important information that still needs to be confirmed by the buyer (never assume anything).				
3. Whether fabric has been received in the stores.				
4. How many garments have been ordered, in which sizes and colours.				
5. The operation sequence (the order in which to perform each operation).				
6. The type of machine / needle / tools that would be most suitable.				
7. Fabric consumption and marker utilization details.				
8. How much time is needed to complete the order.				
9. Operations that are difficult and may require attention.				
10. Wash and care instructions; finishing processes and specifications.				
Fabric, trims, construction, thread, print / embroidery, seams and stitches details.				







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 make more accurate and precise patterns, counter samples, size sets, and pattern boards in the sample room.

Making base patterns

Making counter samples

Making size sets

Preparing **production**

In this session, you will think of ways to apply your new knowledge to improve your sampling and pattern-making activities by reviewing best practices and drafting your own action plan.



Activities

Activity

3a



Best practices checklist

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



1) Together, look at the list of best practices in table 11, and put a ✓ in the column on the right if you use these practices in your factory.

Table 11. Making counter samples			
Best practices	✓		
Base patterns are developed by qualified sample makers for each style based on specification sheets provided by the buyer or merchandising.			
Counter samples are made based on base patterns, then controlled for accuracy, shrinkage and quality.			
Base patterns are adjusted based on counter samples or vice versa until they are satisfactory.			
4. Grading is done only after the base pattern is finalized, according to specific measurements or grade rules.			
Pattern boards are only made once the counter sample and size set have been approved by the buyer.			
6. A pre-production meeting is held with all department heads after the counter sample has been approved by the buyer.			



Activity 3b



Your action plan

In this activity, you will think of ways to apply your new knowledge to improve your sampling and pattern-making activities by drafting your own action plan.



1) Together, fill in the action plan (table 12) 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 12. Sampling & pattern-making – Action Plan

Problem identified

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

Sampling & pattern-making

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