Footwear Production LEVEL II

Based on Nov, 2019 V5 OS and Feb, 2020 V1 Curriculum

Module Title: - Preparing foot wear Upper materials Requirements

LG Code: FWP2 M04 LO(1-6) LG (10-15)

TTLM Code: **FWP2 TTLM 1220VT**

November, 2020

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LG#10	LO #1- Identify and prepare tools, materials and equipment

Instruction sheet

This learning guide is developed to provide you the necessary information regarding the following content coverage and topics:

- Obtaining Work instructions, specifications, and operational details.
- Identifying and obtaining hand tools, patterns and materials
- Checking materials, tools and equipment

This guide will also assist you to attain the learning outcomes stated in the cover page. Specifically, upon completion of this learning guide, you will be able to:

- Obtain Work instructions, specifications, and operational details.
- Identify and obtaining hand tools, patterns and materials
- Check materials, tools and equipment

Learning Instructions:

Read the specific objectives of this Learning Guide.

- Read the specific objectives of this Learning Guide.
- Read the information written in the “Information Sheets 1”.
- Accomplish the “Self-check. Request the key answer / key to correction from your teacher or you can request your teacher to check it for you.
- If you earned a satisfactory evaluation proceed to “Information Sheet 2”. However, if your rating is unsatisfactory, see your teacher for further instructions or go back to Information Sheets 1.
- Read the information written in the “Information Sheet 2”.
- Accomplish the “Self-check 2”. Again you can request the key answer / key to correction from your teacher or you can request your teacher to check it for you.
- If you earned a satisfactory evaluation proceed to “Information Sheet 3”. However, if your rating is unsatisfactory, see your teacher for further instructions or go back to Information Sheet 2.
- Read the information written in the “Information Sheet 3”.
- Accomplish the “Self-check 3”. Request the key answer / key to correction from your teacher or you can request your teacher to check it for you.
- If you earned a satisfactory evaluation proceed to “Information Sheet 4”. However, if your rating is unsatisfactory, see your teacher for further instructions or go back to Information Sheet 3.

- Information Sheet 1 Obtaining Work instructions, specifications, and operational details.

. **Work instruction**

A work instruction is a tool provided to help someone to do a job correctly. This simple statement implies that the purpose of the work instruction is quality and that the target user is the worker.

Work instruction, including plans, specifications, quality requirements and operations details relevant to the task should be obtained, confirmed and applied to the allotted task.

Work instructions for machines used in cutting department

- **Work instruction for Swing arm clicking press**

- Receive the leather with work-ticket. Verify the leather for quality and area issued.
- Put the leather on the leather horse.
- Before cutting, collect the dies for right article, & size to be put on the table. Do not keep the dies on top of other.
- Check the die for deformation of shape before proceeding for cutting.
- Set the correct pressure & adjust the height of the head 10-15 mm above the die.
- Cut large components first. Take small sizes from more defective skin.
- Components should be placed edge to edge to minimize waste.
- Ensure that components are cut pair wise & components should be placed edge to edge to minimize waste.
- Bundling of components should be done on 10 Pairs basis with flesh side up.
- Always transfer the cut component with upper job-card.
- Clean your work place after completing your work and place the dies in the specified die rack.
- Throw the leather waste in to bin only.
- Switch off the machine when not in use.
- Return the remaining quantity of leather to the department in-charge.

- **Work instructions for the travel head clicking press**

1. Receive the material with work-ticket. Verify the material for quality and quantity issued.

- Layer the material and staple it before cutting.
- Before cutting, collect the dies for right article, & size to be put on the table. Do not keep the dies on top of other.
- Check the die for deformation of shape before proceeding for cutting.
- Set the correct pressure & adjust the height of the head before cutting.
- Ensure that components are cut pair wise & components should be interlocked well (minimum 2 mm gap is recommended) to minimize waste.
- Making a bundle of components should be done on 10 Pairs basis.
- Always transfer the cut component with upper job-card.
- Clean your work place after completing your work and place the dies in the specified die rack.
- Throw the waste in to bin only.
- Switch off the machine when not in use.
- Return the remaining quantity of material to the department in-charge.

- **Work instruction for the strap cutting machine**
  - Do not operate the machine without prior approval.
  - Do not work without written job order card.
  - Only one person is allowed to work on the machine at one time.
  - Before starting cutting straps, set the correct width of knife and pressure.
  - Switch off the machine when not in use.
  - Put the leather on the leather horse.
  - Components should be placed edge to edge to minimize waste.
  - Always transfer the cut-comp. after stamping with job-card.
  - Clean your work place after completing your work.
  - Return the remaining quantity of leather after cutting to the department in change.
  - Throw the leather waste in to bin only.

- **Work instruction for the splitting machine**
  - Do not operate the machine without prior approval.
  - One person is allowed to work on the machine at one time.
  - Set the correct thickness before starting splitting of components
  - Match the split component with the thickness gauge once a day.
  - Switch off the machine when not in use.
  - Do not split leather in layers
  - Clean your work place after completing your work.
  - Empty the leather waste in to waste bin only.
- **Work instructions for the stamping machine**
  - Receive the cut-components with upper job card on 10 Pairs basis.
  - Check the digits for stamping as per plan no., size etc.
  - Check for the temperature of the heated number plate / die (70-80 degree Celsius).
  - Place each component on machine platform carefully with specified margin/place on the components.
  - Keep the hands away from the heated number plate/die
  - Clean your work place after completing your work.
  - Switch off the machine when not in use.
- **Plan** is a list of steps with timing and resources, used to achieve an objective.

Sr. no.	Customer name	Material description/ model no	Color	Due date	Upper leather	Lining leather	Other material	Order quantity	Month-1	Month-2

1.1.1 **Monthly plan: -**

It is a plan which resources are allocated into months or the plan is divided into months.

Table-1 Example for Monthly plans

- **Weekly plan: -**

It is a plan which is divided into weeks.

Sr. no	Customer name	Material description/ model no	Color	Due date	Upper leather	Lining leather	Other material	Order quantity	Wk-1	Wk-2	Wk-3

Table-2 Example for Weekly plan

- **Daily plans: -**

It is a plan which allocates resources into daily basis.

Sr. no	Customer name	Material description/model no	Color	Due date	Upper leather	Lining leather	Other material	Order quantity	Day 1	Day 2	Day 3	Day 4	Day 5

Table-3 Example for Daily plans

1.2 Specification

- The knife must not be pressed to hard or it will cut too deeply into the cutting board.

1.2.1. Standard specification of article

It is a specification for an article derived from a standard.

1.2.2. Special instruction from buyer

-In this case customers are the owners of the specification/requirement. And also the product must feet or conform to known customer or buyer requirements.

1.3 Quality requirements

The first requirement for a shoe upper material is that it should take the desired shape during making. The second requirement is that, it should retain the shape during storage and wear. Lastly it should be able to take new shape to adjust to the feet of the wearer. And also attaching of the upper with the sole requires some quality requirements. In order to achieve this quality requirements one should realize and fulfill the following key points:

1.3.1 Quality specification sheet:-

It is a sheet that contains the exact statement of the particular needs to be satisfied and the requirement for a particular material or component.

Test	Equipment (M/Cs)	Requirement
Breaking load and extension at break	Tensile tester	
Twist per unit length	Twist Tester	
Fastness of color to abrasion	Bally Finish Tester	

Table-4 Simple example of specification for physical testing of threads

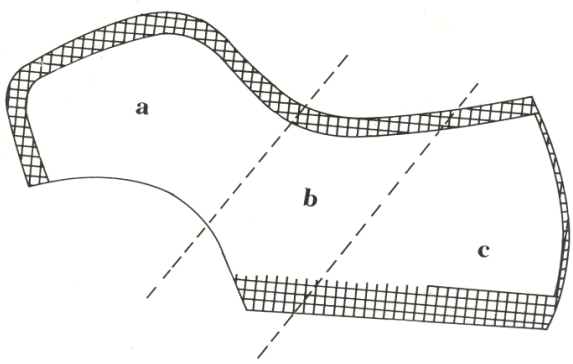
1.3.2 Material

Material is of various kinds which any fabricated or semi-fabricated shoe components are made of. The sum of these quality materials (Leather,

Inter lining, threads…) is that makes a quality shoe components and then a quality shoe. The following are the components which the shoe is made from materials.

- Counters
- Insole
- Synthetic linings
- Toe-puffs
- Soles
- Laces

When a clicker is cutting he/she should take into account the various quality requirements (quality regions) of each component. For example in cutting a quarter component of a derby shoe the quality region looks like:-



(a) First quality region

(b) Second quality region

(c) Third quality region

Fig.1 quality regions for quarter of a derby shoe

(a) The front of the quarter joins the vamp and should be clean and of good quality.

(b) The center of the quarter can incorporate slight markings. This is more so on the inside quarter than the outside quarter.

(c) The back of the quarter can be of slightly lighter weight due to the counter reinforcement

1.3.3. Cutting area

To help in the ability to make quick accurate decisions while cutting, the clicker must know the shoe he/she is cutting. He/she should be able to break the shoe down in to the various parts and then divide those parts in to the quality regions. The line of tightness usually runs from heel to toe. The various areas of Hide and side have different quality regions. Quality is directly related to the “Tightness and the compactness “of the fiber structure. Therefore, the “best quality” and “the worst quality” of the hide and skin from where the components are cut from must be known by the cutter. And not only knowing the quality areas and regions but cutting components from the defect areas efficiently must be kept in mind.

- **Cutting directions**

The direction of lines of tightness and lines of stretch play a major role in cutting of pattern from hide or skin. Lines of tightness are defined as the direction in which the material does not extend in length or very little increment in length takes place on applying force by two thumbs. Whereas, in the direction of lines of stretch, material is increased in length or stretches more by applying the same amount of pulling force. Normally, the line of tightness is just at 90° to the lines of stretch.

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Therefore these points must be in mind in order to fulfill the quality requirements.

- **Bundling of components**

Bundling of the components for every shoe style in cutting must be done. This bundling must be pair wise in order to keep the grain side neat, clean, and avoid scratches & other defects.

- **Quality show boards**

Putting quality show boards is important in each department of foot wear manufacturing

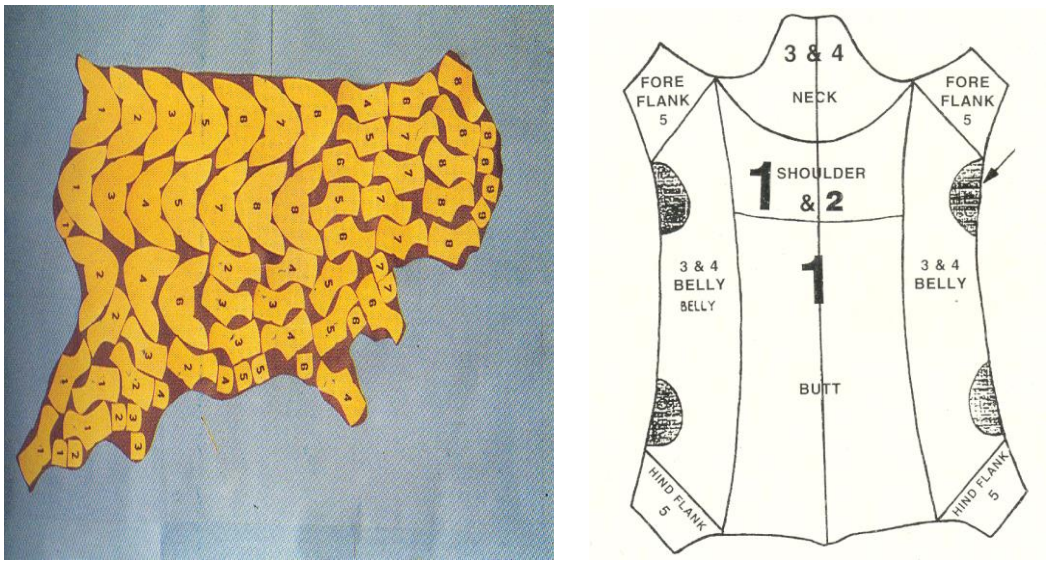


Fig.2 Examples for quality show boards

- **Operational details**

Operational details are the specific details of day to day workings and activities. These records kept will be one of the most important management tools and then it also creates a good communication between the operators. Therefore, it should be allocated due importance. Operational details includes:-

- **Cutters' ticket**

The cutters' ticket incorporates the needed information about what activities have been done by cutters' during his/her cutting operation.

- **Daily production report of cutting**

In this case, daily production report is the report that points out what tasks have been accomplished during the day on cutting operation. And daily production of cutting process must much with the daily production plan.

DAILY PRODUCTION REPORT										
The date										
CUTTING DEPARTMENT										
Article number	Order number	Customer	Color	Plan number	Input	Input cum	Output	Output cum	Rejection. %	Remark

Fig.3 sample for cutters' ticket daily production report

- **Stamping details**

This operational detail contains the information bellow:

- the size of the shoe
- the pair number of the components
- the style of the shoe
- the organization's name and so on

So this will help for the next operator to easily identify the components and accomplish the next operation efficiently.

- **Daily material consumption report of cutting**

Daily material consumption like leather can be taken from every cutter's ticket data. And can be easily calculated by subtracting material returned from the material issued. This will provide clear information about the cutters' performance.

DERBY UPPER

The main feature of this shoe is that Quarter overlays the vamp. This shoe is designed for easy entry of the foot in the shoe. It is an open throat laced shoe, with a tongue cut in one piece with vamp or separately. The derby shoe has many variations.

The skill required to stitch Derby upper is:

- Sorting
- Skiving components of upper

    - Underlay skives on Vamp.
    - Fold skive (8mm) top line of Quarter.
    - Close raw edge skives on Quarter.
    - Open raw edge skives on Quarter.
    - Open raw edge skives of Tongue.
    - Underlay skives on vamp lining.

- Attach interlining to Quarters and Vamp. (Keep under scarf of skiving)
- Foil stamping lining for size and fitting on quarter lining.
- Back seam Quarter by single needle zigzag machine.
- Taping of back seam.
- Stitch Vamp to Quarter by double needle post bed machine.
- Stitch Quarter lining with Heel grip with single needle flat bed machine.
- Stitch quarter lining to vamp lining by single needle flat bed machine.
- Manual folding or machine folding Quarter top line.
- Pre fit lining shell to upper by rubber solution adhesive.
- Edge inking top line lining and tongue by same color.
- Attaching eyelets by eyeleting machine.
- Lining trimming by lining trimmer.
- Trim all loose ends.
- Examine upper

Monk shoe is similar to derby shoes but with a cross over section to fasten the quarters

with a side buckle.

COMPONENTS

Here we have considered all upper and leather components are of leather and tongue is not one piece with vamp but cut separately. The interlining is attached to add strength to the upper material if upper material has enough strength then interlining may not be required. The components of Derby shoe are:

Upper:

- Two Vamp (1 left foot and 1 for right foot)
- Four Quarters (2 inside and 2 outside)
- Two Back strap (one for left and one for right shoe)
- Two Tongue (one for left and one for right)

Lining:

- Two Vamp lining (one for left foot and one for right foot)
- Four Quarter lining (two for inside and two outside)
- Two Heel grip (one for right and one for left foot)

Interlining :-

- Two for vamp
- Four for quarter

Peaks or cut out is given on the inside of the vamp and vamp lining. These indicate left and right feet. They must always be facing on the inside of the upper and lining. Peaks or cutouts are also given on the quarter lining these indicate inside and outside to match quarter and vamp. Care should be taken to stitch inside quarter with the inside portion of the vamp and lining for left foot must be stitched on the left upper and right foot lining on right foot upper.

SEQUENCE OF OPERATION

The sequence of operation is given for Derby shoe with back strap. The assembly of an upper consists of preparation of components and then fitting and actual stitching. The preparation consists of sorting, stamping, stitch marking, punching, gimping, skiving and attaching interlining. The prepared components are then fitted together for ease in stitching Leather lining at lasting edges is also skived from the gain side as it helps in lasting. Finished side does not paste well to insole while toe lasting or side lasting.

Finished surface is just removed while skiving lining at lasting edges. The sequence of operations for derby shoe is:

- Stitch marking on components.
- Skiving:
  - Underlay skive Vamp
  - Underlay skive bottom of Tongue
  - Underlay skive Vamp lining
  - Raw edge skive Tongue edges.
  - Fold skive top line of Quarter
  - Raw edge skives Quarters edge
- Attach interlining (if required)
- Zigzag seam on Quarters
- Taping of back seam.
- Stitch Back strap to Quarters. (Single row seam)
- Stitch Heel grip to Quarter lining (single row seam)
- Stitch Vamp to Tongue. (Single row stitching)
- Stitch Vamp to Vamp lining at tongue (single row seam)
- Attach Eyelet reinforcement tape and top line tape on Quarter top line.
- Attach reinforcement tape on Vamp at derby lock area.
- Fold top line of Quarter
- Pre fit Quarter lining to Quarter
- Stitch Quarter to Quarter lining (single row seam)
- Trim Lining at top line and trim Vamp lining.
- Stitch Quarter to Vamp (double row seam)
- Stitch Derby lock (single row seam)
- Stitch Vamp lining to Quarter lining. (Single row seam)
- Attach eyelets on upper.
- Edge inking top line of lining and tongue.
- Cement Vamp lining with Vamp upper
- Trim all loose threads ends and cleaning
- Quality checking
- Packing.

Machines:

- **SINGLE NEEDLE FLAT BED** machine is required for operation no. 6 to 9.
- **DOUBLE NEEDLE POST BED** machine is required for operation no. 16.
- **SINGLE NEEDLE POST BED** machine is required for operation no. 14and 17.
- **EYELETTING** machine is required for operation no. 19.
- **THERMOFOLDING** machine is required for operation no. 12
- **TAPING** machine is required for operation no. 5 or can be done manually.
- **TRIMMING** machine is required for operation no 15 or a lining trimmer can be fixed on the machine.
- **LATEX SPRAY** machine is required for operation no. 21.

- **ZIG-ZAG** machine is required for operation no. 4. Close seam can also be given at back seam.
- **SKIVING** machine is required for operation no 2.

SR.NO.	TYPES OF THE MACHINES	QUANTITY
1	SINGLE NEEDLE FLAT BED MACHINE	4
2	SINGLE NEEDLE POST BED MACHINE	2
3	DOUBLE NEEDLE POST BED MACHINE	1
4	EYELETTING MACHINE	1
5	THERMOFOLDING MACHINE	1
6	TAPING MACHINE	1
7	TRIMMING MACHINE	1
8	LATEX SPRAY GUN	1
9	ZIG-ZAG MACHINE	1
10	SKIVIING MCHINE	1

OXFORD UPPER

The anatomy of a shoe can be divided in an upper and lower (or bottom part). Sections of the upper include vamp, quarter, toecap, counter, collar and eyelet facing. The sections of the lower shoe consist of an outsole, insole, mid sole and heel.

The Upper of the Shoe

All parts or sections of the shoe above the sole that are stitched or otherwise joined together to become a unit then attached to the insole and outsole. The upper of the shoe consists of the vamp or front of the shoe, the quarter i.e. the sides and back of the shoe, and the linings. Uppers are made in a variety of different materials, both natural and synthetic. Leather became the obvious cover of choice because it allowed air to pass through to and from the skin pores thereby providing an opportunity to keep the feet, cool. The plastic properties of animal skins further help mould the shoe to the foot beneath. The ability for leather to crease or flex over surfaces facilitates the function of the foot. Ironically synthetics used as uppers display elastic properties, which mean the shoe upper never quite adjusts to the foot shape in the same way as natural leather. Synthetics are cheaper to mass-produce and are now found in mass produced footwear. Synthetic uppers are more waterproof.

Oxford shoe is shoe style for men with closed front and the eyelet tabs are stitched under the vamp. It can be plain oxford, full brogue and semi-brogue versions. The main feature of oxford shoe is that vamp overlays the quarter. It is an open throat lace shoe

with three or more eyelets. Oxford shoe have many variation in design. Toecap oxford is a variation of oxford shoe. The skill required to stitch oxford upper is

- Sorting
- Skiving components of upper
    - Underlay skive quarters
    - Underlay skiving eyelet facing
    - Underlay skive tongue.
    - Underlay skive on vamp
    - Fold skive (8mm) top line of quarter
    - Fold skive (8mm) top line of eye facing
    - Fold skive toe cap
    - Close raw edge skives of quarters.
- Attach interlining to toecap, quarters and vamp (Keep under scarf of skiving). If required.
- Foil stamping lining for size and fitting on quarter lining.
- Closed seam quarter by single needle flat bed machine.
- Back seam rubbing (flattening back seam) and tape back seam.
- Stitch toecap to vamp by double needle flat bed machine.
- Stitch vamp to quarter by double needle post bed machine.
- Stitch quarter lining with heel grip
- Stitch quarter lining to vamp lining by single needle flat bed machine.
- Manual folding quarter top line, vamp and toecap.
- Pre fit lining shell to upper by rubber solution adhesive.
- Edge inking top line lining and tongue by same colour.
- Attaching eyelets by eyeleting machine.
- Lining trimming by lining trimmer.
- Trim all loose ends.
- Examine upper

These sequences will not be same for every oxford shoe upper.

COMPONENTS

Oxford shoes have following components. Here we have considered all upper and leather components are of leather. In some case vamp lining could be of drill and quarter lining can be of synthetic material. The interlining is added to add strength to the

upper material if upper material has enough strength then interlining may not be required.

Upper:

- Two Toe cap (one for left foot and one for right foot)
- Two Vamp (one for left foot and one for right foot)
- Four Quarters (2 inside and 2 outside)
- Four Eyelet facing (2 for left foot and 2 for right foot)
- Two Tongue (one for left foot and one for right foot)

Lining:

- Two Vamp lining (one for left foot and one for right foot)
- Four Quarter lining (two for inside and two outside)
- Two Heel grip (one for right and one for left foot)
- Two Tongue lining (one for right foot and one for left foot)

Interlining:

- Two for Vamp
- Four for Quarter
- Four for Eyelet facing

Peaks or cut out is given on the inside of the vamp and vamp lining. These indicate left and right feet. They must always be facing on the inside of the upper and lining. Peaks or cutouts are also given on the quarter lining these indicate inside and outside to match quarter and vamp. Care should be taken to stitch inside quarter with the inside portion of the vamp and lining for left foot must be stitched on the left upper and right foot lining on right foot upper.

SEQUENCE OF OPERATION

The sequence of operation is given for toecap oxford with loose lining. The assembly of an upper consists of preparation of components and then fitting and actual stitching. The preparation consists of sorting, stamping, stitch marking, punching, gimping, skiving and attaching interlining as per requirement. The prepared components are then fitted together for ease in stitching. Lining at lasting edges is also skived from the grain side as it helps in lasting. Finished side does not paste well to the insole while toe lasting or side lasting. Grain surface is just removed while skiving lining at lasting edges.

The sequence of operations of toecap oxford is:

- Stitch Marking
- Skiving
    - Underlay skive quarters
    - Underlay skive vamp
    - Underlay skive eyelet facing
    - Underlay skive bottom of tongue
    - Underlay skive vamp lining
    - Raw edge skive tongue

- Close raw edge skive quarter
- Fold skive top line of quarter and eyelet facing

- Attach interlining (if required)
- Close seam of Quarters (Single row seam)
- Seam rubbing & taping
- Silked / French seam. (Single row seam)
- Stitch Heel grip to Quarter lining (Single row seam)
- Stitch Quarter lining to Vamp lining (Single row seam)
- Stitch Tongue to Tongue lining (Single row seam)
- Stitch Quarter to Eyelet facing (Double row seam)
- Attach Eyelet reinforcement tape on eyelet facing and top line tape on Quarter top line
- Fold top line of Quarter
- Fold Toecap and Vamp
- Stitch Toecap to Vamp (Double row seam)
- Stitch Vamp to Quarters with leather stay. (Vamping- double row seam)
- Pre fit lining shell to upper shell
- Stitch Upper to Lining – top line stitch. (Single row seam)
- Trim Lining at top line and trim Tongue lining.
- Attach visible Eyelets
- Edge ink top line of Lining and Tongue
- Stitch Tongue to Upper (single row seam)
- Cement Vamp and Quarters
- Trim all loose threads ends and cleaning
- Quality checking
- Packing

- Single needle flat bed machine is required for operation no. iv to ix. and xxi
- Double needle flat bed machine is required for operation no. x and xiv.
- Double needle post bed machine is required for operation no. xv .
- Single needle post bed machine is required for operation no. xvii and xxi
- Eyeleting machine is required for operation no. xix
- Thermo folding machine is required for operation no. xii and xiii
- Seam rubbing and taping machine is required for operation no. v.
- Trimming machine is required for operation no xviii or a lining trimmer can be fixed on the machine.
- Latex spray machine is required for operation no. xxii
- Skiving machine is required for operation no ii

SR.NO.	TYPES OF THE MACHINES	QUANTITY
1	SINGLE NEEDLE FLAT BED MACHINE	5
2	DOUBLE NEEDLE FLAT BED MACHINE	2
3	SINGLE NEEDLE POST BED MACHINE	2
4	DOUBLE NEEDLE POST BED MACHINE	1
5	EYELETTING MACHINE	1
6	THERMOFOLDING MACHINE	1
7	TAPING MACHINE	1
8	TRIMMING MACHINE	1
9	LATEX SPRAY GUN	1
10	SKIVIING MCHINE	1

COURT SHOE UPPER

INTRODUCTION

This is ladies shoe with low cut vamp either with low or high heel. Originally the upper was in one piece. The main visual feature of this shoe is that it has an unbroken top line. A bow or other decorative piece is sometime attached on the vamp. Top line can be folded, bagged top line or given a French binding or English binding. The throat curves are under stress so they are given additional reinforcement. The skill required to stitch court shoe upper are:

- Sorting
- Skiving components of upper
    - Fold skive (8mm) top line of Quarter.
    - Fold skive top line of Vamp.
    - Underlay skive Quarter
    - Close raw edge skives on Quarter.
    - Close raw edges skive on Vamp.
- Attach interlining to Quarters and Vamp. (Keep under scarf of skiving)
- Foil stamping lining for size and fitting on quarter lining.
- Back seam Quarter to Vamp by single needle Flat bed machine.
- Rubbing and Taping of back seam.
- Stitch Vamp to Quarter by double needle flat bed machine.
- Stitch Quarter lining with Heel grip with single needle flat bed machine.
- Stitch Quarter lining to Vamp lining by single needle flat bed machine.
- Manual folding or machine folding Vamp and Quarter top line.
- Pre fit lining shell to upper by rubber solution adhesive.

- Edge inking top line lining and tongue by same colour.
- Lining trimming by lining trimmer.
- Trim all loose ends.
- Examine upper

COMPONENTS

Here we have considered all upper and leather components are of leather. The interlining is added to add strength to the upper material if upper material has enough strength then interlining may not be required. Interlining is pasted on flesh side of upper components. Top line can be given various treatments. Bow can also be attached on the vamp. We have considered plain court shoe with inside quarter. The main components of court shoe are:

Upper

- Two Vamp (1 left foot and 1 for right foot)
- Two Quarters (one for left foot and one for right foot)

Lining:

- Two Vamp lining (one for left foot and one for right foot)
- Two Quarter lining (one for left foot and one for right foot)
- Two Heel grip (one for right and one for left foot)

Interlining

- Two for vamp
- Two for quarter

Peaks or cut out is given on the inside of the vamp and vamp lining. These indicate left and right feet. They must always be facing on the inside of the upper and lining. Peaks or cutouts are also given on the quarter lining these indicate inside and outside to match quarter and vamp. Care should be taken to stitch lining for left foot must be stitched on the left upper and right foot lining on right foot upper.

SEQUENCE OF OPERATION

The sequence of operation is given for court shoe with quarter having folded top line. The top line can be given French binding or other treatment depending on the design of the shoe. Suitable reinforcement is provided on the high stretch areas like throat curve. A lining shell is separately stitched and then stitched with the upper at top line. Leather lining at lasting edges is also skived from the gain side as it helps in lasting. Finished side does not paste well to insole while toe lasting or side lasting. Finished surface is

just removed while skiving lining at lasting edges. The sequence of operation for court shoe is:

- Stitch Marking
- Edge coloring (if required)
- Skiving
    - Underlay skive of Quarter
    - Raw edge skive of Quarter
    - Fold skive of Quarter
    - Fold skive of Vamp
    - Raw edge skive of Vamp
    - Underlay skiving of vamp lining.
    - Skiving of quarter lining at lasting edge from grain side.
    - Skiving of vamp lining at lasting edge from grain side.
- Interlining ironing
- Stitching of Vamp to Quarter side seam (double row seam)
- Stitching of back seam Vamp to Quarter. (Single row seam)
- Seam rubbing & taping
- Reinforcement attaching on top line
- Top line folding
- Taping in throat areas
- Stitching of Quarter to Heel grip (single row stitch)
- Stitching of Quarter lining to Vamp lining (single row seam)
- Stitching of top line of Upper with Lining (single row seam)
- Top line edge trimming
- Cement upper and lining with adhesive
- Cleaning and thread burning
- Quality checking
- Packing

- Single needle flat bed machine is required for operation no. vi, xi and xii..
- Double needle flat bed machine is required for operation no. v
- Single needle post bed machine is required for operation no. xiii
- Thermo folding machine is required for operation no. ix or it can be done manually.
- Seam rubbing and taping machine is required for operation no. vii
- Trimming machine is required for operation no xiv or a lining trimmer can be fixed on the machine.
- Latex spray machine is required for operation no. xv.
- Skiving machine is required for operation no iii

SR.NO.	TYPES OF THE MACHINES	QUANTITY
1	SINGLE NEEDLE FLAT BED MACHINE	3
2	DOUBLE NEEDLE FLAT BED MACHINE	1
3	SINGLE NEEDLE POST BED MACHINE	1
4	EYELETTING MACHINE	1
5	THERMOFOLDING MACHINE	1
6	TAPING MACHINE	1
7	TRIMMING MACHINE	1
8	LATEX SPRAY GUN	1
9	SKIVIING MCHINE	1

SLIP-ON UPPER

INTRODUCTION

This shoe permits easy entry of the foot. Elastic inserts are provided at instep under the apron. Saddle is also stitched at the instep area over the apron. Saddle can have many designs which have and effect on the appearance of the shoe. The shoe does not have eyelets and laces. In this shoe wearer merely slips his foot. Top line can be folded or binding can be attached on the top line. This shoe can have various designs. The skills require stitching slip on shoe are:

- Sorting of component.
- Skiving components of upper
    - Underlay skives on Quarter
    - Open raw edge skives on Vamp
    - Fold skiving on Vamp at cording area.
    - Fold skives on Vamp at extended tongue area.
    - Underlay skives on Vamp lining.
    - Open raw edge skives on Counter.
    - Close Raw edge skives on collar.
    - Underlay skives on Heel grip.
    - Fold skives on Saddle.

- Attach interlining to Quarters and Vamp and Counter. (Keep under scarf of skiving)
- Foil stamping lining for size and fitting on quarter lining.
- Stitch Vamp to Quarter by double needle Flat bed machine.
- Stitch Quarter lining with Heel grip with single needle flat bed machine.
- Stitch Quarter lining to Vamp lining by single needle post bed machine.
- Stitch Vamp to counter by double needle post bed machine.
- Stitch Quarter lining and Collar to Upper top line by single needle post bed machine.
- Pre fit lining shell and collar to upper by rubber solution adhesive.
- Edge inking Upper and Vamp lining by same colour.
- Lining trimming by lining trimmer.
- Trim all loose ends of threads.
- Examine upper

COMPONENTS

Here we have considered all upper and leather components are of leather and tongue is not one piece with vamp but cut separately. The interlining is attached to add strength to the upper material if upper material has enough strength then interlining may not be required. The components of slip on shoe are:

Upper

- Two Vamp (one for left foot and one for right foot)
- Two Quarters (one for left foot and one for right foot)
- Two counters (one for left foot and one for right foot)
- Two saddle strip (one for left foot and one for right foot)
- Two collars (one for left foot and one for right foot)

Lining:

- Two Vamp lining (one for left foot and one for right foot)
- Four Quarter lining (two for inside and two outside)
- Two Heel grip (one for right and one for left foot)
- Two Saddle lining (one for right and one for left foot)

Interlining

- Two for Vamp
- Two for Quarter
- Two for Counter

Peaks or cut out is given on the inside of the vamp and vamp lining. These indicate left and right feet. They must always be facing on the inside of the upper and lining. Peaks or cutouts are also given on the quarter lining these indicate inside and outside to match quarter and vamp. Care should be taken to stitch inside quarter with the inside portion of the vamp and lining for left foot must be stitched on the left upper and right foot lining on right foot upper.

SEQUENCE OF OPERATION

This sequence of operation is given for slip on shoe having vamp with extended tongue however tongue can be cut separately and stitched to vamp. Top line can be given various treatments like English binding, bagged top line or French binding. In cheaper shoe it can be left raw edge. While stitching collar a top line tape must be stitched, vamp lining should be pasted to vamp on round otherwise wrinkles will appear on vamp lining. A cord of specified thickness is stitched under the vamp for the raised effect. Cord should be stitched on the marking and it must show a raised affect on the upper after stitching. Care should be taken to keep the bottom tension tight for stitching a cord. While cementing lining with upper, care should be taken not to use too much of adhesive as it may cause wrinkles and shrinkage of upper.

Sequence of Operations

- Stitch marking on components.
- Edge coloring (if required)
- Skiving
  - Fold skive Vamp.
  - Open raw edge skive Vamp.
  - Raw edge skive collar.
  - Open raw edge skives Counter.
  - Fold skive Saddle
  - Underlay skives Vamp lining.
- Interlining ironing (if required)
- Stitch cord to Vamp. (Double row seam)
- Fold Vamp at extended tongue.
- Fold saddle.
- Attach tape on saddle and paste saddle lining
- Attach tape on Vamp at saddle area and cording area.
- Stitch back seam at Counter (Single row seam)
- Seam rubbing and taping back seam.
- Stitch Vamp to Vamp lining. (Single row seam)
- Stitch Vamp to Counter. (Double row seam)
- Stitch Quarter to Counter. (Double row seam)
- Stitch Vamp to Quarter. (Double row seam)
- Stitch Quarter lining to Heel grip. (Single row seam)
- Trim lining at Vamp and saddle.
- Pre fit lining and collar to upper topline.
- Stitch Lining and Collar together to Upper top line. (Single row seam)
- Fold Collar on outside of upper and paste.
- Stitch Collar to Upper. (Single row seam)
- Stitch Vamp lining to Quarter lining. (Single row seam)
- Stitch Saddle to Vamp (Double row seam)
- Cement Lining and Upper at waist area..

- Cleaning and thread burning
- Quality checking.
- Packing.

- Single needle flat bed machine is required for operation no. x, xii and xvi
- Single needle post bed machine is required for operation no. xix , xxi and xxii
- Double needle flat bed machine is required for operation no. xiii and xiv.
- Double needle post bed machine is required for operation no. xv and xxiii.
- Cording machine is required for operation no ix.
- Thermo folding machine is required for operation no. vi and vii or can be done manually.
- Seam rubbing machine is required for operation no. xi or can be done manually.
- Trimming machine is required for operation no xxiii or a lining trimmer can be fixed on the machine.
- Latex spray machine is required for operation no. xxiv
- Skiving machine is required for operation no iii

SR.NO.	TYPES OF THE MACHINES	QUANTITY
1	SINGLE NEEDLE FLAT BED MACHINE	3
2	DOUBLE NEEDLE FLAT BED MACHINE	2
3	SINGLE NEEDLE POST BED MACHINE	3
4	DOUBLE NEEDLE POST BED MACHINE	2
5	EYELETTING MACHINE	1
6	THERMOFOLDING MACHINE	1
7	TAPING MACHINE	1
8	TRIMMING MACHINE	1
9	LATEX SPRAY GUN	1
10	SKIVIING MCHINE	1
11	CORDING MACHINE	1

Self-Check 1	Written Test

Instructions: Write all your answers in the provided answer sheet on page 16.

Test I: Short Answer Questions

Directions: Answer all the questions listed below. Examples may be necessary to aid some explanations/answers. **(Total Points: - 5X2=10)**

1. Define the weekly and monthly plan
2. What is meant by the specification sheet of particular article?
3. What are the special instructions in the specification sheets?
4. What do you understand about the quality requirements of the buyer?
5. What is the use of the cutter's ticket?

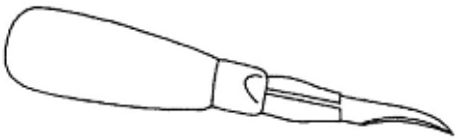
Score = _____ Rating: _____

- Information Sheet 2 Identifying and obtaining hand tools, patterns and materials

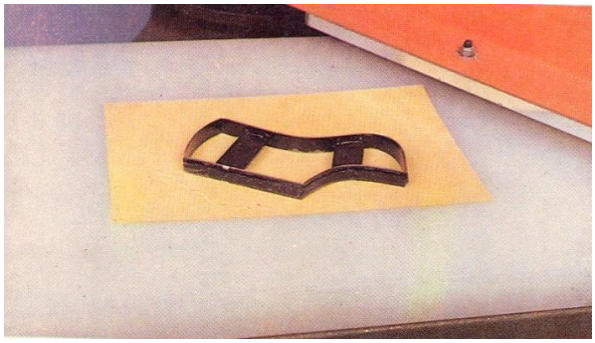
Tools and equipment

Tools and equipment are selected to carry out tasks and are consistent with the requirements of the job. Checking of these tools and equipment for serviceability and any faults is needed to be rectified or reported.

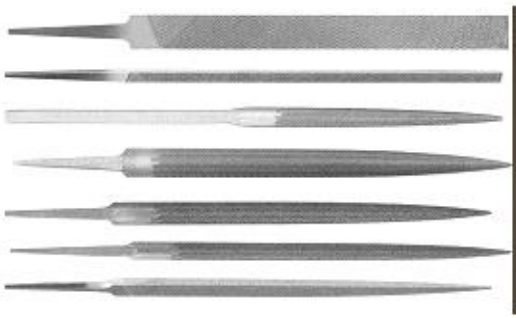
- Cutting Handle/knife: - a tool used in hand cutting; its function is to cut components of a shoe.



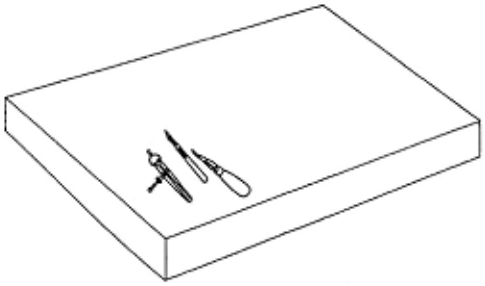
- Cutting Die: - a tool used in machine cutting.



- Sharpening file:- is a tool used to smooth the edge of tin patterns.



- Cutting board: - a tool used in hand cutting which is used as a base in cutting the shoe components.



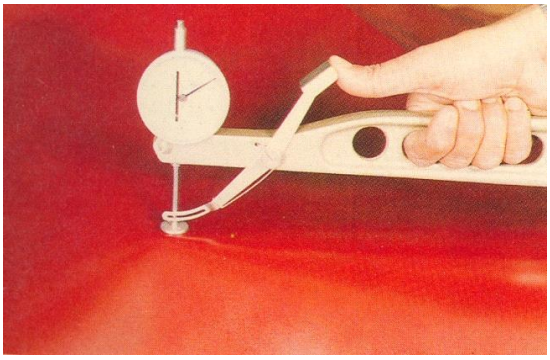
a. Cutting board of cutting pres

b. Cutting board of a hand cutting

- Bell knife: - an equipment in skiving machine which skive the flesh side of the leather.

- Steel ruler: - is used in case of any needed measurement (in tin pattern making and so on…)
- Grinding stones for skiving machines: - an equipment in skiving machine in which is round shape and used to sharpen the bell knife.

- Grinding knife for splitting machine:- it is equipment located in splitting machine and its function is to sharpen the blade
- Leather measuring gauge:-a tool used to measure the thickness of leather.



- Grading tool:-a tool used in measuring of hides and skins with defects or without defects then this will help in setting out of grades.

- Knife for the strap cutting machine:- located in the strap cutting machine which is an equipment which is used to cut the materiaL

TOOLS USED:-

- **THREAD TRIMMER:-** It is used for trimming the thread while stitching the components.

- **SCISSORS:-** It is used for lining trimming & can also be used for thread trimming.

- **L/Hexagonal Keys :-** Unscrew and tightening screw (angle corners) & for changing the needle.

- **Folding Hammer :-** Helps in folding edges.

- **Spreader:-** For spreading out the edge of the eyelets, fixing them properly on the material.

- **Work Stone :-** It is used for hammering, folding and fitting work. This is used as a base for the skiving operation. This is found in square and rectangle shape and has different dimensions according to the space available in the closing room. The both top and bottom surfaces of the stone is found very smooth, which helps in providing fine base for the skiving tools. It also used to sharpen the edge of the tool during skiving.

- **Adhesive container:** To keep adhesive.

- **Adhesive application brushes**: This is a normal brush and used to clean the passage used for dust and different surfaces of the machine bed. During skiving scarf is coming off from the flesh side of the material and stuck inside the various cavities exists with the mechanism.

- **Punches**: Making perforation in the components in order to fix eyeleting.

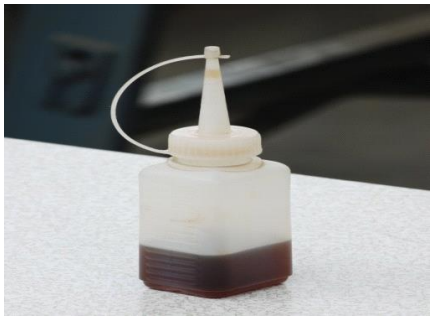
- **Dressing tool**: The scale is found of steel and plastic and used to measure the skiving width, but it can be replace by skiving width guides. These guides are pre-made according to different skiving widths and distributes by supervisor to the skiving operator.

- **Scale:-** The scale is found of steel and plastic and used to measure the skiving width, but it can be replace by skiving width guides. These guides are pre-made according to different skiving widths and distributes by supervisor to the skiving operator.

- **Small screwdriver (small and narrow tip)** : For removing & replacing needles in the m/c and for small screws, e.g. Gibb screws.

- **Long screwdriver:** For unscrew & tightening screws in hard to get position on various parts of m/cs.

- **Oil Container:-** Oiling the moveable parts of m/c.

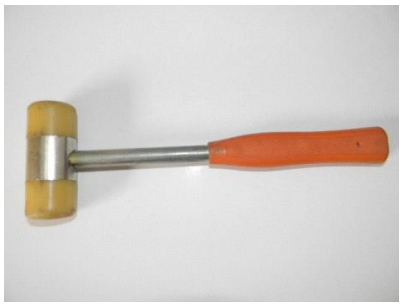


- **Gimping Scissors:-** Used for decoration cuts over raw edges of component.

- **Rampi:-** It is used during manual skiving of cut components. This tool is mostly used in sample making, as one or two pairs are been made during sampling. This tool is mostly found in two categories are light and heavy RAMPI. The light Rampi is used for the upper material skiving and heavy one is used for bottom component skiving.

- **Thickness measurement Gauge:-** This tool is used to measure the thickness of the component before and after skiving. This measures the material thickness in millimeters and to maintain its accuracy level, it is calibrated accordingly.

- **Hammer:-** used for making the upper.



- **SHARPENING STONE:-** This is found in rectangle shape and used to sharpen the hand tool (Rampi). This stone has two surfaces called top and bottom is used for leveling and sharpening accordingly. The smooth side of the stone is used for final sharpening and coarse side is used for leveling the scratchy edge of the tool before sharpening it.

- **PRICK MARKER:-** Prick marker is used during folding for pleating the convex curves, where excess material is adjusted accordingly.

- **DEVIDER:-** used for stitch marking.

Self-Check 2	Written Test

Name: _____ **Date:** _____

Test I: Short Answer Questions (10 points)

Directions: Answer all the questions listed below. Examples may be necessary to aid some explanations/answers.

1. Write down about the slip on upper.(1 point)
2. What is the difference between derby shoe upper and oxford shoe upper.(1 point)

- Where should we use P point needle in Derby upper? (1 point)
- Write down the name of machine used for attaching vamp lining with vamp upper.
  (1 point)
- Where reinforcement is provided in Derby shoe upper? (1 point)
- How many components are required to assemble Derby upper? (1 point)
- What is the use of thermo folding machine in Derby upper? (1point)
- What type of skiving should be done on following components of Derby? (2point)
  Vamp
  Quarters
  Vamp lining
- What are the tools required for making slip on upper.(1 point)

Self-Check 2.2	Written Test

Instructions: Write all your answers in the provided answer sheet on page 29.

Test I: Match the following words: (Total points: 5)

• Cutting Handle/knife • Cutting Die • Sharpening file	• tool used in hand cutting; its function is to cut components of a shoe. • s a tool used to smooth the edge of tin patterns? • tool used in machine cutting.
• Cutting board • Bell knife	• n equipment in skiving machine which skive the flesh side of the leather. • A tool used in hand cutting which is used as a base in cutting the shoe components.

Test II: Short Answer Questions: (Total points: - 5)

Directions: Answer all the questions listed below. Examples may be necessary to aid some explanations/answers.

- What are the tools and equipment used in cutting department? And what is their use?

Score = _____

Rating: _____

Note: **Satisfactory rating – 100%**You can ask you teacher for the copy of the correct answers

- Information Sheet 3 Checking materials, tools and equipment

Hand tools as per the need of the job

Hand tools are selected consistent with needs of the job. So before starting any operations selecting the tools for that needed job must be done.

Cutting handle/knife

Hand cutting is done with the use of hand held knife and cutting patterns. Whenever hand cutting is needed knife or cutting handle with blade is used.

-Method of holding the knife must be in a proper way and Method of cutting must be in a way that the cutter's finger or hand will not be damaged.

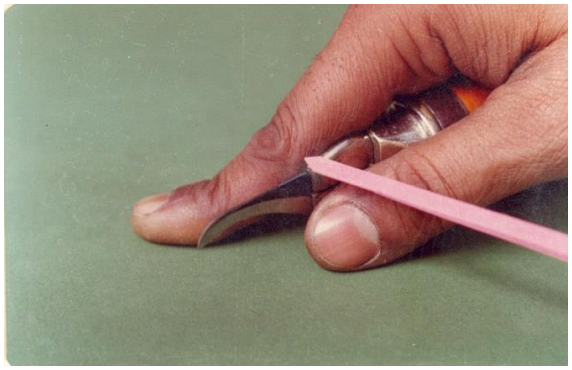
- Hold your knife correctly for cutting.

(Right handed cutter)

Hold the handle with your 2nd, 3rd and 4th fingers.

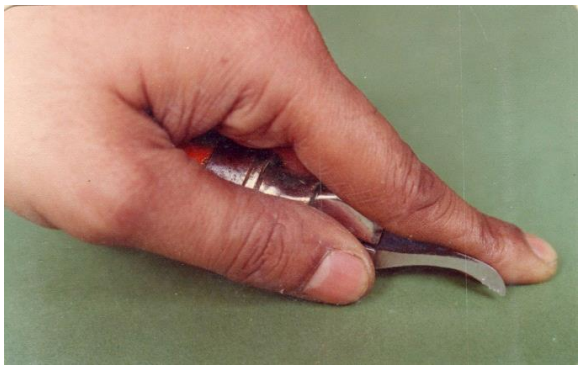
- Place your 1st finger across the clamping jaws so that it will just touch the material being cut.

This finger helps guide you.

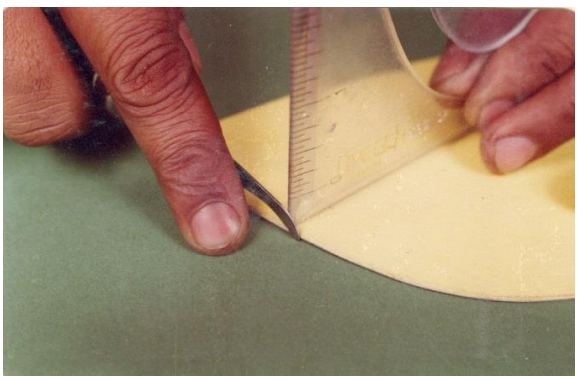


- Place the thumb on the side of the clamping jaws.

- A left handed person does the same with the lift hand.



- The knife is held at about 90 degree to the edge of the pattern.



- And pulled along at about 30 degree to the horizontal.

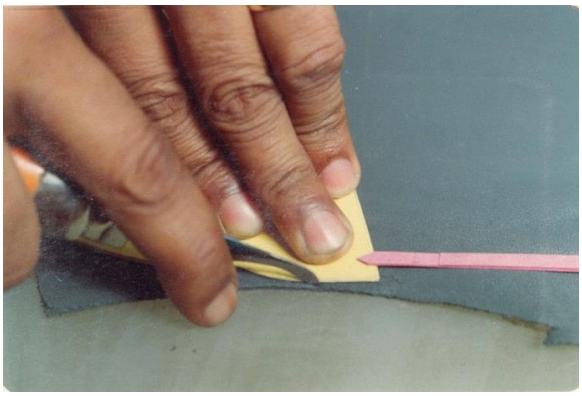
- Holding large patterns may require all fingers to obtain the necessary pressure.

- Small patterns may only require two or three fingers.

- Ensure that your fingers never the edges of the pattern.

- Fingers should be grouped in the area being cut, apply even pressure to secure the pattern.

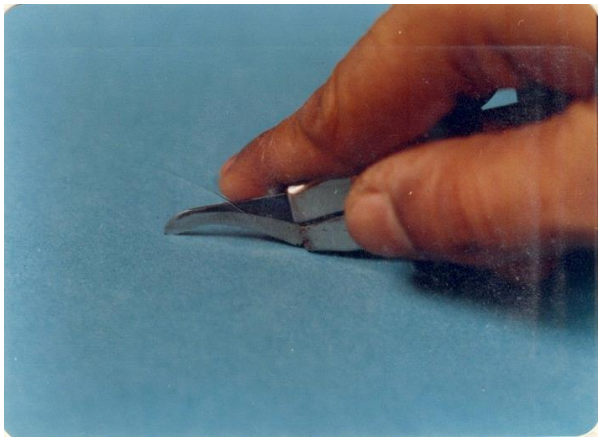
- Fingers should follow just behind the knife, in the direction of the cut.



- Fingers should NEVER be allowed in front of the knife.

- Thumb and fore- finger help to guide the blade in cutting

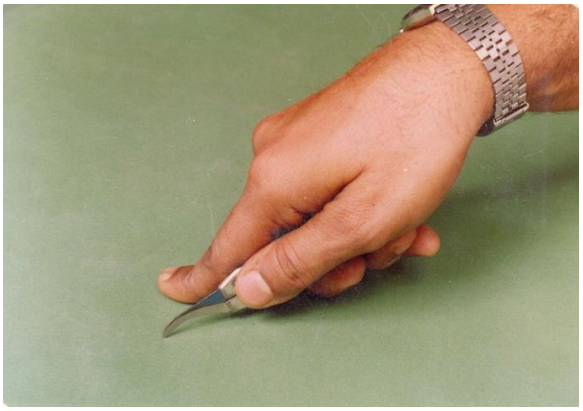
- The tip of the fore-finger just touches the material to act as a brake and pivot for turning sharp corners.



- Pressure is placed on the knife blade against the edge of the pattern.

- Pressure is placed downwards on the blade of the knife.

- The knife must not be pressed to hard or it will cut too deeply into the cutting board.



Grading tool

A tool used in measuring of hides and skins with defects or without defects then this will help in setting out of grades. To set out a grade for leathers grading tool is used.

- **Main steps for leather area measuring by grading tool:**

- Collect the leather from the bundle.

- Keep and prepare the leather on the flat table and it should be suitable to measure the total area of the leather.

- Use grading tool (grid plate which is commonly 10 sq. dm size)

1	**2**	**5**	**7**	**9**
2	**4**	**6**	**8**	**10**

= 10 sq.dm

1	**2**	**3**	**4**
5	**6**	**7**	
8	**9**		
10			

= 10 sdm

- **Block = 1 sq.dm.**
- Then drawing the grading plate sequentially step by steps on the full size of leather using the white pencil. If the space is enough to draw the

full size of grid plate it is good. Unfortunately, due to the irregular shape of leather it can be difficult to get the space for the whole plate to draw, so it is possible to draw/mark even the spare/fraction of leather part using the grid and measure in decimeter.

Step 1

Step 2

Step 3

- Then measure the leather size by counting the sketched grading plate on the leather. Measure each space/block that drawn on the leather in decimeter.

- Sum up each blocks and calculate the total area of leather in decimeter and convert in to square feet (1sq.ft = 9.29 sq.dm).

Ruler

Whenever measurement is needed steel ruler can be used.

Small screwdriver (small and narrow tip): For removing & replacing needles in the m/c and for small screws, e.g. Gibb screws.

Large screwdriver (wide tip) : Unscrew & tightening the large screws in m/c.

Long screwdriver: For unscrew & tightening screws in hard to get position on various parts of m/cs.

Scissors: for cutting thread of work when finished and for trimming all loose threads away from work.

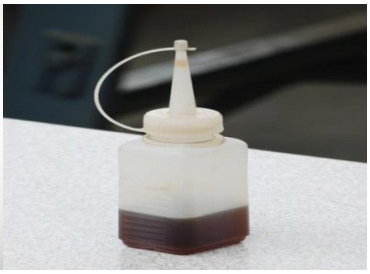
Knee press Tool: For loosening & thi9gtening knee press nut on the m/c so as to adjust the knee press to suit any individual.

L/ hexagonal Keys: It is used for unscrewing & tightening the screw.

Silver Marketing pen: Marking the work before required operation.

Maintenance Kit:

- Brush: for cleaning fluff & material build-up.
- Oil Container: Oiling the moveable parts of m/c.
- Kerosene container: Cleaning the material build-up using the brush.

Dressing tool: Cleaning the sharpening stone in the skiving m/c.

Folding hammer: Helps in folding edges.

Punches: Making perforation in the components in order to fix eyeleting.

Spreaders: For spreading out the edge of the eyelets, fixing them properly on the material.

Check the tools

Before any use of the tools there must be checking practice. Tools are checked for the sake of serviceability and safety, and faults to be reported. Some of check points for the tools can be:

- Checking if there is breakage on the tools
- Checking sharpness of Blades, Dies ,etc., …
- Checking the accuracy of measuring, and other related tools.

Safety measures while using the hand tools

In cutting operation, methods for holding the tools used and method of operating must be clearly known for the sake of safety. For example the method of hand cutting must be in a way that the cutter's finger or hand will not be damaged.

- Clothing requirements: - wearing a protective cloth is important especially during machine operations.
- Precautions: - Method of holding the knife must be in a proper way. And method of cutting must be in a way that the cutter's finger or hand will not be damaged.

Location of hand tools

- Location: - Hand tools should be safely located when not in immediate use.
- Safety: - Hand tools should be used safely and effectively according to their intended use.
- Systematically arrangement: - Materials should be clamped or fixed in position.

Self-Check 3	Written Test

Instructions: Write all your answers in the provided answer sheet on page no.15.

Test I: Short Answer Questions:

Directions: Answer all the questions listed below. Examples may be necessary to aid some explanations/answers. **(Total points: 5X2=10)**

1. What are the uses of hand tools in hand cutting?
2. What are the check points of the hand tools?
3. What are the safety aspects of the hand tools?
4. How can we keep the hand tools?
5. Define the step by step procedure of using grading tool.

Score = _____ Rating: _____

Note: **Satisfactory rating – 100%**

You can ask you teacher for the copy of the correct answers

LG#11	LO #2- Apply principles and concepts of upper material estimation

Instruction sheet

This learning guide is developed to provide you the necessary information regarding the following content coverage and topics:

- Describing the principle and concepts of material estimation.
- Describing the different methods of material estimation.
- Describing the purpose of material estimation.
- Identifying and obtaining the footwear specification including type of footwear, material type and number of components.

This guide will also assist you to attain the learning outcomes stated in the cover page. Specifically, upon completion of this learning guide, you will be able to:

- Describe the principle and concepts of material estimation.
- Describe the different methods of material estimation.
- Describe the purpose of material estimation.
- Identify and obtaining the footwear specification including type of footwear, material type and number of components.

Learning Instructions:

Read the specific objectives of this Learning Guide.

- Read the specific objectives of this Learning Guide.
- Read the information written in the “Information Sheets 1”.
- Accomplish the “Self-check. Request the key answer / key to correction from your teacher or you can request your teacher to check it for you.
- If you earned a satisfactory evaluation proceed to “Information Sheet 2”. However, if your rating is unsatisfactory, see your teacher for further instructions or go back to Information Sheets 1.
- Read the information written in the “Information Sheet 2”.
- Accomplish the “Self-check 2”. Again you can request the key answer / key to correction from your teacher or you can request your teacher to check it for you.
- If you earned a satisfactory evaluation proceed to “Information Sheet 3”. However, if your rating is unsatisfactory, see your teacher for further instructions or go back to Information Sheet 2.
- Read the information written in the “Information Sheet 3”.
- Accomplish the “Self-check 3”. Request the key answer / key to

correction from your teacher or you can request your teacher to check it for you.

- If you earned a satisfactory evaluation proceed to “Information Sheet 4”. However, if your rating is unsatisfactory, see your teacher for further instructions or go back to Information Sheet 3.
- Read the information written in the “Information Sheet 4”.
- Accomplish the “Self-check 4”. Request the key answer / key to correction from your teacher or you can request your teacher to check it for you.

Information Sheet 1 Describing the principle and concepts of material estimation.

Introduction

Upper materials estimation is critical in footwear manufacturing industries so, It is very important to know the quantity of materials required to make a pair of shoe and their costs, as based on these information, we do Product Costing Material, Requirement, Planning, Production Planning etc.

This unit describes about the importance of material consumption calculation and a brief description of various methods for upper material calculation.

Objective of upper material estimation

There are systems to calculate Materials allowance as shoe manufacture need to predetermine the consumption of upper and lining leather required for a particular design and type of leather

The main objective of upper materials estimation is:-

- To establish the initial cost of a style
- To control the consumption of material by the clicker,
- It is necessary to calculate the amount of material required for each style and leather type used.

  Any system for predetermine the material consumption allowance need the following attributes

- consistency between style and shoe size
- Consistency between materials types
- Sufficient accuracy to be used as a standard against which cutting result can be compared so that steps can be taken to eliminated excessive wastage

  It is important to get accurate figure because

- The upper typically the largest single item in the cost of material of the shoe and Sufficiently accurate figure are needed to set material consumption allowanced for Product development product costing and standard costing
- The profitability of the company depends on accurate costing
- The consumption allowance related to a batch for clicker to cut is called clickers allowance and can be as a basis for payment for result on Leather saved against allowance by the clicker

CLICKER ALLOWANCES: The intensity of upper material given to the clicker to cut a pair of shoes.

Unit of mesurèrent

The most common units of measurement used to estimate upper materials are :-

- Square feet
- square Decimetre
- Square meter

The area of leather measured in two units of measurements;

- Square feet
- square Decimetre

Conversions of units of measurements

Since different unit of measurement used in different organization it is very important to have conversion factors.

1sq.ft = 9.29 DM2

1 square meter = 10.76 sq.ft.

Self-Check 1	Written Test

Instructions: Write all your answers in the provided answer sheet on pages 9-10.

Test I: Short Answer Questions

Directions: Answer all the questions listed below. Examples may be necessary to aid some explanations/answers.

1. What do you mean by costing?(1 points)
2. Why predetermination of material consumption per pair is necessary?(2 points)
3. Mention the attributes necessary for costing.(2 points)

Test II: Multiple Choice

Directions:

1. There are five [5] questions in Test II. Select the best answer for each question and write only the letter that corresponds to your answer in the provided answer sheet.
2. A correct answer scores 1 point and an incorrect answer scores 0 point. No marks will be given for a question if more than one answer is supplied.

Start here:

1. Cutting value is……

   A. % useable area of leather

   B. % area of leather which is free of any defects

   C. Total area of leather minus total defective area

   D. All

2. Which of the following statement is wrong?

A. The Grade A leather cutting value is 97-100%

B. The wastage of grade b leather is 10 %

C. The Cutting value of grade F leather is 72-76%

D. The wastage of grade E leather is 19-23 %

3. The grades of leather after 1st grade all are vary by how much % of cutting value?

A. 3 %

B. 5%

C. 8%

D. 13%

4. The main purpose of upper materials estimation is……

1. To establish initial cost of style

B .to control consumption of materials by clickers

C. to calculate amount of materials required for each style

D. all of the above are correct

5. The most common unit of measurement of area of leather are?

A. Square feet.

B. Square decimeter.

C. meter

D. A and B

Information Sheet 2 Describing the different methods of material estimation.

INTRODUCTION

Upper materials estimation is critical in footwear manufacturing industries so, It is very important to know the quantity of materials required to make a pair of shoe and their costs, as based on these information, we do Product Costing Material, Requirement, Planning, Production Planning etc.

This unit describes about different methods available for calculation or estimation of upper materials, advantage and disadvantage of available system, and factors to be considered while using the different methods.

METHOD OF UPPER MATERIAL ESTIMATION

The following is a list of material allowance calculation systems that are stated in approximately historical order.

1. Marking up
2. Graphical
3. RSM
4. SLM
5. SATRA Sum
6. Graphic(for textile and synthetic)
7. Tracing methods(for textile and synthetic)

Methods listed above from no. 1- 5 are used for leather materials allowance calculation and the last two methods 6 and 7 are used for estimation of textile and synthetic materials.

MARKING UP

The Cutting Room Supervisor or a similarly skilled cutting person selects a skin or hide from a bundle of leather that is to be used for the style. The skin is then marked by drawing the patterns onto its surface with due regard to cutting principles and quality requirements. Complete pairs are drawn, as far as possible and an allowance is calculated by dividing the area of the skin by the

number of pairs obtained from the mark-up. Sometimes, the skin is marked on the reverse side so that it can be subsequently used without having to clean off the marks from the surface. In this case a percentage is usually added that reflects the amount of waste that would be encountered on the grain side because of flows and blemishes not seen on the reverse.

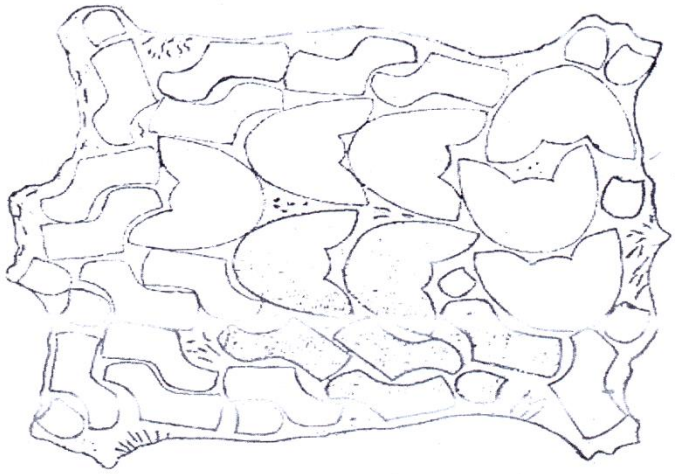


Fig1. Marking up

ADVANTAGES:

- There is a permanent record of the cutting method and quality standard
- Takes into account cutting principles and unavoidable waste
- The allowance calculation can be justified to cutters.
- Provided the person who marks the skin is skilled and the skin of the leather is truly representative, then this should be very accurate method.

DISADVANTAGES:

- A skilled trustworthy cutter is required to do the mark-up.
- It can be time consuming particularly if there are many pattern items in the shoe set.
- It may not truly emulate cutting practice (e.g. a cutter would probably cut more vamps or more quarters from an individual skin rather than cut a complete number of pairs.)

- It is usually not linked to a leather grading system or shoe size adjustment system so individual cutting jobs may yield significantly different results to the calculated allowance.

GRAPHICAL METHODS

The complete patterns for one pair are laid out in the most compact and economical arrangement onto graph paper. A rectangle is then drawn around the patterns that enclose the set. Sometimes, the lines cut across the patterns to a degree as in the example. This assumes that the parts that protrude could be accommodated in the gaps within the rectangle.

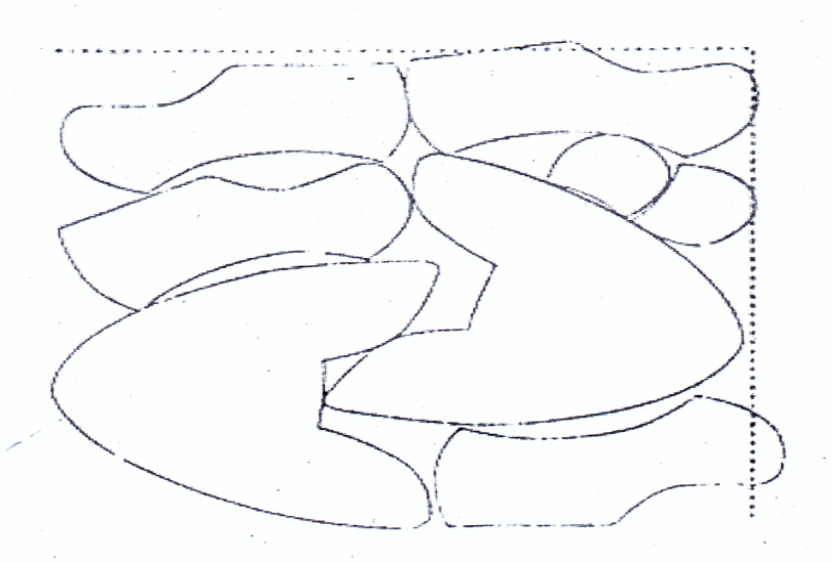


Fig.2. Graphical methods

The area of the rectangle is calculated by multiplying the length by the width or counting up the number of squares covered. A percentage is applied to this area to calculate an allowance for the pair. The percentage will usually vary according to:

- Material type
- Material quality
- Average pattern area in relation to average material area

- Variations in size and width fitting

These percentages are usually based on previous experience and some companies apply the same percentage for all styles and materials.

ADVANTAGES:

- Reasonably quick and easy to use.
- Permanent record of the calculation method
- The same base area can be used to calculate allowances for different materials, qualities, and sizes (provided previous experience has allowed a build up of appropriate percentage additions).
- Less skill is required than the marking-up method.

DISADVANTAGES:

- It is subjective because the original rectangle area could vary significantly depending on the interlocking skill of the assessor.
- The percentages applied are based on previous cutting history which may reflect uneconomical cutting.
- There may be no previous experience of particular materials so an estimate has to be made.
- The lay-up does not reflect usual cutting practice i.e. vamps tend to be cut together from the butt and backbone areas, quarters from belly, legs, neck area etc.

RSM

The first serious attempts at establishing a scientific method of arriving at leather consumption allowance resulted in the publication in 1922 of a system by masers W.W. RUSS and F.L. SMALL.

A more scientific approach can give adequately accurate results and it is considered that a system of this type posses many advantages.

The factors which affect the cutting results i.e. the factor to be considered for calculating material consumption are given below:

1. Pattern area:

This is the net area of the individual pattern item comprising the upper and the first or interlocking waste. The first waste is declined as the space left b/n two pattern pieces, when interlocked together due to irregularities in shape.

This is also called “scale area” and used as a base for further phase in the system.

2. Second waste:

This waste is additional to the waste .It depends on the following factors

a. The shaped of the skin to be used ,because the shape however fitted together will not coincide in outline with that of a skin which result in edge waste

b. The size (or area) of the shoe in relation to the size of the individual pattern shapes. The large the area, smaller the wastage, smaller the area, larger the wastage.

c. General shoe making consideration in which certain Portion of the skin or in certain direction according to the direction of stretch or shade matching and colour matching in individual pieces as a result of which the interlocking arrangement may be destroyed.

Pattern scale area when added with the second waste allowance is called GROSS AREA (G) this depends on different kinds of leather also. For calculating G we use certain empirical formulas as:-

For Full Grain Leather /corrected Grain Leather:

G = S (1.205+ S/A)

Where:

S= Pattern Scale area

A = Area of the Skin

1.205 = This is an area addition that pair of the mathematical equation. This is constant for a particular kind of skin

I S/A>0.185 i.e. if the pattern item sized is bigger than the skin size e.g ladies ¾ cut court shoe vamp to be cut from goat leather then

G=S (1. 02+2S/A)

In the case of split /suede leather

G2=S (1.098+S/A)

3. Third waste

It related of the curability grades of leather. On first grade leather, normally an Allowance of 3% is given while on the other grade % allowance may vary by 5%

4. FURTHER PERCENTAGES ARE ADDED TO ALLOW FOR DIFFERENT SHOE SIZE AND FITTINGS.

ADUSTEMENT FOR SIZE AND FITTINGS

Different shoe sizes and fittings will require different cutting areas. The difference in cutting area between one size and the next and also between one fitting and the next will be in regular step in respect of any particular pattern.

For example, in English size system or gents sizes 5% material allowances is given on the material allowance for each full size and 2.5% for each half size and in French system(Paris point) in gents sizes 3.5- 4 % material allowance is given for each size.

5. SOME EXTRA ALLOWANCE MAY BE GIVEN FOR SOME OTHER FACTORS:

For bicolour or multicolour styles, some extra allowance may be given as in this case edge waste will be more. In some cases, one can treat to different colours as different batches.

Here also some extra allowances may be added.

SLM

SLM or Scientific leather Measurement was introduced to the shoe industry in the early 1950s. It established very clearly two separate components for allowance calculation pattern assessment and leather assessment.

Each pattern in the shoe set is measured separately. The pattern is drawn carefully onto paper and then “blocked off” by drawing straight lines connecting highest points on the pattern perimeter. This gross area is measured and then the most economical interlocks are chosen and drawn into position. The interlocking pattern must be kept parallel or at 180 – to the original.

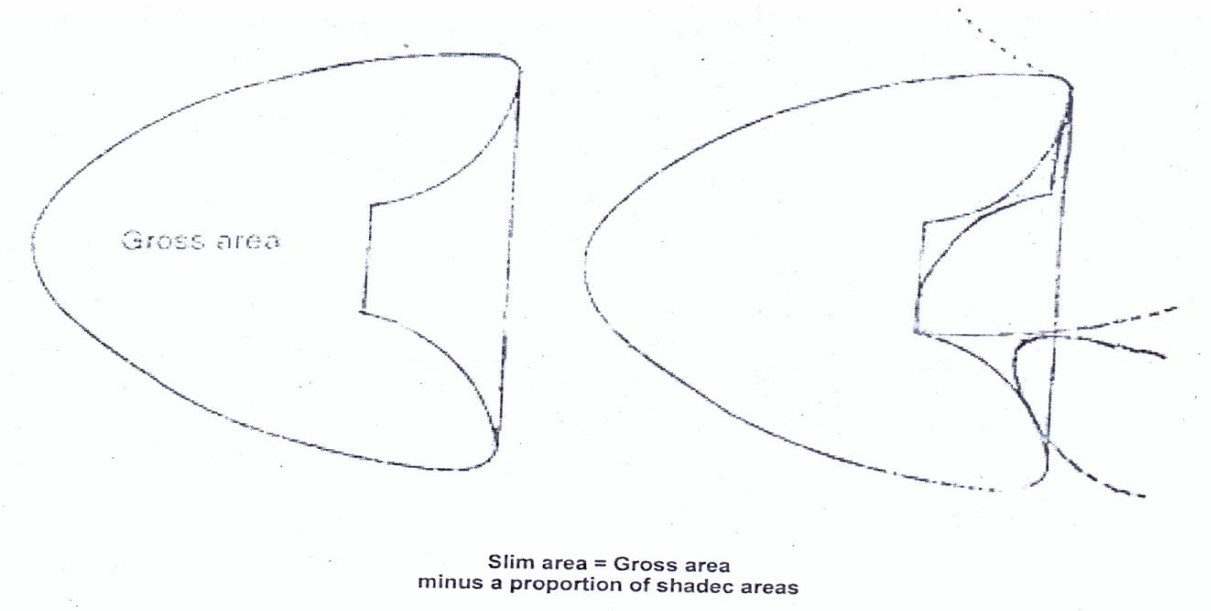


Fig.3. SLM

The area of interlocks falling within the gross area is measured, plus any shared waste. And a proportion of this area subtracted from the gross area. The result

is known as the “Slim area” and this is used as a basis for allowance calculation.

SATRA Sum

Initially developed by SATRA in the early 1980’s, this system continues to be developed. SATRA Sum has replaced SLM as an industry standard system for material allowance calculation.

Self-Check 2	Written Test

Instructions: Write all your answers in the provided answer sheet on pages 18.

(Total marks 12)

Test I: Short Answer Questions (8 points)

Directions: Answer all the questions listed below. Examples may be necessary to aid some explanations/answers.

1. Define the advantage of marking up method.(2points)
2. List the various methods available for calculating material consumption per pair.(2 points)
3. What are the factors considered while calculating upper materials consumption by R.S.M?(2 points)
4. Define the disadvantages of graphical method.(2points)

Test II: Fill in the blanks (4 points)

1. The area of the rectangle is calculated by multiplying the length by the ----------.

2. SLM or ---------- was introduced to the shoe industry in the early 1950s.

3. Pattern scale area when added with the second waste allowance is called ----------.

4. ---------- is the net area of the individual pattern item comprising the upper and the first or interlocking waste.

Score = _____

Rating: _____

Note: **Satisfactory rating – 100%** You can ask you teacher for the copy of the correct answers.

Information Sheet 3 Describing the purpose of material estimation.

Introduction

Upper materials estimation is critical in footwear manufacturing industries so, It is very important to know the quantity of materials required to make a pair of shoe and their costs, as based on these information, we do Product Costing Material, Requirement, Planning, Production Planning etc.

This unit describes about the importance of material consumption calculation and a brief description of various methods for upper material calculation.

Objective of upper material estimation

There are systems to calculate Materials allowance as shoe manufacture need to predetermine the consumption of upper and lining leather required for a particular design and type of leather

The main objective of upper materials estimation is:-

- To establish the initial cost of a style
- To control the consumption of material by the clicker,
- It is necessary to calculate the amount of material required for each style and leather type used.

  Any system for predetermine the material consumption allowance need the following attributes

- consistency between style and shoe size
- Consistency between materials types
- Sufficient accuracy to be used as a standard against which cutting result can be compared so that steps can be taken to eliminated excessive wastage

  It is important to get accurate figure because

- The upper typically the largest single item in the cost of material of the shoe and Sufficiently accurate figure are needed to set material consumption allowanced for Product development product costing and standard costing
- The profitability of the company depends on accurate costing
- The consumption allowance related to a batch for clicker to cut is called clickers allowance and can be as a basis for payment for result on Leather saved against allowance by the clicker

CLICKER ALLOWANCES: The intensity of upper material given to the clicker to cut a pair of shoes.

Unit of mesurèrent

The most common units of measurement used to estimate upper materials are :-

- Square feet
- square Decimetre
- Square meter

The area of leather measured in two units of measurements;

- Square feet
- square Decimetre

Conversions of units of measurements

Since different unit of measurement used in different organization it is very important to have conversion factors.

1sq.ft = 9.29 DM2

1 square meter = 10.76 sq.ft.

Self-Check 3	Written Test

Instructions: Write all your answers in the provided answer sheet on pages 9-10.

Test I: Short Answer Questions

Directions: Answer all the questions listed below. Examples may be necessary to aid some explanations/answers.

6. What do you mean by costing?(1 points)
7. Why predetermination of material consumption per pair is necessary?(2 points)
8. Mention the attributes necessary for costing.(2 points)

Test II: Multiple Choice

Directions:

- There are five [5] questions in Test II. Select the best answer for each question and write only the letter that corresponds to your answer in the provided answer sheet.
- A correct answer scores 1 point and an incorrect answer scores 0 point. No marks will be given for a question if more than one answer is supplied.

Start here:

3. Cutting value is……

E. % useable area of leather

F. % area of leather which is free of any defects

G. Total area of leather minus total defective area

H. All

4. Which of the following statement is wrong?

   E. The Grade A leather cutting value is 97-100%

   F. The wastage of grade b leather is 10 %

   G. The Cutting value of grade F leather is 72-76%

   H. The wastage of grade E leather is 19-23 %

3. The grades of leather after 1st grade all are vary by how much % of cutting value?

   A. 3 %
   B. 5%
   C. 8%
   D. 13%

9. The main purpose of upper materials estimation is……

   1. To establish initial cost of style

      B .to control consumption of materials by clickers

      C. to calculate amount of materials required for each style

      D. all of the above are correct

10. The most common unit of measurement of area of leather are?

    E. Square feet.
    F. Square decimeter.

    G. meter

    H. A and B

Information Sheet 4 Identifying and obtaining the footwear specification including type of footwear, material type and number of components.

Introduction

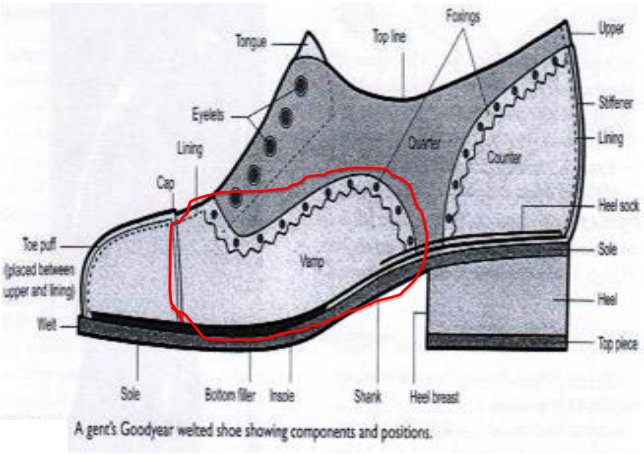
During the estimation of upper materials the quantity of components determines the consumption of materials in footwear industry. Different materials has different shape as well as different size or area this has its own effect on estimation of materials. Quantity of component is very important while estimating. The footwear has different parts or components:-Upper, lining, interlining, foams, and etc has its own cut components.

Number of cut components

There are different cut components for one model or article

Vamp

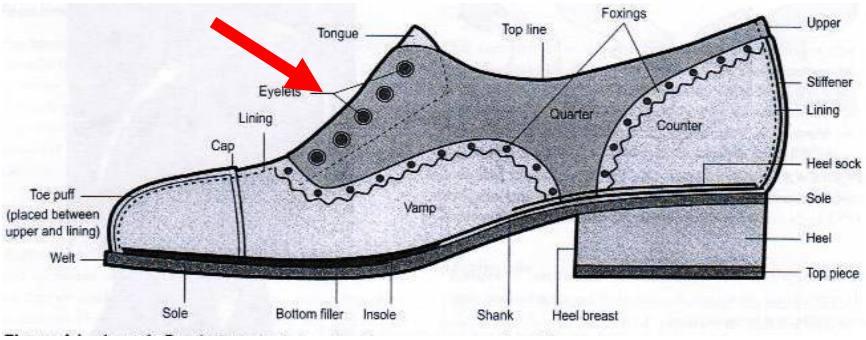
This is the part of the upper covering the front part of the shoe from the toe as far as the quarters. It May consists 1 or more pieces.



A gent's Goodyear welted shoe showing components and positions.

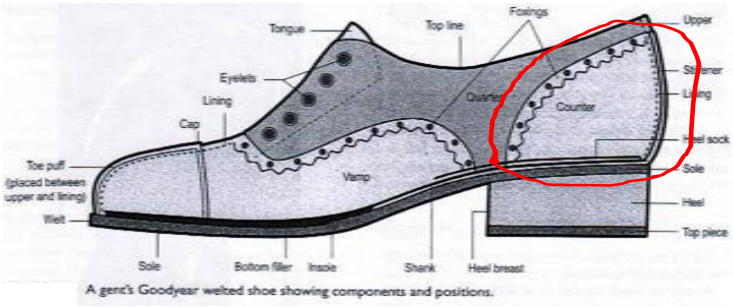
Quarter

Two sections which form the back, outside part of the upper and lay over the instep to close the facings. Most shoes have 2 quarters known as inside and outside.



Counter

Back part of the shoe which covers back part of the heel



A gent's Goodyear welted shoe showing components and positions.

Back strap

Is the thin back part of the shoe, it is not as wide as counter by covering the back. It used to cover back seam.

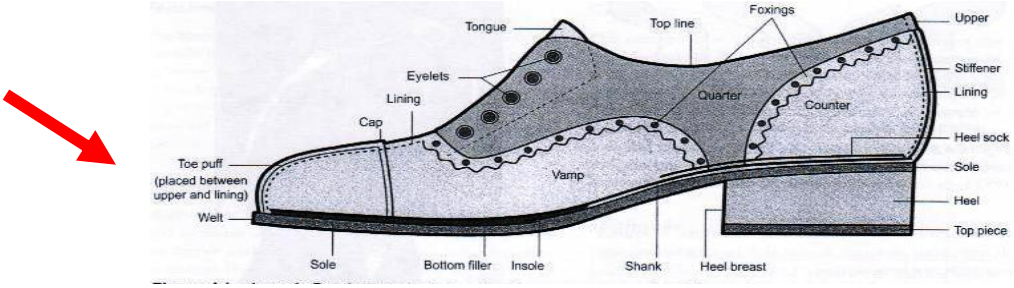
Tongue

A tab or extra part to cover dorsum of foot

Toe cup

It is additional piece of material extending forwards from the vamp to the toe of the shoe. It is attached and placed over the toe stiffener.

The shape the toe cap may be squared or rounded



Binding

The top of the shoe that surrounds the opening for the foot is called the top line or collar (padding, Comfort)

Saddle or Bar

The vamp may have a saddle or bar across it from joint to joint for 2 purposes:

1). to reinforce the shoe especially where flexing occur.

2). for good appearance (to cover a seam or gusset may be a vamp/quarter)

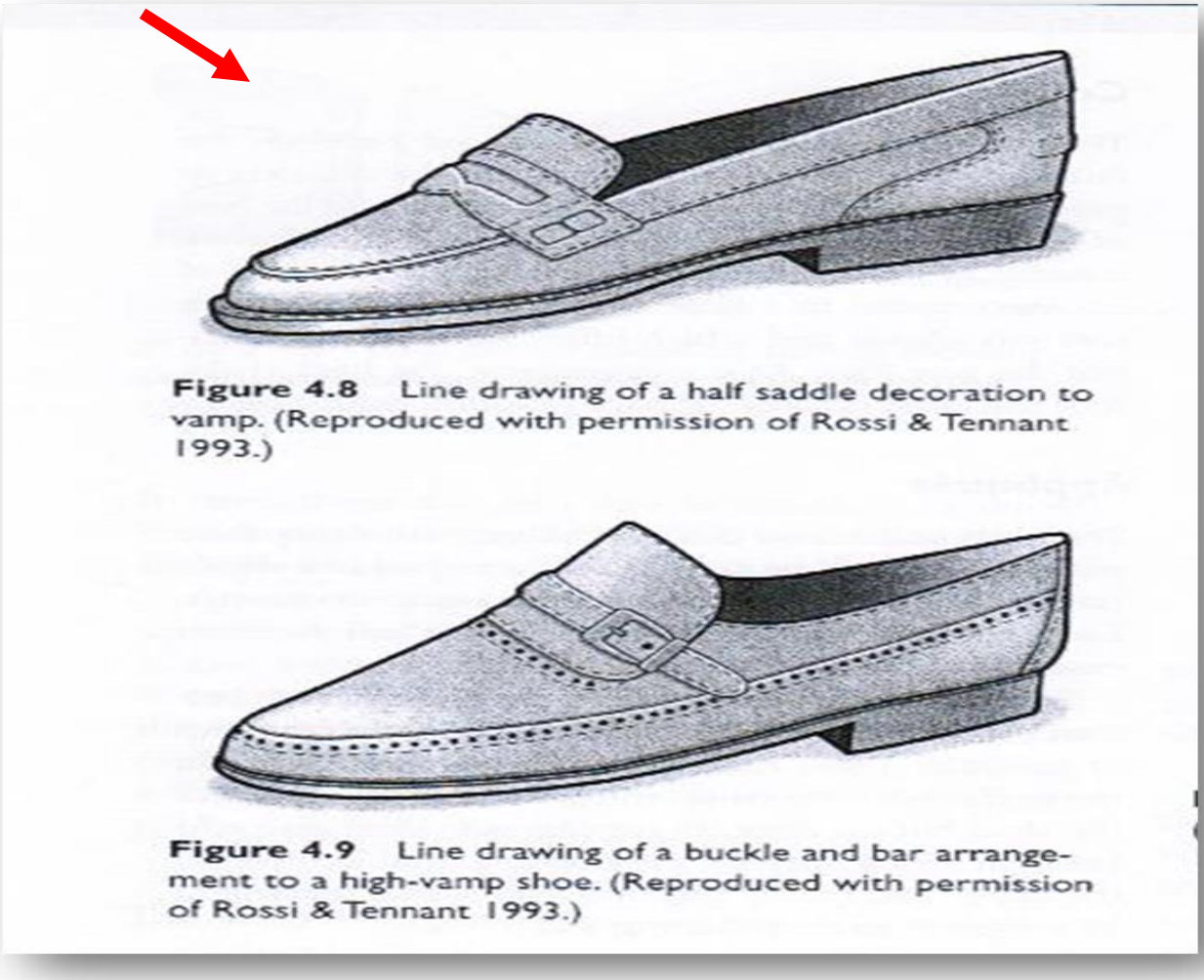


Figure 4.8 Line drawing of a half saddle decoration to vamp. (Reproduced with permission of Rossi & Tennant 1993.)

Figure 4.9 Line drawing of a buckle and bar arrangement to a high-vamp shoe. (Reproduced with permission of Rossi & Tennant 1993.)

Self-Check 4	Written Test

Instructions: Write all your answers in the provided answer sheet on pages 18.

Directions: Answer all the questions listed below. Examples may be necessary to aid some explanations/answers.

Test I: Very Short Answer Questions

1. Write down the name of different cut components of the shoe. (1points)
2. Define vamp? (1points)
3. Define quarter? (1 points)
4. How many quarter one shoe can have? (1 points)

LG#12	LO #3- Perform parallelogram area of the pattern

Instruction sheet

This learning guide is developed to provide you the necessary information regarding the following content coverage and topics:

- Describing fundamental of parallelogram method
- Performing zero degree method of the parallelogram.
- Performing 180 degree method of parallelogram.
- Describing the Selection method of the parallelogram.
- Describing and Performing determination of the parallelogram area.

This guide will also assist you to attain the learning outcomes stated in the cover page. Specifically, upon completion of this learning guide, you will be able to:

- Describe fundamental of parallelogram method
- Perform zero degree method of the parallelogram.
- Perform 180 degree method of parallelogram.
- Describe the Selection method of the parallelogram.
- Describe and Performing determination of the parallelogram area.

Learning Instructions:

Read the specific objectives of this Learning Guide.

- Read the specific objectives of this Learning Guide.
- Read the information written in the “Information Sheets 1”.
- Accomplish the “Self-check. Request the key answer / key to correction from your teacher or you can request your teacher to check it for you.
- If you earned a satisfactory evaluation proceed to “Information Sheet 2”. However, if your rating is unsatisfactory, see your teacher for further instructions or go back to Information Sheets 1.
- Read the information written in the “Information Sheet 2”.
- Accomplish the “Self-check 2”. Again you can request the key answer / key to correction from your teacher or you can request your teacher to check it for you.
- If you earned a satisfactory evaluation proceed to “Information Sheet 3”. However, if your rating is unsatisfactory, see your teacher for further instructions or go back to Information Sheet 2.
- Read the information written in the “Information Sheet 3”.
- Accomplish the “Self-check 3”. Request the key answer / key to correction from your teacher or you can request your teacher to check it for you.

- If you earned a satisfactory evaluation proceed to “Information Sheet 4”. However, if your rating is unsatisfactory, see your teacher for further instructions or go back to Information Sheet 3.
- Read the information written in the “Information Sheet 4”.
- Accomplish the “Self-check 4”. Request the key answer / key to correction from your teacher or you can request your teacher to check it for you.
- Read the information written in the “Information Sheet 5”.
- Accomplish the “Self-check 5”. Request the key answer / key to correction from your teacher or you can request your teacher to check it for you.

Information Sheet 1 Describing fundamental of parallelogram method

Introduction

In Euclidean geometry, a **parallelogram** is a simple (non self-intersecting) quadrilateral with two pairs of parallel sides. The opposite or facing sides of a parallelogram are of equal length and the opposite angles of a parallelogram are of equal measure. The congruence of opposite sides and opposite angles is a direct consequence of the Euclidean Parallel Postulate and neither condition can be proven without appealing to the Euclidean Parallel Postulate or one of its equivalent formulations. The three-dimensional counterpart of a parallelogram is a parallelepiped

Fundamental of parallelogram

Characterizations of parallelogram

A simple (non self-intersecting) quadrilateral is a parallelogram if and only if any one of the following statements is true:

- Two pairs of opposite sides are equal in length.
- Two pairs of opposite angles are equal in measure.
- The diagonals bisect each other.
- One pair of opposite sides are parallel and equal in length.
- Adjacent angles are supplementary.
- Each diagonal divides the quadrilateral into two congruent triangles with the same orientation.
- The sum of the squares of the sides equals the sum of the squares of the diagonals. (This is the parallelogram law.)

- It possesses rotational symmetry

Properties

- Opposite sides of a parallelogram are parallel (by definition) and so will never intersect.
- The area of a parallelogram is twice the area of a triangle created by one of its diagonals.
- The area of a parallelogram is also equal to the magnitude of the vector cross product of two adjacent sides.
- Any line through the midpoint of a parallelogram bisects the area.
- A parallelogram has rotational symmetry of order 2 (through 180°). If it also has two lines of reflectional symmetry then it must be a rhombus or an oblong.
- The perimeter of a parallelogram is $2(a + b)$ where a and b are the lengths of adjacent sides.
- The sum of the distances from any interior point of a parallelogram to the sides is independent of the location of the point. (This is an extension of Viviane's theorem). The converse also holds: If the sum of the distances from a point in the interior of a quadrilateral to the sides is independent of the location of the point, then the quadrilateral is a parallelogram.

Base Any side can be considered a base. Choose any one you like. If used to calculate the area (see below) the corresponding altitude must be used. In the figure below, one of the four possible bases and its corresponding altitude has been chosen.

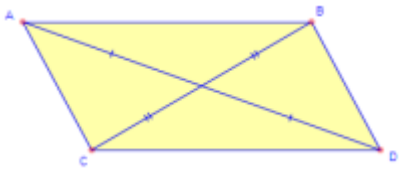
Altitude (height) The altitude (or height) of a parallelogram is the perpendicular distance from the base to the opposite side (which may have to be extended).

Area The area of a parallelogram can be found by multiplying a base by the corresponding altitude. See also Area of a Parallelogram

Perimeter The distance around the parallelogram. The sum of its sides. See also Perimeter of a Parallelogram

Oppositesides Opposite sides are congruent (equal in length). As you reshape the parallelogram at the top of the page, note how the opposite sides are always the same length.

Diagonals Each diagonal cuts the other diagonal into two equal parts, as in the diagram below. See Diagonals of a parallelogram for an interactive demonstration of this.



Interior angles

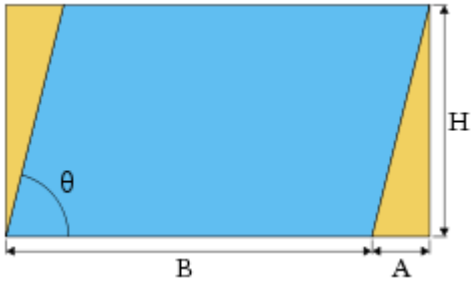
1. Opposite angles are equal as can be seen below.
2. Consecutive angles are always supplementary (add to 180°)

Types of parallelogram

- Rhomboid – A quadrilateral whose opposite sides are parallel and adjacent sides are unequal, and whose angles are not right angles
- Rectangle – A parallelogram with four angles of equal size

- Rhombus – A parallelogram with four sides of equal length.
- Square – A parallelogram with four sides of equal length and four angles of equal size (right angles).

Area formulas



The area of the parallelogram is the area of the blue region, which is the interior of the parallelogram

- The area *K* of the parallelogram to the right (the blue area) is the total area of the rectangle less the area of the two orange triangles.

The area of the rectangle is

$$A_{\text{rect}} = (B + A) \times H$$

and the area of a single orange triangle is

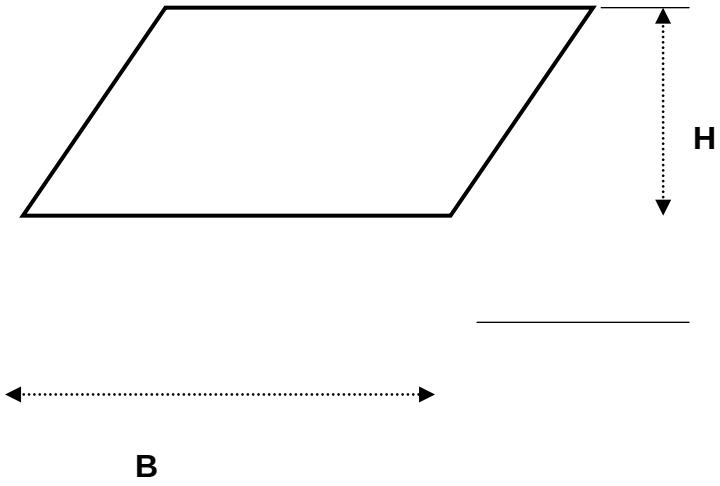
$$A_{\text{tri}} = \frac{1}{2} A \times H.$$

Therefore, the area of the parallelogram is

$$\begin{aligned} K &= A_{\text{rect}} - 2 \times A_{\text{tri}} \\ &= ((B + A) \times H) - (A \times H) \\ &= B \times H \end{aligned}$$

Area of parallelogram

Simply The formula used to calculate the area of parallelogram



Area of parallelogram (pattern scale area) (K) = B*H

H= perpendicular height of parallelogram to base (Cm)

B = base of parallelogram (Cm)

Self-Check 1	Written Test

Instructions: Write all your answers in the provided answer sheet on pages 8.

Test I: Short Answer Questions

Directions: Answer all the questions listed below. Examples may be necessary to aid some explanations/answers.

1. What is parallelogram?(2 points)
2. Write the two properties of parallelogram(2 points)
3. Discuss the interior angles of parallelogram?(2 points)

Test II: Multiple Choice

Directions:

1. There are three [3] questions in Test II. Select the best answer for each question and write only the letter that corresponds to your answer in the provided answer sheet.
2. A correct answer scores 2 point and an incorrect answer scores 0 point. No marks will be given for a question if more than one answer is supplied.

Start here:

5. Which one is not true about parallelogram……

   I. Opposite sides are parallel

   J. Adjacent angle are complementary

   K. Any line through midpoint of parallelogram bisects the area

   L. Except B all are correct

6. One of the following is not a parallelogram?

I. Rectangle

J. Square

K. Rhombus

L. all

Test 3: Matching

Directions:

1. Match the column A and B, write only the letter that corresponds to your answer in the provided answer sheet.
2. A correct answer scores 1 point and an incorrect answer scores 0 point. No marks will be given for a question if more than one answer is supplied.

A	B
1. Base	a. equal in length
2. Altitude	b. sum of all sides
3. Perimeter	c. any side of parallelogram
4. Opposite sides	d. perpendicular distance from base to opposite side

Score = _____ Rating: _____

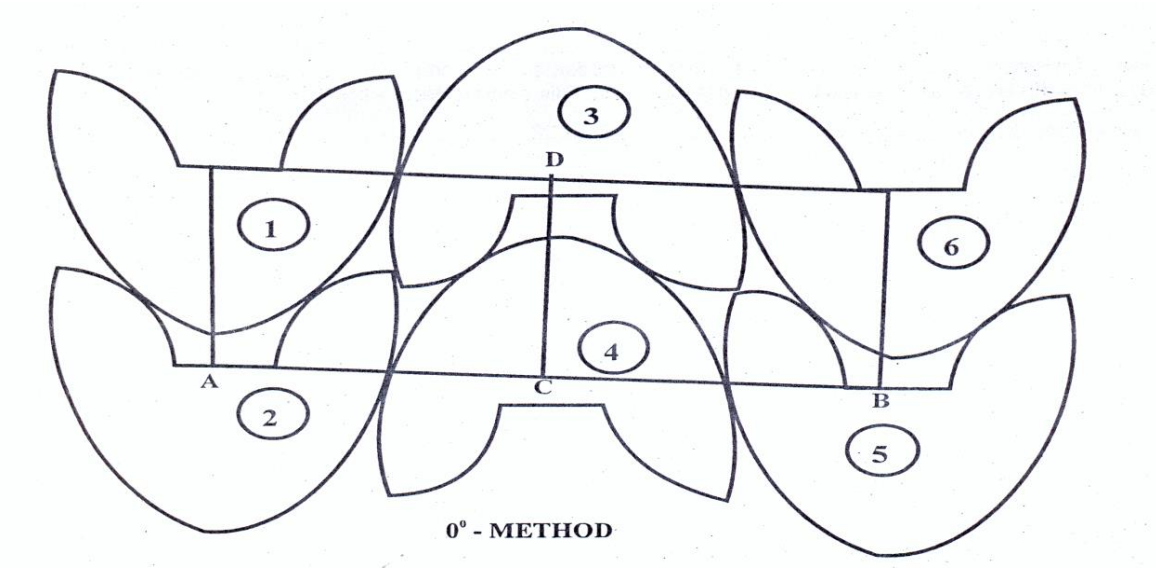
Note: **Satisfactory rating – 100%**

You can ask you teacher for the copy of the correct answers.

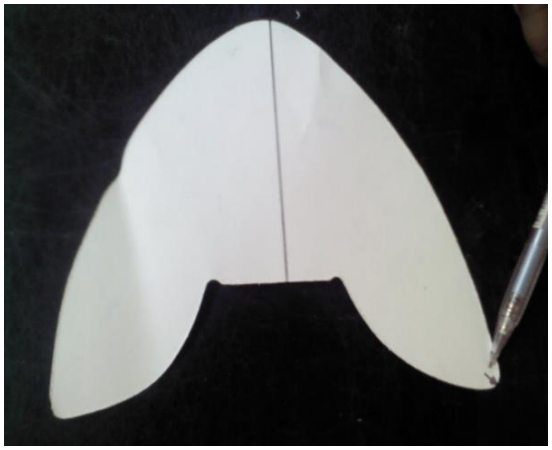
Information Sheet 2 Performing zero degree method of the parallelogram.

PATTERN SCALING FOR 0 METHOD

Steps are as follows:

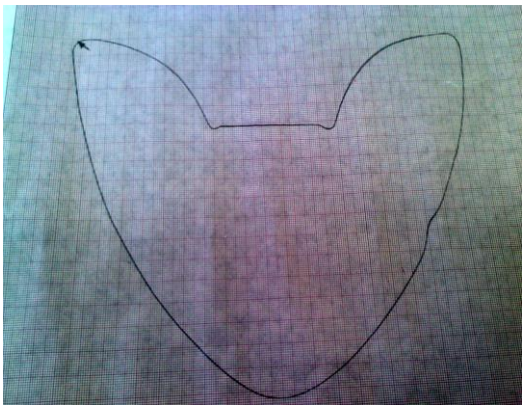


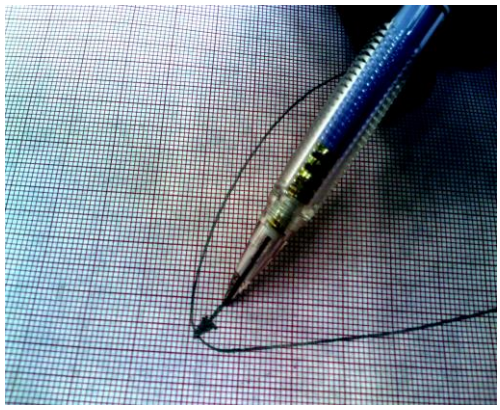
1. Trace the straight line and mark location point on the pattern

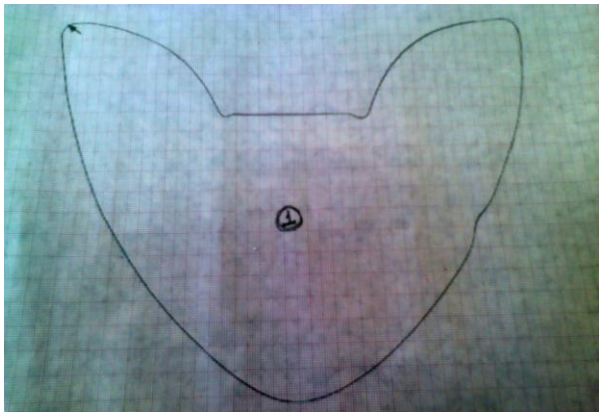


2. Lay the pattern to be traced down on the graph paper in such a way that the line on the pattern is aligned with the line on the paper.

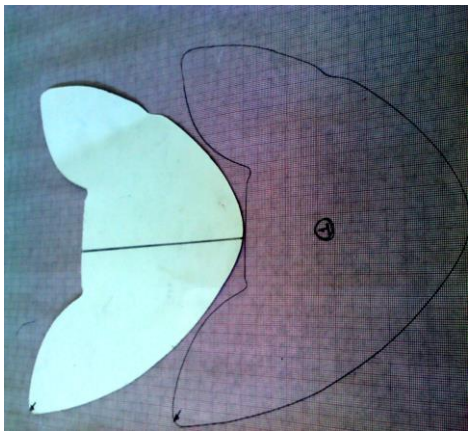
3. Trace round the pattern with a sharp pencil to get a clear line, mark the location point.

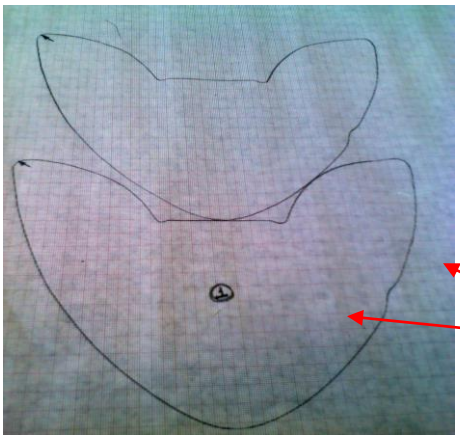






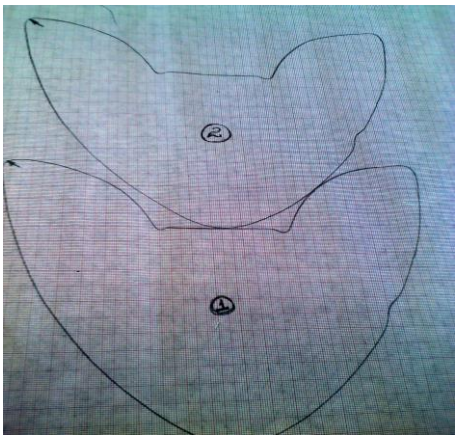
4. The next tracing is drawn in the same way as no.1 in the same direction (i.e. without rotating). Second pattern should touch the first pattern at two possible points.

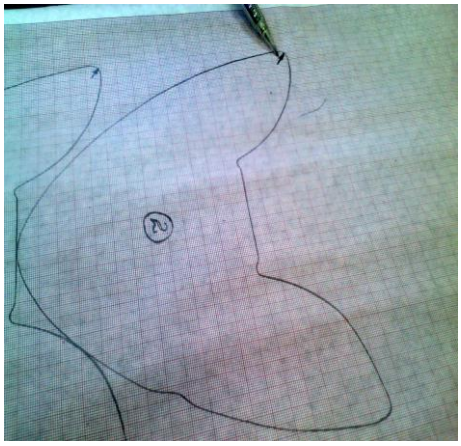




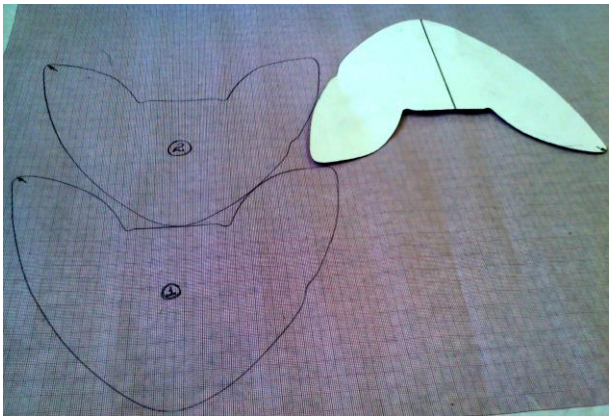
Points of

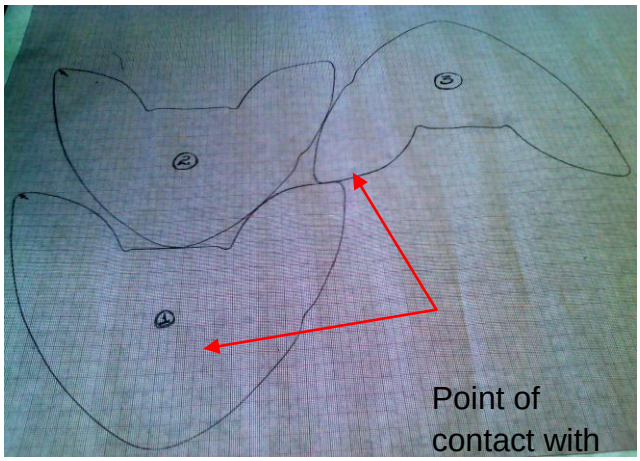
5. Mark the location point and number as pattern no.2.



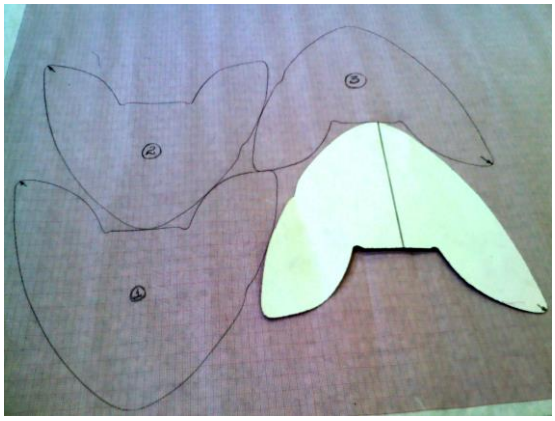


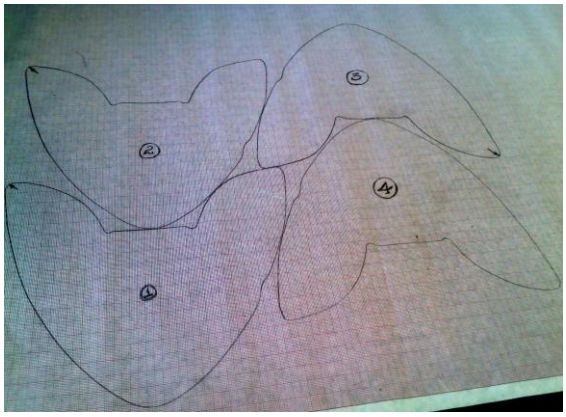
6. To trace the 3rd pattern, the pattern is rotated by 180 and it must touch 1st & 2nd at least at two points, in either direction, aligning the center line. The location points and number is marked.



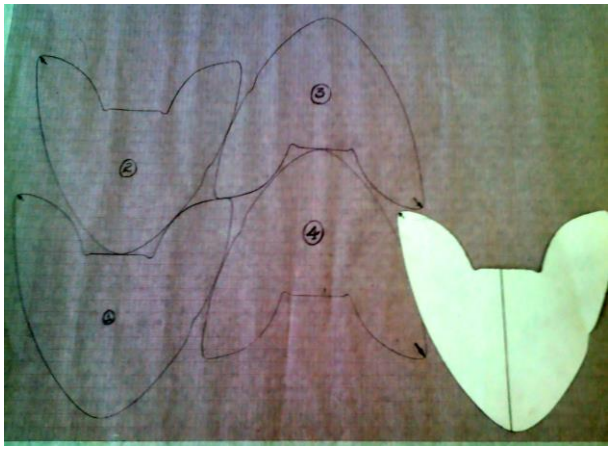


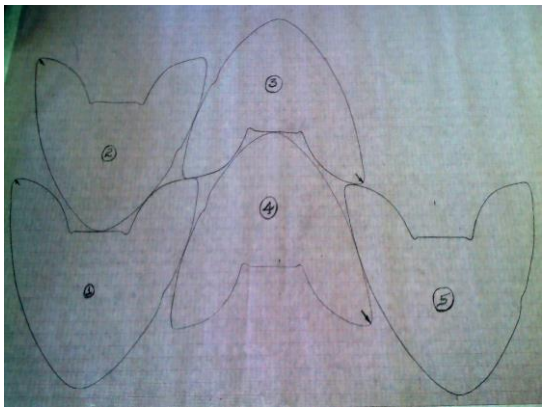
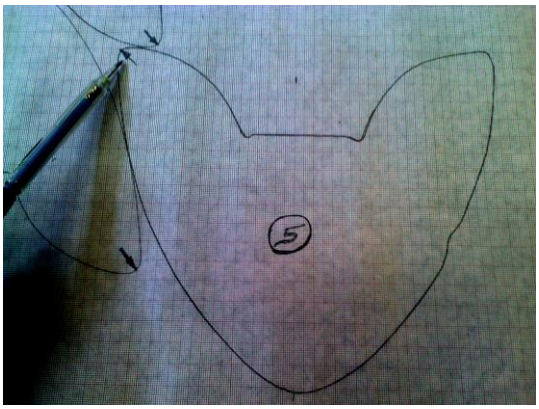
7. The 4th tracing will be same as no.3 and it must touch 1 & 3 & 2 & 3, at least at two points. Location point is marked and number as 4.



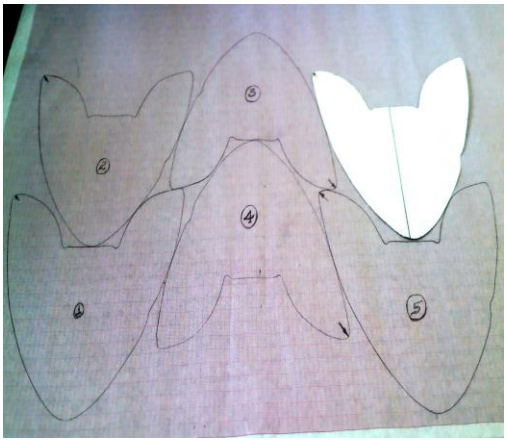
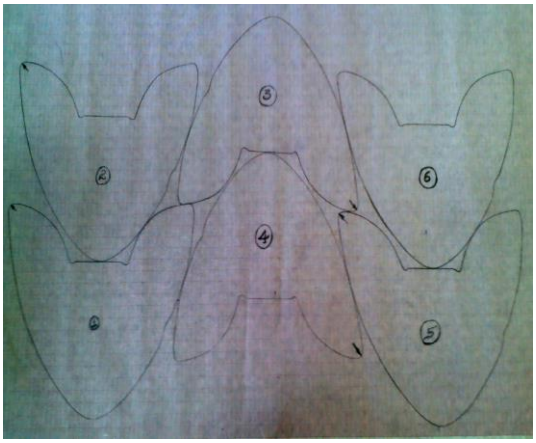


8. The 5th pattern is again rotated by 180 i.e. in the same direction as no.1. It should touch 3 & 4 at least at two points.

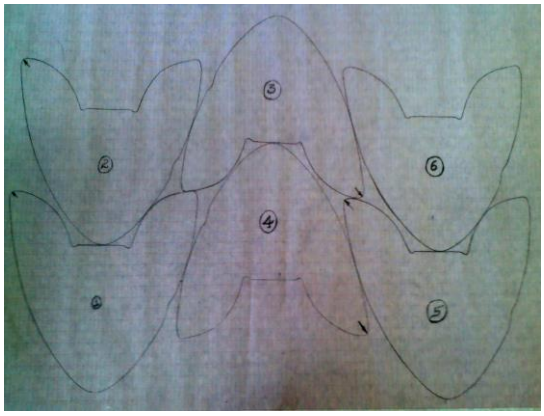
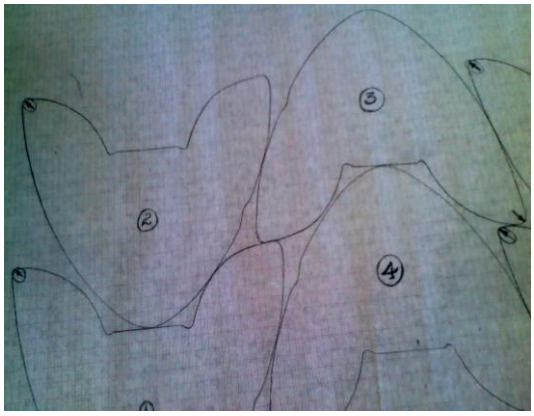


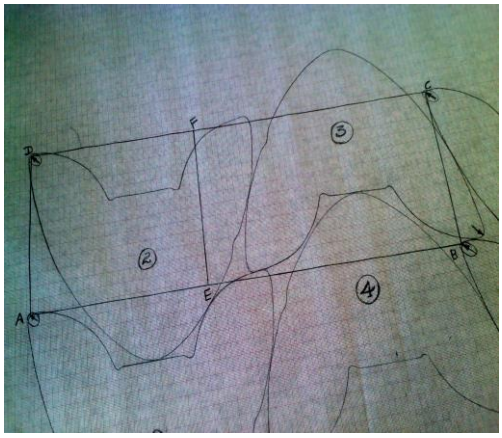
9. The 6th tracing must face the same direction as No.5 and touch 4 & 5, or 3 & 5 at least at two points.

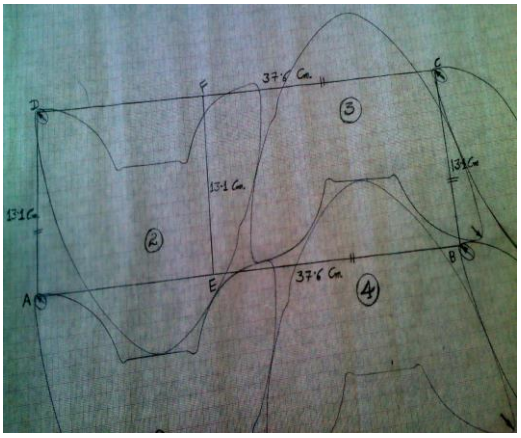



10. The sequence is repeated until a nest of interlocking patterns is produced that has four patterns facing in the same way.

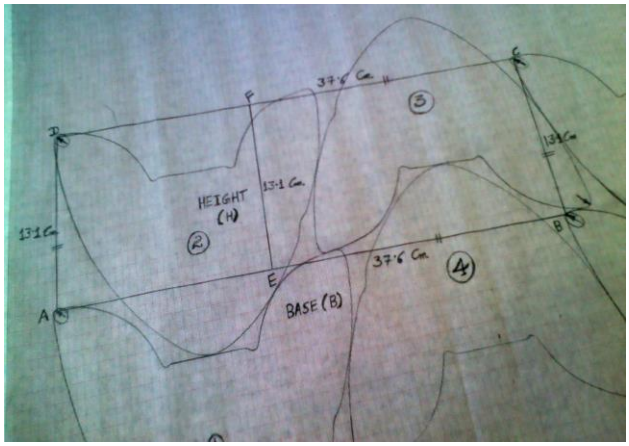



11. A parallelogram is drawn using like points on the four patterns as corners.





12. The area of the parallelogram is calculated (length & height) and this is used as the basis for allowance calculation. The area of parallelogram A(ABCD) is called the scale area of the pattern item.



Area of parallelogram (ABCD) = base (B) * height (H)

= AB * EF

= 37.6 cm * 13.1 cm

= 492.56 sq. cm.

= 492.56/100

=4.9256 SDM

A close examination of this area will show that is contains two complete patterns and the unavoidable waste. If the assessor has chosen the most economical interlock, this

should be the smallest area from which the pattern can be cut. Each pattern item is the shoe set is measured in this way.

Summary of 0 Degree Method

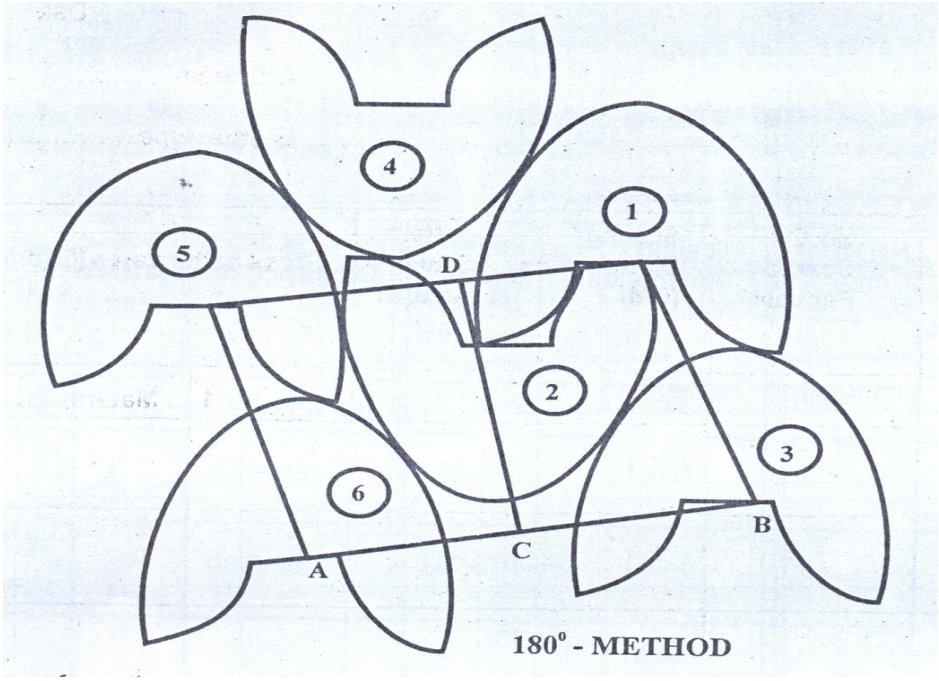
0 Degree Method

- Trace pattern 1on graph sheet aligning the center line. Mark the location point
- Trace the second pattern aligning at o degree with the first. Mark the location point
- Trace the third pattern rotating at 180 degree and mark the location point. The third pattern must touch the first and second pattern at minimum two points
- Trace the fourth pattern in the same direction as pattern three touching pattern 3 and 2 at minimum two points. Mark the location point
- Trace the fifth pattern rotating at 180 degree method touching pattern 2 and 4 at minimum two points. Mark the location point
- Trace the sixth pattern in the same direction as pattern five touching pattern 4 and 5 at minimum two points. Mark the location point
- Note pattern 1,2 ,5 and 6 are in the same direction

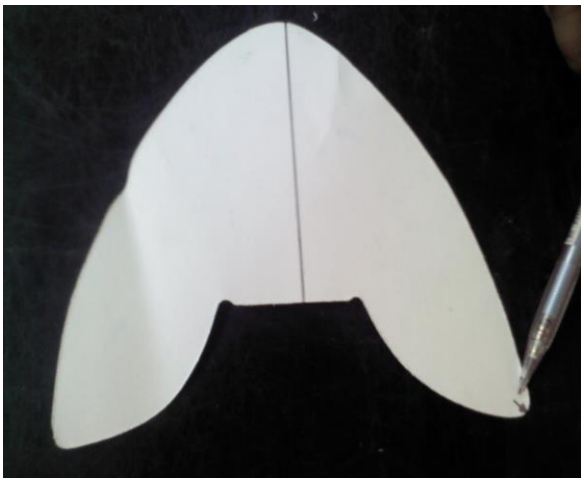
Information Sheet 3 Performing 180 degree method of parallelogram.

PATTERN SCALING FOR 180^{O} METHOD:

The steps are as follows:

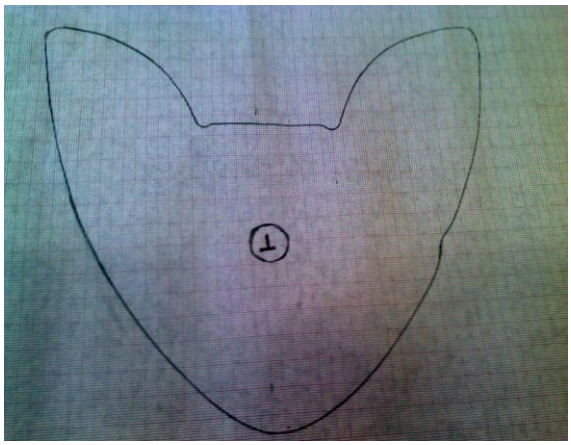


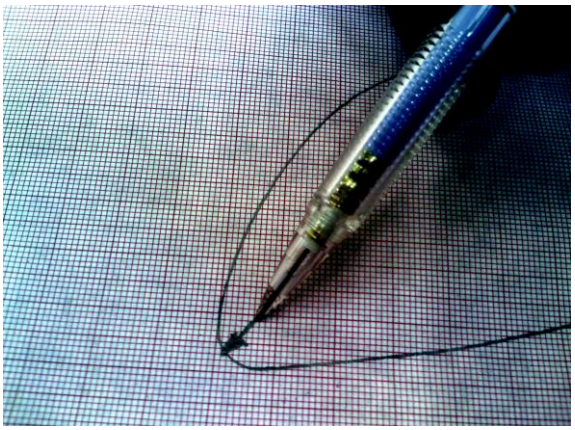
1. Trace the straight line and mark location point on the pattern



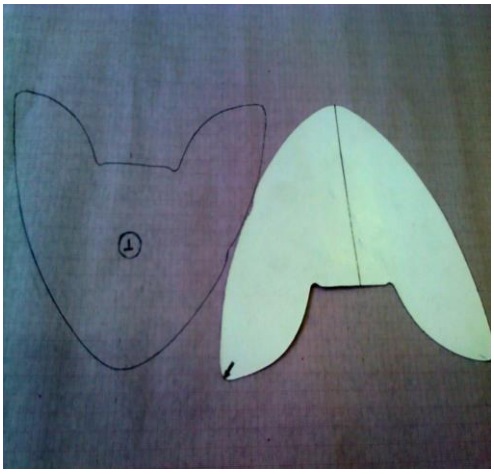
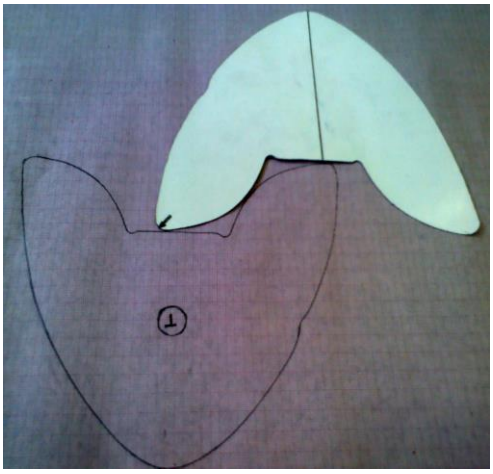
2. Lay the pattern to be traced down on the graph paper in such a way that the line on the pattern is aligned with the line on the paper.

3. Trace round the 1ST pattern with a sharp pencil to get a clear line, mark the location point.

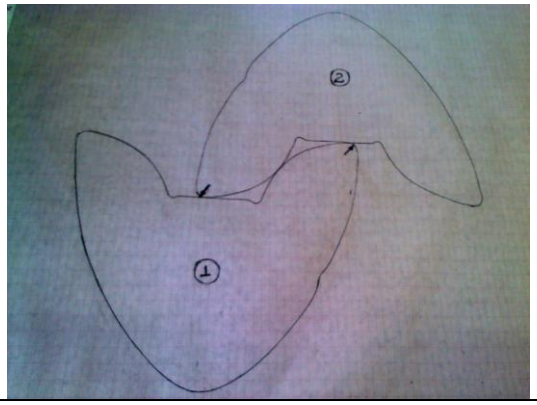




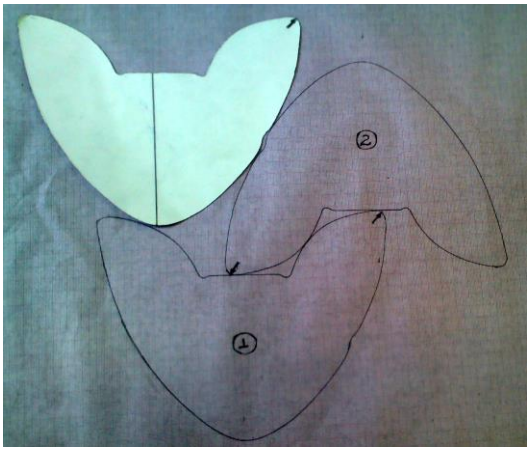
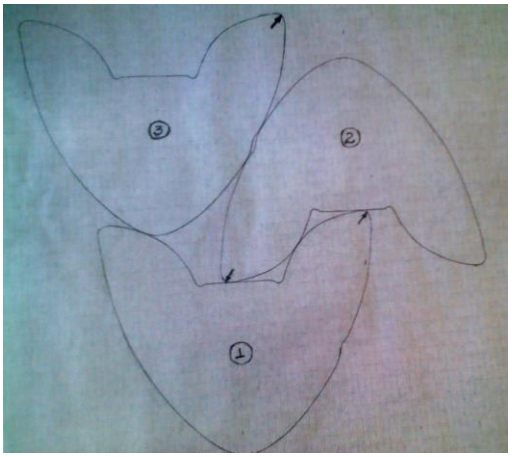
4. The 2nd pattern is then rotated through exactly 180Oand interlocking with the first pattern. The second traces must touch the 1st at least two points. Mark the location points on the tracing and mark the trace no.2

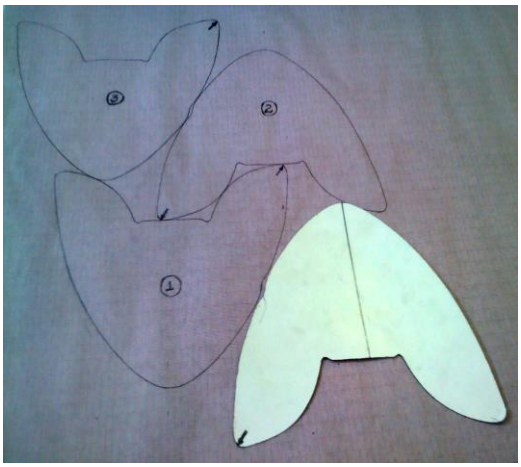
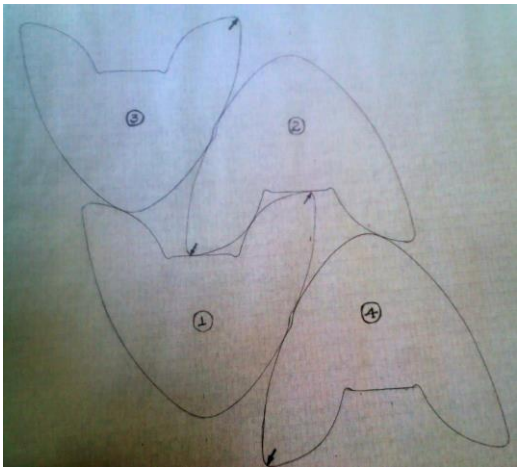
Look two interlocking types both are 180 degree methods in the first case wastage is high and point of contact between two trace is not more than one; in second case wastage is low and point of contact between two trace is more than one



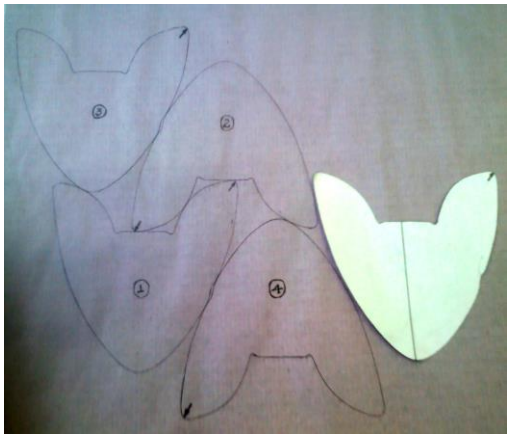
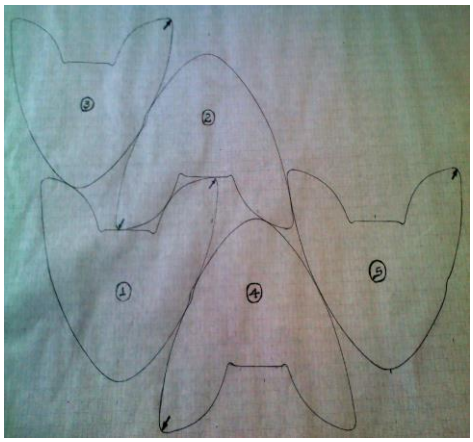
5. 3rd trace again rotated through 180^0 and a 3rd pattern is drawn so that it touches both 1st & 2nd at least two points, in either direction. (Depends on the availability of space on the graph for further pattern). Number it trace no. 3

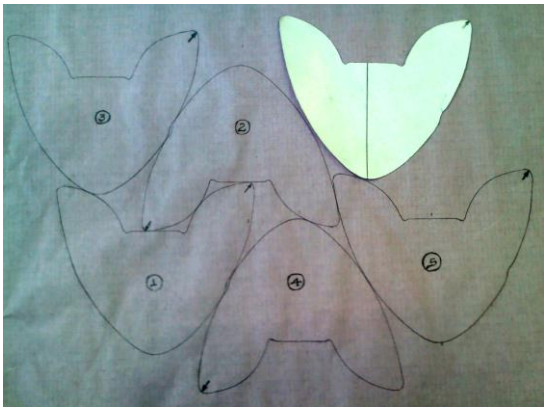
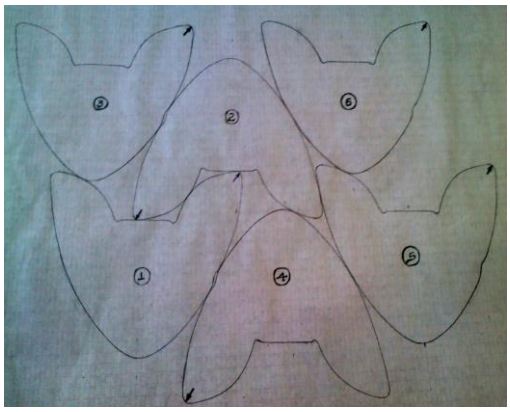
6. Interlock the 4th tracing. This should be interlocked with either 1st &2nd or 2nd & 3rd, but should touch any of them at least two points trace round and Mark the location points and number this trace no.4.

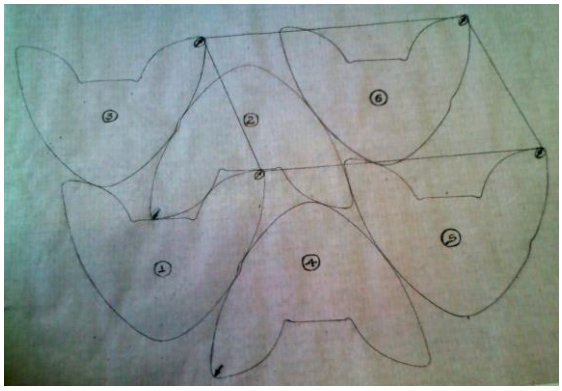
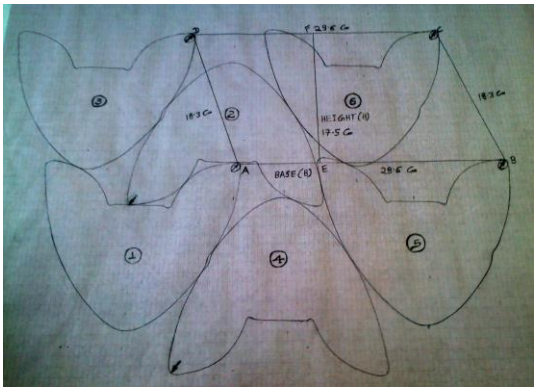
7. The fifth trace must face the same direction as no.1 and should touch 2nd &4th; tracing at least one point each it must face the two tracing in opposite direction. Mark the location points and number this trace no.5.

8. The sixth trace faces the same way as no .5 should touch 2nd&5th or 4th &5th, Mark the location points and number this trace no.6.thus, one ends up with 4 tracing the same direction and two in the opposite direction.

9. A parallelogram is drawn using like points on the four patterns as corners of the parallelogram.

Area of parallelogram (ABCD) = base (B) * height (H)

= AB * EF

= 29.6 cm * 17.5 cm

= 518 sq. cm.

= 518/100 = 5.18 SDM

Summary of 180 Degree Method

- Trace pattern 1 on graph sheet aligning the center line. Mark the location point
- Trace the second pattern aligning at 180 degree with the first. Mark the location point
- Trace the third pattern rotating at 180 degree and mark the location point. The third pattern must touch the first and second pattern at minimum two points
- Trace the fourth pattern rotating at 180 degree touching pattern 3 and 2 or pattern 1 and 3 at minimum two points. Mark the location point
- Trace the fifth pattern rotating at 180 degree touching pattern 2 and 4 at minimum two points. Mark the location point
- Trace the sixth pattern in the same direction as pattern five touching pattern 4 and 5 or 2 and 5 at minimum two points. Mark the location point
- Note pattern 1,3 ,5 and 6 are in the same direction

Information Sheet 4 Describing the Selection method of the parallelogram.

Introduction

There are two methods available to construct parallelogram using different shapes of patterns. The Selection of method of construction of parallelogram depends on the economical interlocking of patterns i.e. minimum wastage interlocking.

The selection carried out

PREPARATION

i) If you are using computer paper, tape the lined paper together. If using a graph paper 100mm x 100 mm is needed.

ii) Draw a straight line through the upper pattern supplied.

iii) Draw the location points for future reference and all parts to be traced anywhere on the centre of the paper.

iv) Always use the same foot when tracing i.e. the pattern should not be turned over.

v) Trace the pattern on the graph paper

vi) Check both methods (0 and 180 degree) to the minimum wastage interlocking (economical interlocking) and select the methods with minimum wastage.

vii) Use the economical methods until the end

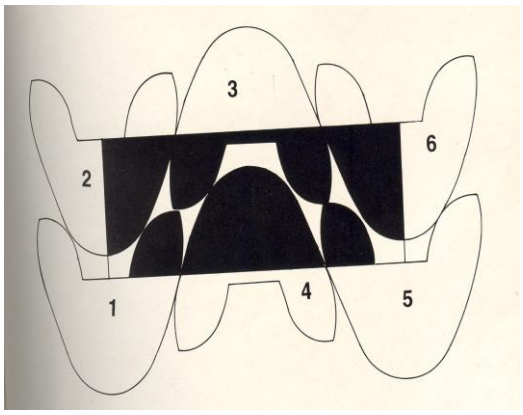
viii) Different pattern can use different methods based on the shape of the pattern

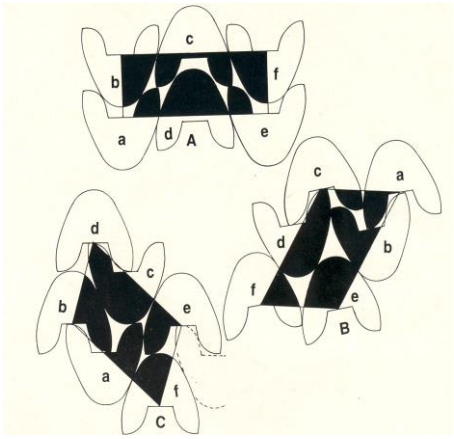
The two methods available for constructing parallelogram is:-

1. 0 degree methods
2. 180 degree methods

The degree i.e. 0° or 180° signifies whether the patterns while making 11 gm are placed in the same direction as the first on i.e. at 0~ or rotated by 180~.

The assessor must make a judgment as to which is the most economical interlock.


3
2
6
1
4
5


c
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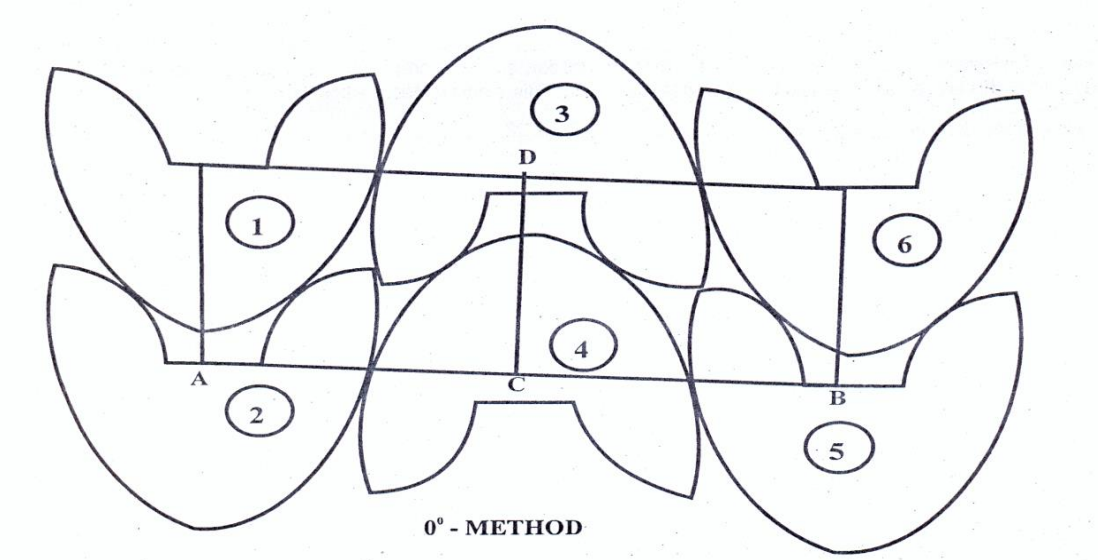
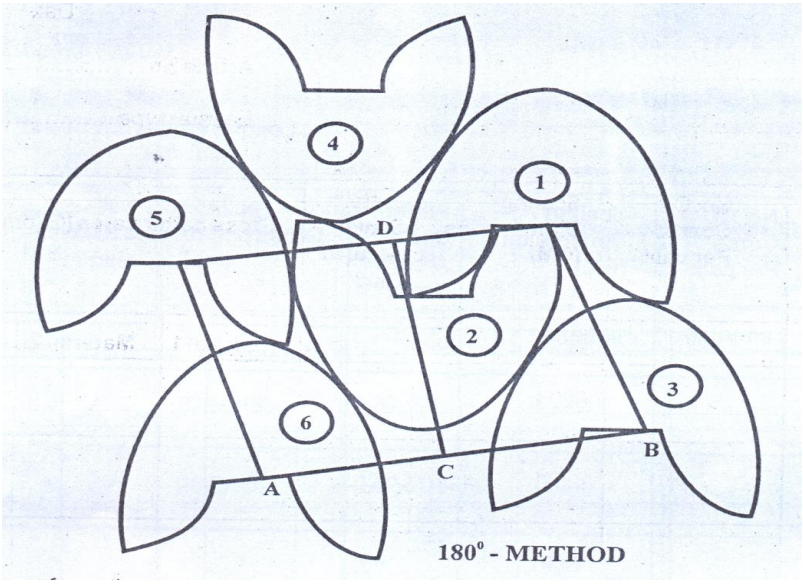

3
D
1
6
4
A
C
B
2
5
0° - METHOD


4
1
5
D
2
3
6
B
C
A
180° - METHOD

Self-Check 4	Written Test

Instructions: Write all your answers in the provided answer sheet on pages 12.

Directions: Answer all the questions listed below. Examples may be necessary to aid some explanations/answers. (Total marks 5)

Test I: One word answers:

5. Write the one method used to construct parallelogram. (1point)
6. What is the criteria to select from 0 and 180 degree method of parallelogram constructing using a pattern? (1 point)
7. What is the use of location point? (1 point)

Test II: Fill in the blanks:

1. The ---------- should not be turned over. (1 point)
2. Different pattern can use ---------- based on the shape of the pattern. (1 point)

Score = _____

Rating: _____

Note: **Satisfactory rating – 100%**

You can ask you teacher for the copy of the correct answers.

Information Sheet 5 Describing and Performing determination of the parallelogram area.

Introduction

Measurement of scale area of the pattern - For calculating pattern area or scale area each pattern item is first assessed separately by arranging it in a sequence of interlocking patterns. The objective is to get a parallelogram with the patterns, the area of which includes two patterns area and the interlocking waste.

Russ & Small method

Introduction

By Russ & Small Method, we calculate the area of one pair of patterns on graph sheet by 0° or 180° whichever is suitable and then by applying certain formulas the costing norm of a particular style is calculated. This is a scientific method of costing. The entire process takes place in three steps

1. Calculation of scale area called as S which is area of one pair of pattern + first waste which is the unavoidable waste due to irregularity in shape of the pattern.

2. Calculation of gross area which is called as G which is scale area + second waste

3. Calculation of costing norm is equal to total gross area + third waste which is grade waste.

Determining area of parallelogram (RSM)

Measurement of scale area of the pattern - For calculating pattern area or scale area each pattern item is first assessed separately by arranging it in a sequence of interlocking patterns. The objective is to get a parallelogram with the patterns, the area of which includes two patterns area and the interlocking waste.

There is a kind of rules for arranging the patterns to make a parallelogram. Two methods are normally adopted for this.

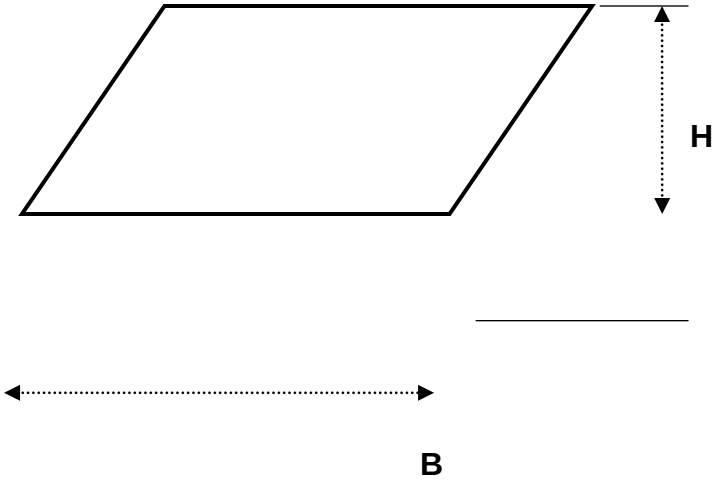
1. 0° method
2. 180° method

The degree i.e. 0° or 180° signifies whether the patterns while making parallelogram are placed in the same direction as the first on i.e.at 0° or rotated by 180°.

The assessor must make a judgment as to which is the most economical interlock.

Area of parallelogram

The formula used to calculate the area of parallelogram



Area of parallelogram (pattern scale area) (S) = B*H

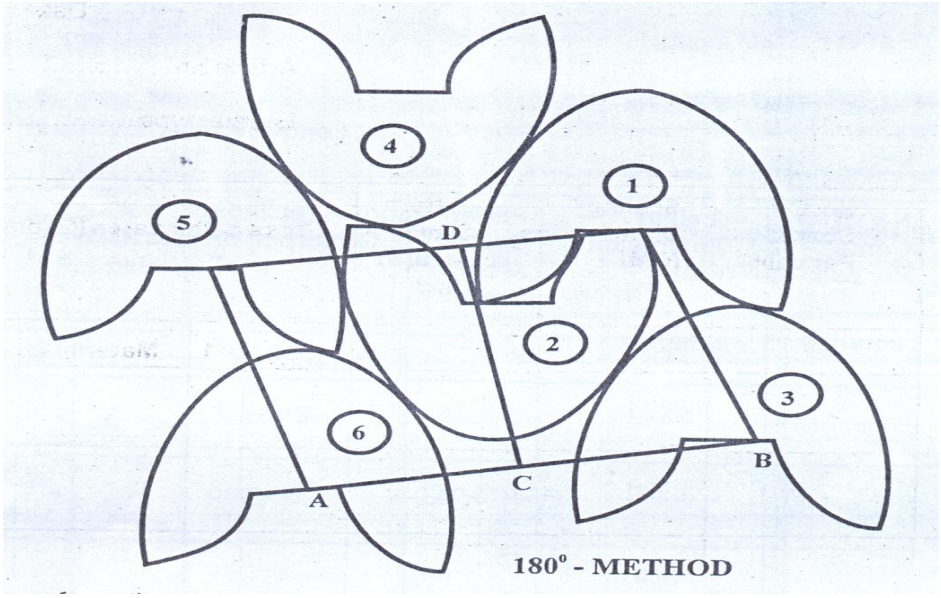
H= perpendicular height of parallelogram to base

B = base of parallelogram

Pattern scale area is described in sq. decimeter.

NOTE:-

1 sq. decimeter = 100 sq. centimeter



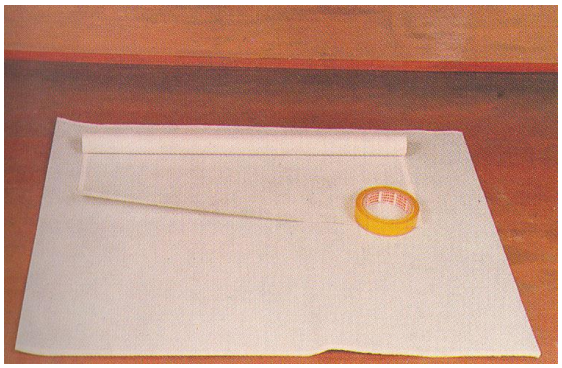
The area of the parallelogram includes the two full pattern areas and first wastage (wastage between two patterns due to the shape of the pattern).

Area of the parallelogram (S) = AB * CD Sq.Cm.

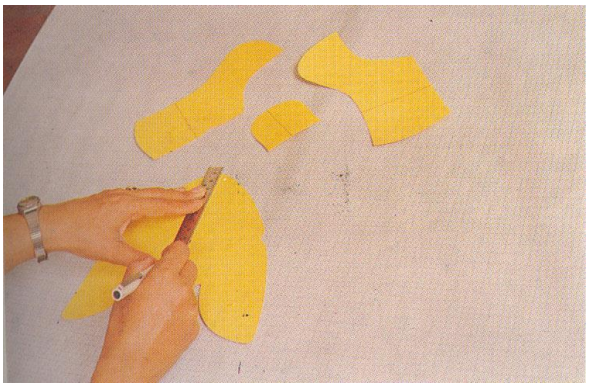
Area of the parallelogram (S) = AB * CD /100 SDM

Preparation

If you are using computer paper, tape the lined paper together. If using a graph paper 100 mm × 100 mm is needed.

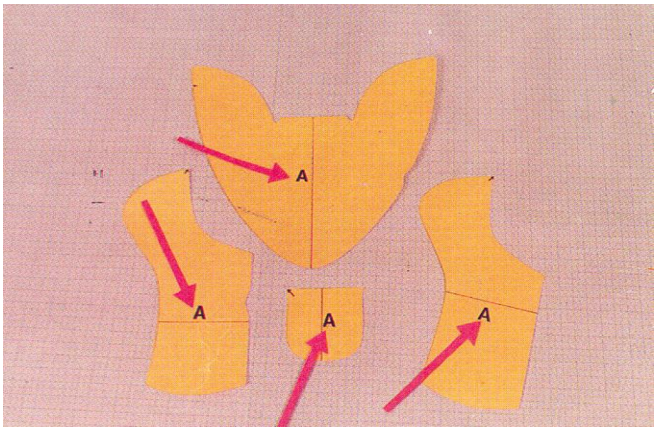


Draw a straight line through the upper pattern supplied.



Draw the location points for future reference and all parts to be traced anywhere on the center of the paper.

Always use the same foot when tracing i.e. the pattern should not be turned over.



Self-Check 5	Written Test

Instructions: Write all your answers in the provided answer sheet on pages 12.

Test I: One word Answer Questions

Directions: Answer all the questions listed below. Examples may be necessary to aid some explanations/answers.

1. Write the is the formula used to calculate area of parallelogram.(1 points)
2. Write types of wastage included in parallelogram method of consumption calculation?(1 points)
3. Write the formula used to convert the area of parallelogram from sq.cm. to sdm?(1 points)
4. What are methods used for arranging patterns to make a parallelogram?(1 points)

Test II: Multiple Choice

Directions:

- There are three [3] questions in Test II. Select the best answer for each question and write only the letter that corresponds to your answer in the provided answer sheet.

- A correct answer scores 2 point and an incorrect answer scores 0 point. No marks will be given for a question if more than one answer is supplied.

Start here:

1. Parallelogram methods is called……

   A. RSM

   B. Square methods

   C. Graphical methods

   D. All of the above

2. Which of the following statement is wrong?

   A. The Grade A leather cutting value is 97-100%

   B. The wastage of grade b leather is 10 %

   C. The Cutting value of grade F leather is 72-76%

   D. The wastage of grade E leather is 19-23 %

3. Third wastage is……

   A. Wastage between patterns due to irregularity in shapes of pattern

   B. Wastage due to size of leather

   C. Allowance added due to grade wastage

   D. None of the above

Score = _____

Rating: _____

Note: **Satisfactory rating – 100%**

You can ask you teacher for the copy of the correct answers

LG#13	**LO #4- Determine second wastage**
Instruction sheet	

This learning guide is developed to provide you the necessary information regarding the following content coverage and topics:

- Determining size of leather.
- Describing relationship between pattern area and leather size.
- Describing the use methods applicable to different types of leather and patterns condition.
- Performing second waste computation.

This guide will also assist you to attain the learning outcomes stated in the cover page. Specifically, upon completion of this learning guide, you will be able to:

- Determine size of leather.
- Describe relationship between pattern area and leather size.
- Describe the use methods applicable to different types of leather and patterns condition.
- Perform second waste computation.

Learning Instructions:

Read the specific objectives of this Learning Guide.

- Read the specific objectives of this Learning Guide.
- Read the information written in the “Information Sheets 1”.
- Accomplish the “Self-check. Request the key answer / key to correction from your teacher or you can request your teacher to check it for you.
- If you earned a satisfactory evaluation proceed to “Information Sheet 2”. However, if your rating is unsatisfactory, see your teacher for further instructions or go back to Information Sheets 1.
- Read the information written in the “Information Sheet 2”.
- Accomplish the “Self-check 2”. Again you can request the key answer / key to correction from your teacher or you can request your teacher to check it for you.
- If you earned a satisfactory evaluation proceed to “Information Sheet 3”. However, if your rating is unsatisfactory, see your teacher for further instructions or go back to Information Sheet 2.
- Read the information written in the “Information Sheet 3”.
- Accomplish the “Self-check 3”. Request the key answer / key to correction from your teacher or you can request your teacher to check it for you.
- Read the information written in the “Information Sheet 3”.

- Accomplish the “Self-check 3”. Request the key answer / key to correction from your teacher or you can request your teacher to check it for you.

Information Sheet 1 Determining size of leather

Introduction

We purchase leather from tanneries. In most cases, we sell it in the exact form we receive from the tannery. The leather industry has general terms applied to the various ways that leather is sold by, such as side, hide, skin, split, belly, etc. The actual size of these is determined by measuring devices at the tannery. As the size of each side, hide, skin, split or belly varies the size the product you order may vary.

There are different sizes of leather used in footwear manufacturing industries. The size of leather depends on the age and size of animals. There are different types of animals leather used in foot wear manufacturing industries; these are cow, sheep, goat, camel, buffalo, horse, pig, crocodiles, ostrich, and etc. are used in foot wear industry.

Size of leather

Leather type	Properties	Size range	use	
Cow	durable and rough grain surface up on the age	Size 25-30 sq.ft., thickness 1.3-3 mm	Used for making shoe and goods	Mostly used for upper making
Sheep	finer and tougher grain surface	Size 2-10 sq.ft. thickness 0.4-1.2 mm	Used for men's ,ladies upper & lining and garments	Mostly used for lining making
Goat	Strong and have a very hard-wearing grain	size 2-10 sq.ft and thickness 0.4-1.2 mm	Used for making high quality dress shoes, glove	Old goat skin is used for making suede and printed leather
Buffalo	durable and rough grain surface up on the age	Size 25-30 sq.ft, thickness 1.3-3 mm	Used for making shoe and goods	Mostly used for upper making

Grain - The epidermis or outer layer of animal skins.

Full Grain - Leather that is just as it was when taken off the animal. Only the hair has been removed and the grain or epidermis is left on.

Note: Only full grain, vegetable tanned leather will absorb water and tool correctly. All leather carving and tooling must be done on full grain leather.

Top Grain - Top grain leather has often been sanded to remove scars and then sprayed or pasted to "cover up" the work. Top grain is not the same as "Full Grain" leather.

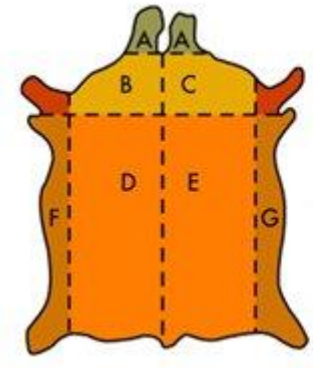
Split - This refers to the under section of a piece of leather that has been split into two or more thicknesses. Splits are usually embossed with a design and finished or seeded.

Suede Split - Leather that has been sanded to produce a nap.

Back - A side with the belly cut off, usually 15 to 18 sq. ft.

Belly - The lower part of a side, usually 4 to 8 sq. ft.

Kip - The skin of a large calf, usually 9 to 17 sq. ft.



Subdivisions of Leather

Belly.....F or G
Single Bend .....D or E
Double Back .....B+C+D+E+A
Side .....A+B+D+F or A+C+E+G
Back.....A+B+D or A+C+E
Double Shoulder..B+C
Single Shoulder...A+B or A+C

Other types of leather may be:

Cow Aniline Softy Leather

- available for both Leather Goods and Leather Shoe. It has its own characteristics of softy leather like softness, fullness. It should not result like grain break and sugary effects while production. Substance from 0.9 mm to 1.0 mm. size ranges from 12 to 14 sq.ft per cow side.

Cow Corrected Grain Softy Leather

Impregnated leather without grain break, looseness and sugary effects. Substance from 1.0 mm to 1.2 mm. size ranges 14 sq.ft per cow side.

Cow Full Grain Softy Leather

Regular type of softy leather with Micro fine or Don bush plated on the grain surface to get more cutting value. Available for both leather footwear and leather goods it should not result like grain break and sugary effects while production. Regarding substance and size we recommend our customers 0.9 mm to 1.0 mm in thickness with size range of 14 to 16 sq.ft per cow side.

Cow Natural Milled Leather

Cow's skin is one of the premium grades of raw materials available around the world. Full chrome cow leather is available in various finishes and colors. It is available in natural milled type and in different colors. Substance of the skin varies from 0.8 mm to 1.5 mm with an average size of 13 to 18 Sq.ft per side.

Cow Printed and Milled Leather

It has softness, roundness and fullness like natural milled leather with waxy, oily and buttery touch. To have more cutting value it is printed in different prints and dry milled to get the surface as possible as natural Substance of the skin vary from 1.1 mm to 1.4 mm with an average size of 14 to 16 Sq.ft per side.

Full Chrome Cow Printed Leather

Printed leather with required softness and fullness. The leather has a unique property of flatness with substances from 0.8 mm to 1.4 mm with an average size of 14 to 17 Sq.ft per side.

Self-Check 1	Written Test

Instructions: Write all your answers in the provided answer sheet on pages 7.

Test I: Short Answer Questions (total marks 8)

Directions: Answer all the questions listed below.

11. Fill in the blanks: (4 marks)

1. Size range of cow leather is ----------.
2. Size range of buffalo leather is ----------.
3. Size range of goat leather is ----------.
4. Size range of sheep leather is ----------.

12. Very Short answer questions:- (4 marks)

1. On what factors size of leather depends?
2. Write down one property of goat leather.
3. What is the grain layer?
4. What is the area range of belly?

Score = _____

Rating: _____

Note: **Satisfactory rating – 100%**

You can ask you teacher for the copy of the correct answers.

Information Sheet 2 Describing relationship between pattern area and leather size

Pattern area:-

This is the actual net area of the individual pattern item comprising the upper and the first waste or interlocking waste. The first waste is declined as the space left between two pattern pieces, when interlocked together, due to irregularities in shape.

This is also called “scale area” and used as the basis for further phase in the system.

Shoe pattern and leather size have inverted proportion to estimating upper materials i.e. as the skin size decreases the consumption of upper materials for one pair increases for a particular pattern size and if the pattern size decreases for a particular skin size than the consumption will decrease.

Relationship Between Size Pattern And Leather Size

S. No.	Leather Size In Sq.ft.	Leather Size In Dm2	size of shoe									
			38	39	40	41	42	43	44	45	46	47
1	4.00	37.16	2.73	2.85	2.96	3.09	3.22	3.35	3.48	3.62	3.77	3.92
2	4.25	39.48	2.70	2.81	2.93	3.05	3.18	3.31	3.44	3.58	3.72	3.87
3	4.50	41.81	2.67	2.78	2.89	3.01	3.14	3.27	3.40	3.54	3.68	3.83
4	4.75	44.13	2.63	2.74	2.86	2.98	3.10	3.23	3.36	3.49	3.63	3.78
5	5.00	46.45	2.61	2.72	2.83	2.95	3.07	3.20	3.33	3.46	3.60	3.74
6	5.25	48.77	2.58	2.69	2.80	2.92	3.04	3.17	3.30	3.43	3.57	3.71
7	5.50	51.10	2.57	2.68	2.79	2.90	3.02	3.15	3.28	3.41	3.54	3.69
8	5.75	53.42	2.54	2.64	2.75	2.87	2.99	3.11	3.23	3.36	3.50	3.64
9	6.00	55.74	2.52	2.62	2.73	2.85	2.97	3.09	3.21	3.34	3.48	3.61

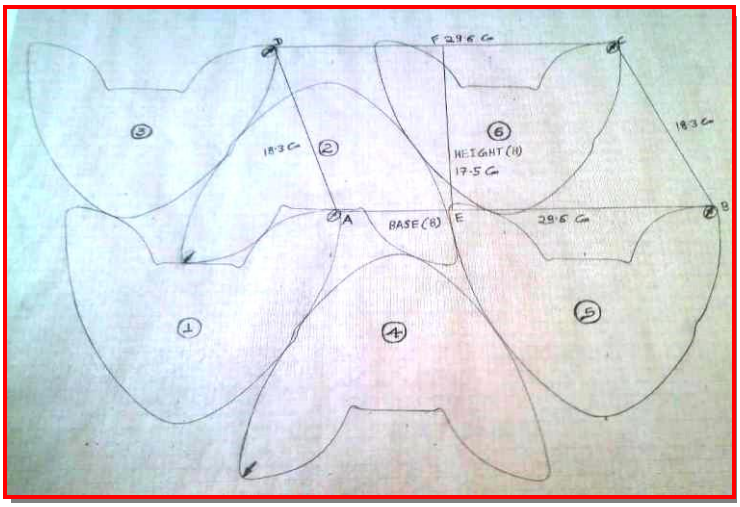
10	6.25	58.06	2.51	2.62	2.72	2.84	2.96	3.08	3.20	3.33	3.46	3.60
11	6.50	60.39	2.50	2.61	2.72	2.83	2.95	3.07	3.19	3.32	3.45	3.59
12	6.75	62.71	2.50	2.60	2.71	2.82	2.94	3.06	3.18	3.31	3.44	3.58
13	7.00	65.03	2.49	2.59	2.70	2.81	2.93	3.05	3.17	3.30	3.43	3.57
14	7.25	67.35	2.48	2.58	2.69	2.80	2.92	3.04	3.16	3.29	3.42	3.56
15	7.50	69.68	2.47	2.57	2.68	2.79	2.91	3.03	3.15	3.28	3.41	3.54
16	7.75	72.00	2.46	2.57	2.67	2.78	2.90	3.02	3.14	3.27	3.40	3.53
17	8.00	74.32	2.45	2.56	2.66	2.77	2.89	3.01	3.13	3.26	3.39	3.52
18	8.25	76.64	2.45	2.56	2.66	2.77	2.89	3.01	3.13	3.26	3.39	3.52
19	8.50	78.97	2.45	2.55	2.65	2.76	2.88	3.00	3.12	3.24	3.37	3.51
20	8.75	81.29	2.45	2.55	2.65	2.76	2.88	3.00	3.12	3.24	3.37	3.51
21	9.00	83.61	2.44	2.54	2.65	2.76	2.87	2.99	3.11	3.23	3.36	3.50
22	9.25	85.93	2.43	2.53	2.64	2.75	2.86	2.98	3.10	3.22	3.35	3.49
23	9.50	88.26	2.43	2.53	2.64	2.75	2.86	2.98	3.10	3.22	3.35	3.49
24	9.75	90.58	2.43	2.53	2.64	2.75	2.86	2.98	3.10	3.22	3.35	3.49
25	10.00	92.90	2.42	2.52	2.63	2.74	2.85	2.97	3.09	3.21	3.34	3.47
26	10.25	95.22	2.51	2.61	2.72	2.84	2.95	3.08	3.20	3.33	3.46	3.60
27	10.50	97.55	2.51	2.61	2.72	2.83	2.95	3.07	3.20	3.33	3.46	3.60
28	10.75	99.87	2.50	2.61	2.72	2.83	2.95	3.07	3.19	3.32	3.46	3.59
29	11.00	102.19	2.50	2.61	2.72	2.83	2.95	3.07	3.19	3.32	3.45	3.59
30	11.25	104.51	2.50	2.60	2.71	2.83	2.94	3.07	3.19	3.32	3.45	3.59

Example of relationship between the Skin area and pattern area:

Derby shoe upper:

Example 1:

Calculation of the gross area for vamp:



Area of parallelogram or scale area (ABCD) = base (B) * height (H)

= AB * EF

= 29.6 cm * 17.5 cm

= 518 sq. cm.

= 5.18 sdm.

1. If the skin size is 125 sdm.

   Than gross area for vamp will be:

   G = S (1.205 + S/A)

   G = 5.18 (1.205 + 5.18/ 125)

   G = 6.46 sdm.

2. If the skin size is 90 sdm.

   Than gross area for vamp will be:

G = S (1.205 + S/A)

G = 5.18 (1.205 + 5.18/ 90)

G = 6.54 sdm.

3. If the skin size is 40 sdm.

Than gross area for vamp will be:

G = S (1.205 + S/A)

G = 5.18 (1.205 + 5.18/ 40)

G = 6.91 sdm.

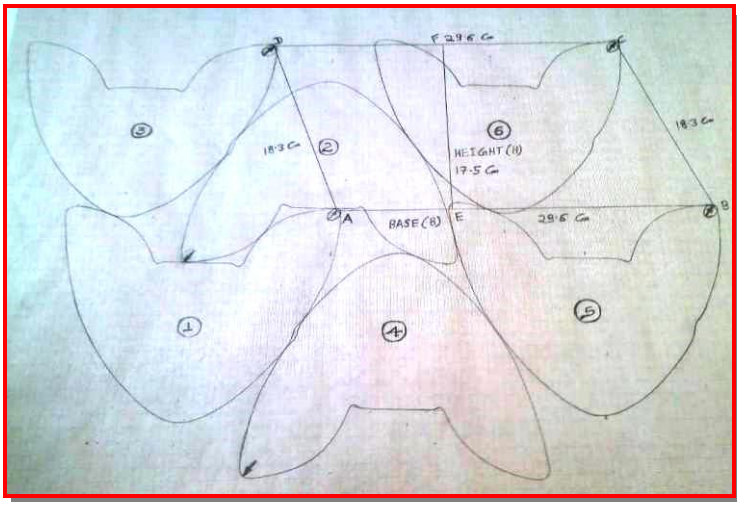
Note: It is clear if the skin size decreases for a particular pattern area than consumption of the pattern will increase.

Example 2:

In this example skin size will remain the same only pattern size will change.

If the skin size is 90 sdm.

1. Gross area for vamp will be:



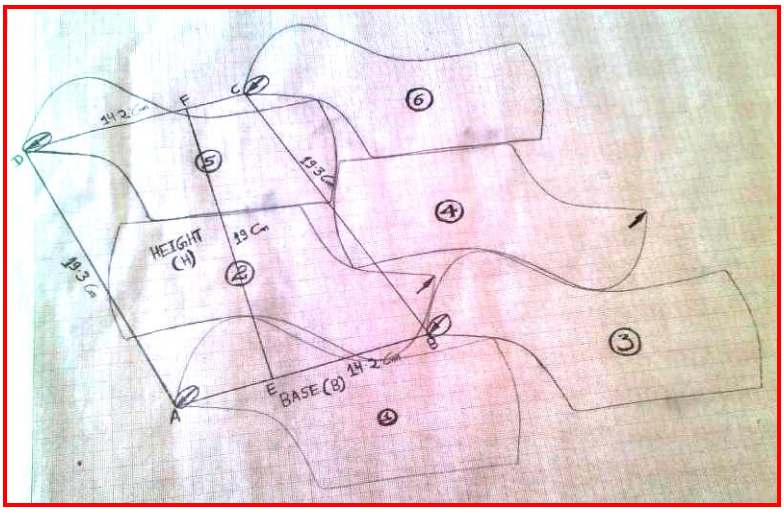
G = S (1.205 + S/A)

G = 5.18 (1.205 + 5.18/ 90)

G = 5.18 (1.205 + 0.0575556)

G = 6.54 sdm.

2. Gross area for quarter will be:



Area of parallelogram or scale area (ABCD) = base (B) * height (H)

= AB * EF

= 14.2 cm * 19 cm

= 269.8 sq. cm.

=2.698 sdm.

Gross area for quarter will be:

G = S (1.205 + S/A)

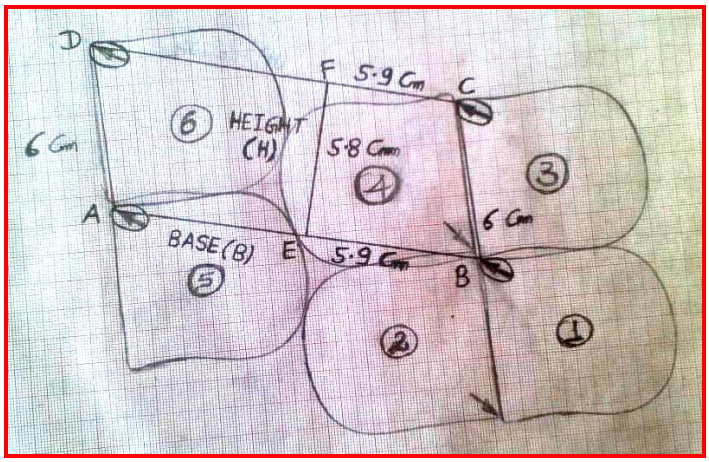
G = 2.698 (1.205 + 2.698/ 90)

G = 2.698(1.205 + 0.0299778)

G = 2.698(1.2349778)

G = 3.33 sdm.

3. Gross area for tongue will be:



Area of parallelogram (ABCD) = base (B) * height (H)

= AB * EF

= 5.9 cm * 5.8 cm

= 34.22 sq. cm.

= .3422 sdm.

Gross area for quarter will be:

G = S (1.205 + S/A)

G = .3422 (1.205 + .3422/ 90)

G = .3422 (1.205 +.0038022)

G = .3422 (1.2088022)

G = .4136 sdm.

Note: Now it is clear is the pattern size decreases for a particular skin size than consumption of the pattern also decreases.

Information Sheet 3 Describing the use methods applicable to different types of leather and patterns condition

The leather-based industry especially leather products industry (footwear, garment, leather goods) is highly fashion oriented. Moreover, articles made of (genuine or simulated) leather are complementing clothing. Leather products (shoes, garment, leather goods) is important export earner for many developing countries. In many countries leather products export ranks within the first three places in the total export. Especially the footwear industry's importance to the national economies in developing countries is underlined by the fact that it is the main contributor to the countries export and – being a labour intensive industry – provides employment to the most vulnerable groups of the society (including a large number of women) in towns and villages where other job opportunities are very scarce. The most of the leather products and footwear industry is dominated by small- and medium-scale operations. These SMEs lack of design information, product development knowledge, information and educated personnel for applying up-to-date quality assurance techniques and productive technology. The institutional background is weak in providing necessary services, support and professional training needed for becoming competitive and thus remaining in business (providing/maintaining working opportunities). UNIDO with other institutions and organizations through tailor made technical assistance assisted to up-grade and enhance leather products sector.

Foot measurement – India - 1999

Based on available and reliable data the foot measurement survey made in India in 1999 led to a very important conclusion: the proportion (i.e. shape) of feet of the local population differs considerably from what is built in European and North-American shoe lasts. The main reason is the ethnic (anthropologic) difference between European and American people, but the fact that the overwhelming majority of the Indian population wears open type of footwear (sandals, chappels, slippers etc.) or nothing must have its impact as well. Although substantial differences have been identified between geographic regions of the country it is quite apparent that

Indian feet are flatter, i.e. their forepart - especially around the ball and waist part - are wider and lower than in case of European feet. Indian feet have shorter forepart: the distance of ball points from the heel part is relatively larger than that of European feet. The consequences are that footwear made on European shoe lasts do not really fit on Indian feet (i.e. they are not comfortable) and wear off quickly. Further distinction should

be between different regions of the country. All this means that specially designed shoe lasts should be used for footwear produced for domestic sale in India..

Women in leather industry

Throughout the world, women make a vital contribution to industrial output.. Their work not only sustains their families, but also makes a major contribution to socio-economic progress. The creativity and talents of all women are an invaluable resource, which can and should be developed both for their own selfrealization and for the benefit of society as a whole.

The key to enhancing women's opportunities, and hence their position in industry and the economy, is to provide them with access to know-how, technologies and credit. Training to upgrade women's technological capabilities and to enhance their entrepreneurial and business skills, whether in simple artisanal production or in high technology industries, is at the heart of allowing women to advance to more rewarding positions. All these activities are an integral part of UNIDO's technical assistance programmes.

The case-studies presented in this series of brochures demonstrate that engament of women women and gender neutral management can be also for benefit of the leather sector.

The Future for Leather

The Global Leather Coordinating Committee (GLCC) in 2013 sought to identify real and perceived strengths, weaknesses, opportunities and threats of importance to the leather industry. This paper sets down a mosaic of major issues stemming from these considerations.This paper was published in the World Leather (February/March 2014).

This survey prepared and presented during the 17th UNIDO Leather Panel is a follow-up to Worldwide Study of the Leather and Leather Products Industry, which was the outcome of an exhaustive survey carried out by UNIDO in the 1970s. It is intended to assist the Organization in the formulation of future assistance programmes and in detecting areas where further study of various kinds may be useful. This report assesses the worldwide prospects of the leather and leather products industry in the coming decade. It examines the major underlying trends of recent years and how they are expected to evolve in the short to medium term. In its attempt to provide a thorough picture of the leather sector, the report covers its various aspects: the availability of raw material, the tanning industry, and the manufacture of footwear and other leather products. The basic intention is to help discern prevailing trends in global trade and to support efforts to design an effective role for organizations in the industrial development arena. The findings and forecasts published here are meant to be indicative rather than

definitive and to form a basis for further surveys and studies. The need to compile this report arose out of the 16th session of the UNIDO Leather and Leather Products Industry Panel held in Brazil in May 2007. The panel recommended that UNIDO undertake a comprehensive study on the future development of the world leather and leather products industry, a study that would cover demand, technology, production, and trade. Consequently, the UNIDO study provides an analysis of the contemporary demand for leather products (footwear, leather goods, gloves, leather garments, sports goods, upholstery, etc.) vis-à-vis the availability of resources (raw hides and skins, manufacturing capacities, skilled labour, knowledge, support industries, and services). It also contains information on other important aspects of the leather industry: trade statistics, the geographic distribution of production, technology developments, physical infrastructure, environmental conditions, and social aspects involved in the production of leather.

This paper elaborates some reasons behind the success of the leather-footwear sector in Italy, also to see how and if the "Italian recipe" can be successfully exported to other Countries.

To this end, this survey breaks down into three main sections:

a) the first part will aim at setting the Italian leather-footwear system against the more general national industrial system. In fact, some elements (the prominence of small and medium companies, its “district” nature) in general are the resources of the Italian system;

b) the second part deals more specifically with the structure of the leather-footwear system in particular, its present situation, its main points of strength and weakness, and anticipating its lines of development;

c) the third part, finally, includes some considerations about the possibility of exporting the Italian model to other countries.

Paper was presented during the 13th Session of the UNIDO Leather Panel Meeting in Bologna (October 1997)

The objective of this survey is to provide a review of domestic and export trading patterns inside footwear business and to give recommendations to developing countries for using appropriate trading strategies and channels. The focus is on footwear marketing and sale. The structure of this paper follows the development we have seen inside sale and marketing of footwear. The paper refers from the beginning less than 150 years ago with local supply of footwear up to day where footwear has become an important business on the global market place. The development has been different from one continent to the other, but it is important to realize that the consumer has

become a powerful player. To know and to acknowledge the customers wishes is and still will be a key factor. The development has created challenges. A lot of new markets have come and the competition is growing every day. The paper describes the most important challenges. Challenges, the footwear business has to be aware of. The paper tries to give an answer to the questions the challenges bring.

In market economies, specifically within (the present global) competitive market conditions actual performance of businesses is measured by the (international) market itself: efficient operations remain in business, produce profit and have potential to develop. In case of productive sectors of the economy, namely the agriculture, the industry, the trade and services such assessment having a post-facto character carries the risk of being late, i.e. it may jeopardize the business itself if it does not have sufficient resources to take corrective actions. Specifically assessment of industrial entities such as (sub)sectors, companies and production units plays an important role for governments and managements as its – timely obtained – results enable decision makers to initiate necessary actions.

The above considerations triggered the preparation of this study. In order to demonstrate practical applicability and usefulness of benchmarking, revealing good manufacturing practices and how thy can serve performance assessment in the industry, the paper is focusing – as an example – on footwear manufacturing and trade.

This paper was presented during the 15th UNIDO Leather Panel and later successfully used in UNIDO TA to benchmark footwear sector and companies.

Wastes Generated in the Leather Products Industry

The present report provides production ratios of solid wastes in leather, footwear and other leather products manufacture and analyse why such wastes are produced and analyses possible solutions in order to reduce the quantity of waste, or to recycle them.

Self-Check 3	Written Test

Instructions: Write all your answers in the provided answer sheet on pages 20.

Test I: Short Answer Questions

Directions: Answer all the questions listed below. **(Total marks 4)**

1.The most of the leather products and foot wear industry is dominated by small and medium scale operation.

2. The actual performance of business of the competitive market is measured by the market itself.

Information Sheet 4 Performing second waste computation.

Introduction

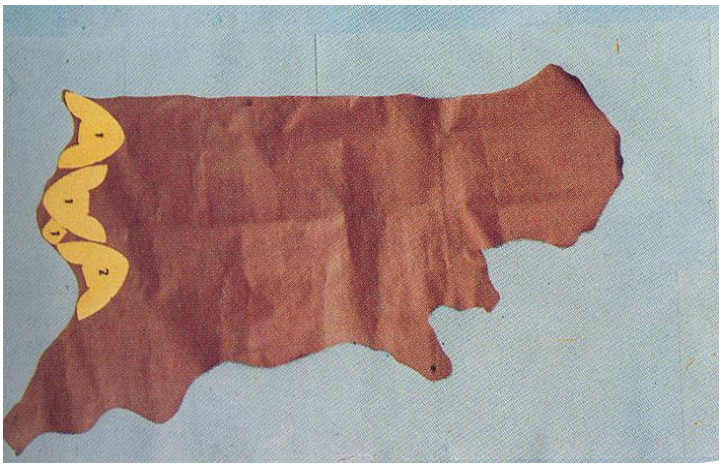
Second Wastage is waste additional to the first waste. That is wastage due to the different size and type of leather; Calculation of the second wastage is depending on the different types and size of leather. The second wastage calculated by using the below formulas.

Estimation of second wastage

Second Wastage is waste additional to the first waste.

This depends on the following factors:

a. The shape of the skin to be used, because the pattern shape however fitted together will not coincide in outline with that of a skin which results in edge



waste.

b. The size (or area) of the skin in relation to the size of the individual pattern shapes, since the larger the area, the smaller the waste and the smaller the area the larger the waste.

c. General shoe making considerations in which certain parts are to be cut from certain portion of the skin or in certain direction according to the direction of

stretch or shade matching and color matching in individual pieces as a result of which the interlocking arrangement may be destroyed.

Pattern scale area when added with the second waste allowance is called GROSS AREA (G). This depends on different kind of leather also. For calculating G we use certain empirical formulas as:

1. For Full grain and corrected grain leather.

G = S (1.205 + S/A)

Where:

S = Pattern scale area

A = Area of the skin

1.205 = this is an area addition that forms part of the mathematical equation. This is constant factor for a particular kind of skin.

If S/A > 0.185 i.e. if the pattern item size is bigger than the skin size e.g. ladies ¾ cut court shoe vamp to be cut from goat leather then

G = S (1.02 + 2S/A)

2. In the case of suede and split leather

G = S (1.098 + S/A)

Adjustment for Size and Fittings

Different shoe sizes and fittings will require different cutting areas.

- The difference in cutting area between one size and the next, and also between one fitting and the next will be in regular step in respect of any particular pattern.

For example in English size system for gents sizes 5% material allowance is given on the material allowance for each full size and 2.5% for each half size while in French system (Paris points) in gents sizes 3.5% material allowance is given for each size.

- Some extra allowance may be given for some other factors for example
- Bicolor or multicolor styles used in a style. Some extra allowance may be given for bicolor or multicolor styles as in this case edge waste will be more. In some cases one can treat to different color as different color batches. Here also some extra allowance may be added.
- Further percentages are added to allow for different shoe sizes and fittings.

Calculation of Weighted Norms

As we have discussed earlier that the consumption from one side to another increases or decreases for 5% and for half sizes 2.5% in English sizing system whereas in French it changes by 3.5%.

The norm of each size calculated from the costing norm is called weighted norm. This is illustrated in the given example.

Example

The costing norm for oxford size 8 is 25 SDM calculate the weighted norms for size 6 size 7 size 9 and 10 of the same article.

Solution

Size	6	7	**8**	9	10
Norm	22.56	3.75	**25**	26.25	27.56
	(23.75 – 5% of 23.75)	(25 – 5% of 25)	(25 + 5% of 25)		(26.25+5%of 26.25)
	= 23.75 – 1.19	= 25 – 1.25	= 25 + 1.25)		= 26.25 + 1.31
	= 22.56 SDM	= 23.75 SDM	= 26.25 SDM		= 26.56 SDM

Hence the weighted norms for size 6, 7, 9, 10 are 22.56 SDM, 23,75 SDM, 26,25 SDM, 26.56 SDM respectively.

Example

1. The pattern scale area is 11.8 dm2; the skin area of sheep aniline finish leather is 4.5 Sq.ft. Calculate the gross area of the pattern.

   Solution

   Given: Type of leather sheep aniline finish

   Pattern scale area(s) = 11.8 dm2

   Skin size (A) = 4.5 Sq.ft = 41.8 dm2

   S/A = 11.8/41.8 = 0.28; S/A > 0.185 so;

   G = S (1.02 + 2S/A)

   = 11.8(1.02 + 2* 0.28)

   = 18.64 dm2

2. The pattern scale area is 5.2 dm2, the skin area of PU finish cow leather is 15 Sq.ft. Calculate the gross area of the pattern.

   Solution

   Given: Type of leather cow PU finish

   Pattern scale area(s) =5.2 dm2

   Skin size (A) = 15 Sq.ft = 139.35 dm2

   S/A = 5.2/139.35 = 0.037; S/A < 0.185 so;

   G = S (1.205 + S/A)

   = 5.2(1.205 + 0.037)

= 6.46 dm2

3. The pattern scale area is 11.8 dm2; the skin area of split leather is 4.5 Sq.ft. Calculate the gross area of the pattern

Solution

Given: Type of leather split

Pattern scale area(s) = 11.8 dm2

Skin size (A) = 4.5 Sq.ft = 41.8 dm2

S/A = 11.8/41.8 = 0.28;

G = S (1.098 + S/A)

= 11.8(1.098 + 0.28)

= 16.26 dm2

Self-Check 4	Written Test

Instructions: Write all your answers in the provided answer sheet on pages 20.

Test I: Short Answer Questions

Directions: Answer all the questions listed below. **(Total marks 10)**

1. Fill in the blanks: (5 marks)

1. G = S (1.205 + ----------).
2. G = S (1.02 + ----------).
3. G = -------- (1.098 + ----------).
4. ---------- is waste additional to the first waste.
5. Pattern scale area when added with the second waste allowance is called GROSS AREA (G).

2. Very short answer questions (5 marks)

1. How much percentage difference is found in the English size consumption from one pair to another pair?
2. How much percentage difference is found in the French size consumption from one pair to another pair?
3. “If larger the area of skin larger will be the waste and if small the area of skin smaller will be the waste”. Is it correct or wrong statement?
4. What is gross area?
5. Write down the formula for gross area calculation if S/A > .185.

Score = _____

Rating: _____

Note: **Satisfactory rating – 100%**

You can ask you teacher for the copy of the correct answers

LG#14	LO #5- Determine material estimation for one pair

Instruction sheet

This learning guide is developed to provide you the necessary information regarding the following content coverage and topics:

- Determining the average grade of the leather.
- Performing estimation of material consumption based upon the grade of the material.
- Documenting the grade of material

This guide will also assist you to attain the learning outcomes stated in the cover page. Specifically, upon completion of this learning guide, you will be able to:

- Determine the average grade of the leather.
- Perform estimation of material consumption based upon the grade of the material.
- Document the grade of material

Learning Instructions:Read the specific objectives of this Learning Guide.

- Read the specific objectives of this Learning Guide.
- Read the information written in the “Information Sheets 1”.
- Accomplish the “Self-check. Request the key answer / key to correction from your teacher or you can request your teacher to check it for you.
- If you earned a satisfactory evaluation proceed to “Information Sheet 2”. However, if your rating is unsatisfactory, see your teacher for further instructions or go back to Information Sheets 1.
- Read the information written in the “Information Sheet 2”.
- Accomplish the “Self-check 2”. Again you can request the key answer / key to correction from your teacher or you can request your teacher to check it for you.
- If you earned a satisfactory evaluation proceed to “Information Sheet 3”. However, if your rating is unsatisfactory, see your teacher for further instructions or go back to Information Sheet 2.
- Read the information written in the “Information Sheet 3”.
- Accomplish the “Self-check 3”. Request the key answer / key to correction from your teacher or you can request your teacher to check it for you.
- If you earned a satisfactory evaluation proceed to “Information Sheet 4”. However, if your rating is unsatisfactory, see your teacher for further instructions or go back to Information Sheet 3.

Information Sheet 1 Determining the average grade of the leather

Introduction

Leather is a very complex material, which there are, however, a few crude and quick tests, which can help the buyer in taking correct decision. These tests will give a danger signal, regarding the whole consignment. so before buying and simply receiving the whole ordered leather depending only on the tanneries' leather grading system, while receiving the order by using random tests method reassessing is very crucial. Then, after receiving the whole order before using it directly for production, conducting reassessment/re-grading of the whole consignment is important. This enables the footwear factories to re-appeal and give feedback regards of the quality of the leather as well they can able to complain on the price based on purchase cost variance calculation. In addition to this, assessing the leather before using it in productions enables the footwear factories to identifies whether the received leathers are suitable for production (for required design or model). This learning guide Breifielly tried to explain on how to assess the average grade of leather, on how to assess the cutting value of the leather(suitability of leather for footwear production) and on the method of storage and bundling of leather in the store. While dispatching the leather to cutters issuing system is shall be or preferably uses average system. If leathers are issued to the cutters based on the average grade, the optimal usage of leather will be achieved and wastage will be reduced.

Average grade of leather grade

While **dispatching** leather from store to the cutters, Average grade of leather shall be issued. That means it is the combination of the entire grade types, if the leather is TR leathers. (From grade A to grade E). If leathers are issued to the cutters based on the average grade, the optimal usage of leather will be achieved and wastage will be reduced. The cutters can able to cut the front part and the quality area of the shoes (vamps, aprons, quarters, toecaps and other visible part of the shoes) from A, B & C grade leathers. For the other parts of the shoes like counters, destinies, straps, collars,

tongues, zip guards, and other small and less visible part of the shoes possibly can cut from E and F grade leathers. so that leather wastage will be minimized and maximize the optimal usage of leathers. Leather selectors in the store, unless there is a special order, they should deliver mixed leather (Grade A to grade E) to all cutters in considering the average grade to be c grade. Sometimes the leather may be SC (selected grade: a combination of F, G &H grade leather) OR SG leathers(selected grade: may be a combination of leather having the same grade i.e. all A grade only OR B only etc) so whether the leather are TR,SC OR SG, the leather selectors Should issue the leather on the average grade basis.

Example: if the daily production order for two cutters are:

Cutter A: 367.5 sq.ft. Cow full grain, TR leather to produces 150 pair of shoes per day of XXM model.
Cutter B: 374 sq.ft cows corrected SC leather to produces 170 pair of shoes per day of RRN model.

SO, the leather selector should be issued the **TR** leather by keeping **C grade** as average grade for cutter **A**.

And for SC leathers, (if F, G &H), issued the leather by keeping **G** grade as average leather for cutter **B.**

- There may be different types rating in issuing the 367.5 SQ.FT of leather by keeping grade c as average grade, the following can be one option for cutter A.

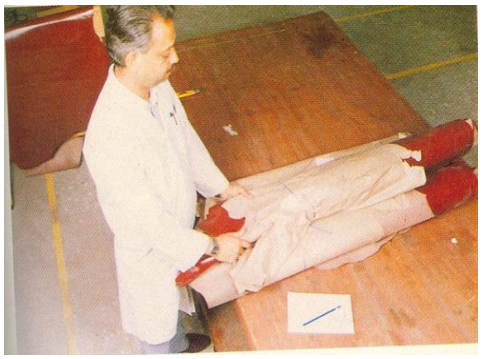
LEATHER GRADE	QUANTITY	REMARK
F	89.1 SQ.FT	
G	189.3	**AVERAGE**
H	89.1 SQ.FT	
TOTAL	367.5 SQ.FT	

- There may be different types rating in issuing the 374 SQ.FT of leather by keeping grade c as average grade, the following can be one option for cutter **B.**

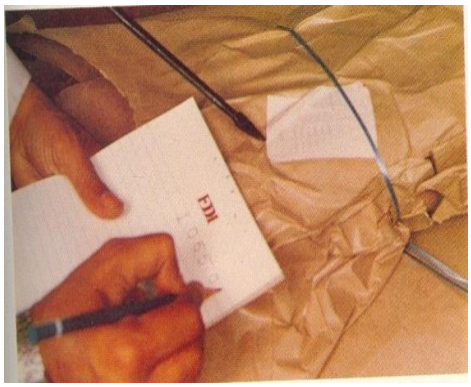
LEATHER GRADE	QUANTITY	REMARK
A	33 SQ.FT	
B	88 SQ.FT	
C	132 SQ.FT	**AVERAGE**
D	88 SQ.FT	
E	33 SQ.FT	
TOTAL	374 SQ.FT	

- **Preparation for Leather Grading**

(i) Receive Leather

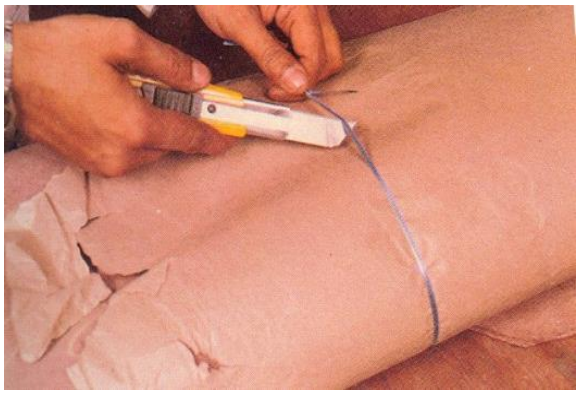


(ii) Check Leather Received against Delivery Documents



(iii) Store Bundle of Leathers in Preparation for Grading

(iv) Un-wrap Leather



(v) Keep the wrapping paper to rue.

- Lay the leather out on the bench. Put all the butts at one end and necks to the other end.
- Continue to un-wrap all the leather.

Incoming Inspection

It is the responsibility of the leather storeroom to inspect, sort, administer, store and distribute upper leather. All incoming materials must be examined to insure that they meet the requirement quality standard. Owing to the high cost of leather a general quality and quantity inspection can save considerable amount of money. Any shortage or discrepancy can be reported to the tannery without delay.

Quantity Check

Upper leather is sold by area, either by sq.ft. Or sq.dm with each batch of leather the tannery should supply a printed list of the No. of skins and their individual area.

It is important to check each delivery for Qty. The skins in each bundle should be counted to ensure that the No. corresponds to that on the delivery list. The addition of the delivery list should be checked and a total addition made for each leather grade and for the total delivery.

System of Leather Grades

- Necessary to assess the actual value of the skin.
- To assess accurately the utilization and quantity of upper to be issued to each
  Individual cutters.
- To control the leather quality based on cutting value arrived at by grading as adjust the section from the suppliers. Leather is grouped into different group according to skin cuttability co-efficiency.
- At time to check by the grid method, the sorting concept of the class limits as feedback to the sorters.

It is recommended to resort the tanners sorting of each incoming shipments to shoe factories own grades e.g. A/B/C etc. For that the shoe factory has to decide on its class limits in terms of cut ability coefficient for each grade e.g.

(A) Grade 97%

(B) Grade 92%

They are used same of the ways leather can be graded and there are variations used within the methods described here. However, it is important that the following operating procedures and standards should be adhered to:

The grading table should be at contactable height and be well lit, preferably next window with no sunshine. The light source should be different mounted so that is causing no shadows and imparts no color fare to the material. Additional light should be situated so that they cost light access the material thus highlighting light swatches as indentations.

Self-Check 1	Written Test

Name: _____ Date: _____

Time started: _____ Time finished: _____

***Instructions*:** Write all your answers in the provided answer sheet on page 7.

Directions: Answer all the questions listed below.

Fill in the blanks

1. _____is the average grade of TR leather.(Mark 1)
2. _____is the average grade of SG leather.(Mark 1)
3. Check Leather Received against ----------.(Mark 1)
4. Store Bundle of Leathers in Preparation for ----------.(Mark 1)
5. It is the responsibility of the leather storeroom to ----------, ---------- administer, store and distribute upper leather.(Mark 1)
6. It is important to check each delivery for ---------.(Mark 1)
7. All incoming materials must be examined to insure that they meet the requirement of ----------.(Mark 1)
8. Choose the correct one: (Mark 1)
9. What is the importance of leather grading?
10. Necessary to assess the actual value of the skin.
11. To assess accurately the utilization and quantity of upper to be issued to each Individual cutters.
12. To control the leather quality based on cutting value arrived at by grading as adjust the section from the suppliers. Leather is grouped into different group according to skin cuttability co-efficiency.
13. At time to check by the grid method, the sorting concept of the class limits as feedback to the sorters.
14. All of the above

Score = _____ Rating: _____

Note: **Satisfactory rating – 100%** You can ask you teacher for the copy of the correct answers

Information Sheet 2 Performing estimation of material consumption based upon the grade of the material

Introduction

For calculating pattern area of scale area each pattern item is first assessed separately by arranging it in a sequence of interlocking patterns. The objective is to get a parallelogram with the pattern, the area of which includes two patterns area and the interlocking waste.

There is a king rule for arranging the patterns to make a parallelogram. Two methods are normally adopted for this:

A. 0^o method
B. 180^o method

The degree i.e. 0^o or 180^o method signifies whether the patterns while making parallelogram are placed in the same direction as the first one i.e. or rotated at $180^{o.}$

The assessor must make adjustment as to which is the most economical interlock.

i. If you are using computer paper, tape the lined paper together.
ii. If using a graph paper 100cm x 100cm is needed.
iii. Draw a straight line through the upper pattern supplied
iv. Draw the location points for future reference and all parts to be traced anywhere on the center of the paper
v. Always use the same foot when tracing i.e. the pattern should not be turned over.

Points to watch while calculating material consumption, by RSM

1. Do not turn over the pattern, while doing pattern scaling.
2. Use the most economical interlocking position.
3. Always ensure that the center line drawn on the patterns are parallel to the lines on the graph paper and the center line should never be thick.
4. Make sure that the patterns do not overlap.

5. Sometimes it may be necessary to position a 7th pattern in between to achieve the best interlock. This can be shown in the diagram by the dotted line. (to be shown with same pattern).

NOTE

Whichever method is used, it is important that each new delivery of leather must be assessed to find the cut ability and area discrepancy in leather.

Accessories and tools used

1. Pencil
2. Eraser
3. Ruler(measuring scale)
4. Graph paper
5. Patterns of shoe
6. Scientific calculator
7. Paper

R.S.M ALLOWANCE SHEET **Date _____**

Upper/Lining _____ Article / Model No_____Size_____

Average skin size (A) Material 1_____Leather grade___ Leather _____

Material 2_____ Leather grade_____Leather type_____

Material 3_____ _Leather grade_____Leather type_____

S. No	Parts	No. of comps. per pair	Scaling Dimension (cm)	Pattern Scale Area(S) Dm2	Gross pattern area(G)Dm2		
					Material1	Material2	Material 3

Total Gross Area(G)							
3rd Wastage							
Allowance (T)							

Example 1

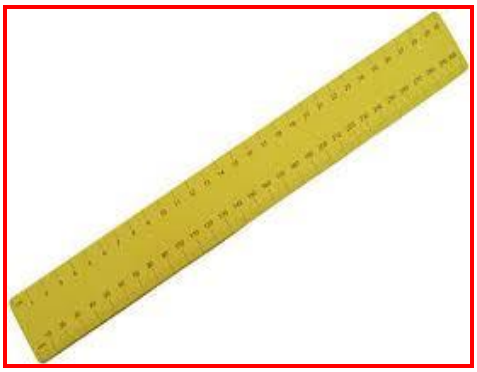
Full one pair consumption of derby shoe patterns is shown below.

Materials and equipment required

1. Pencil

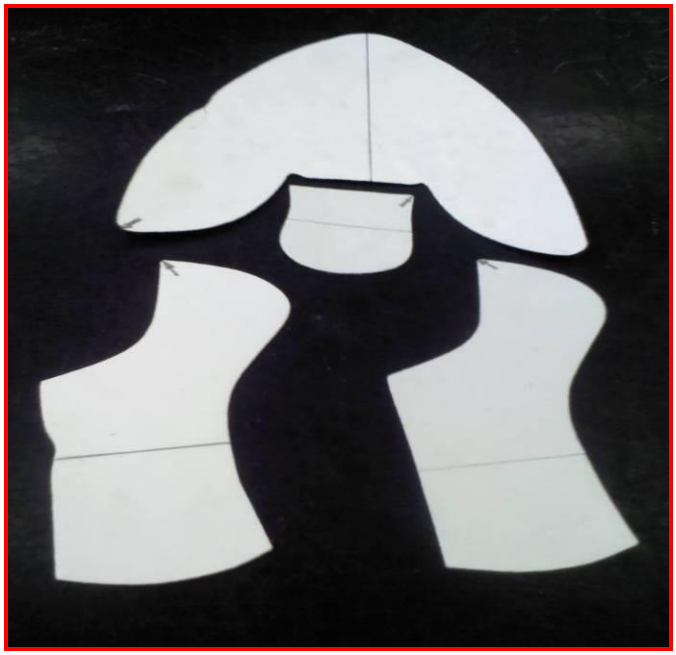
2. Eraser

3. Ruler(measuring scale)

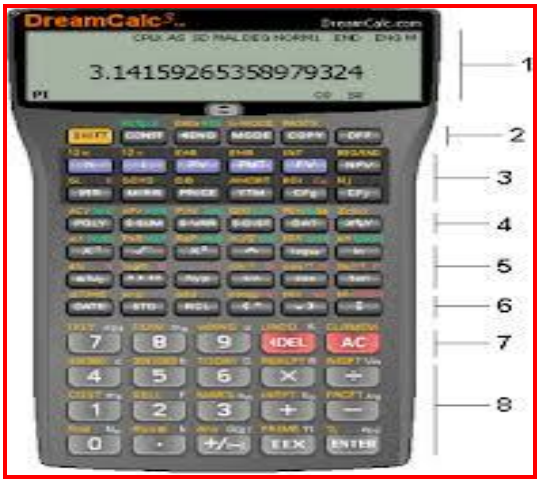


4. Graph paper

5. Patterns of shoe



6. Calculator



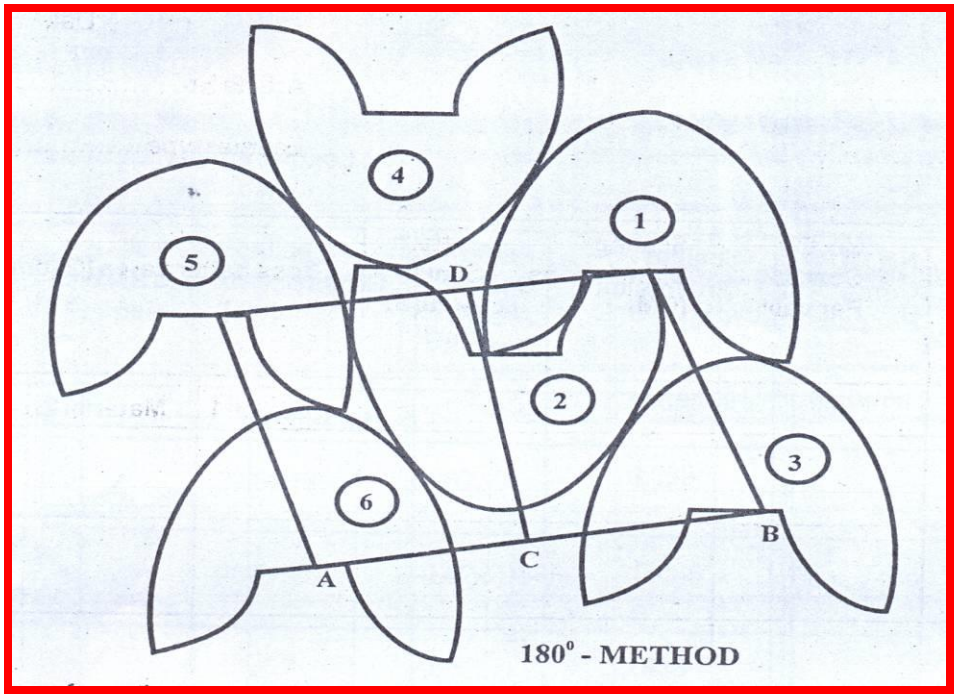
7. Paper

The consumption calculation and estimation of full derby shoe is shown below detail

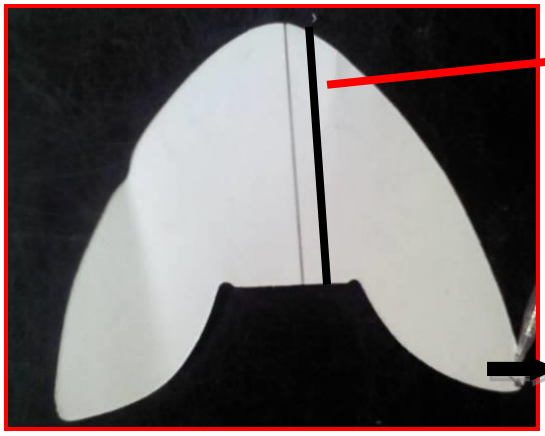
I. PATTERN SCALING FOR 180^{O} METHOD:

A. Derby Vamp cut component consumption estimation shown below

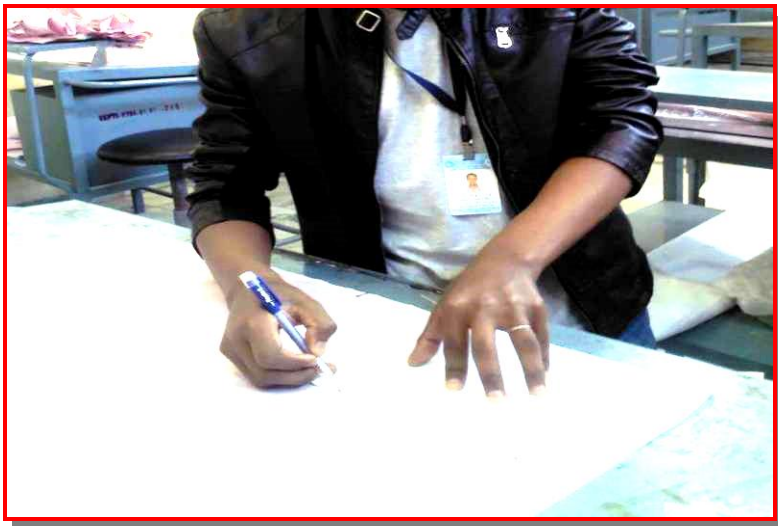
The steps are as follows:



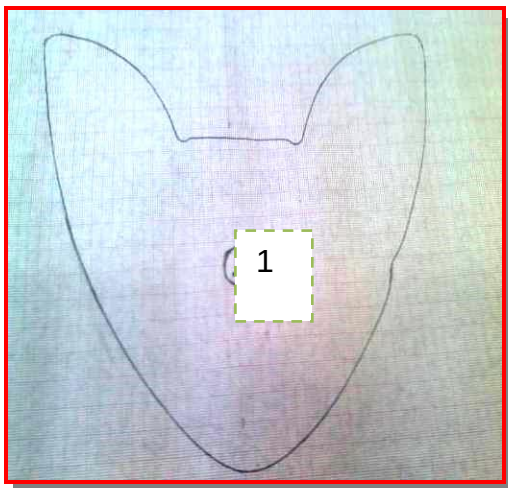
10. Trace the straight line and mark location point on the pattern

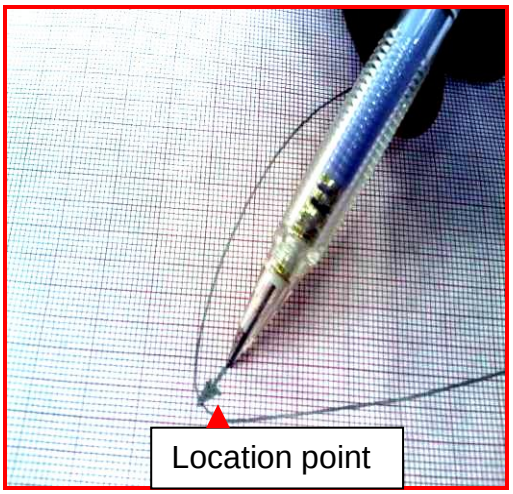


11. Lay the pattern to be traced down on the graph paper in such a way that the line on the pattern is aligned with the line on the paper.

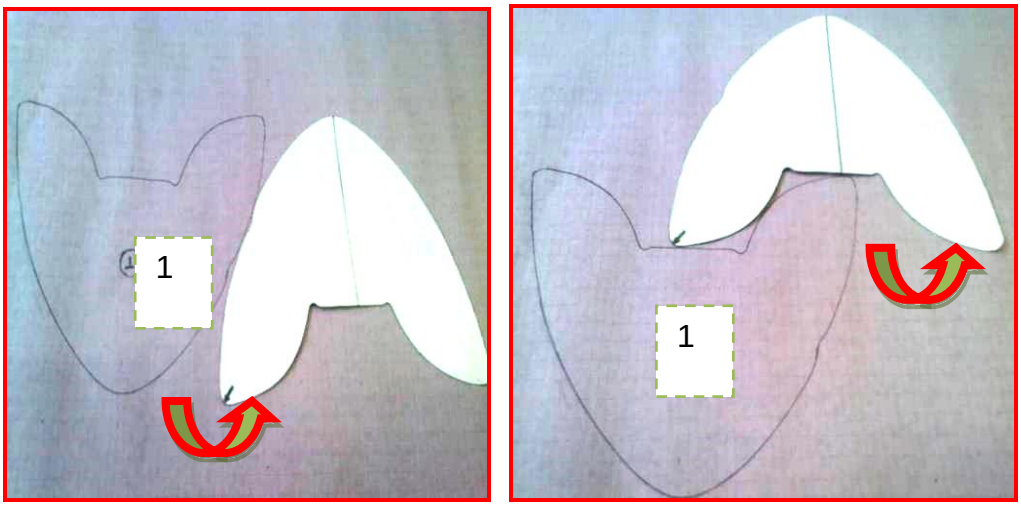


12. Trace round the 1ST pattern with a sharp pencil to get a clear line, mark the location point.

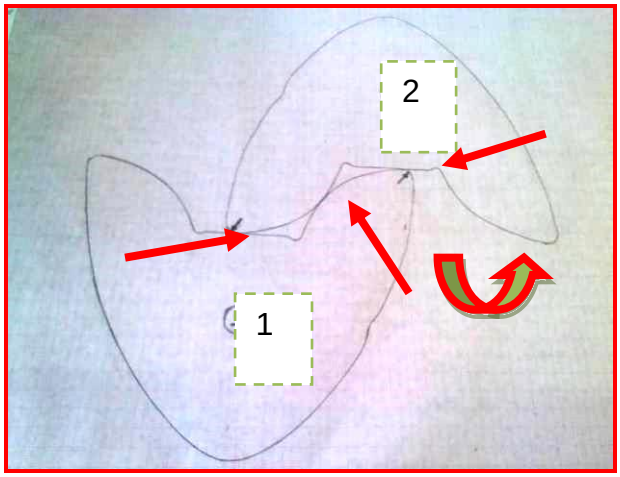




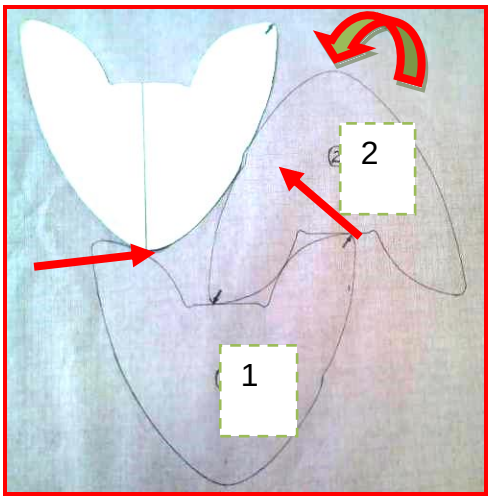
13. The 2nd pattern is then rotated through exactly 180^{O}and interlocking with the first pattern. The second traces must touch the 1st at least two points. Mark the location points on the tracing and mark the trace no.2

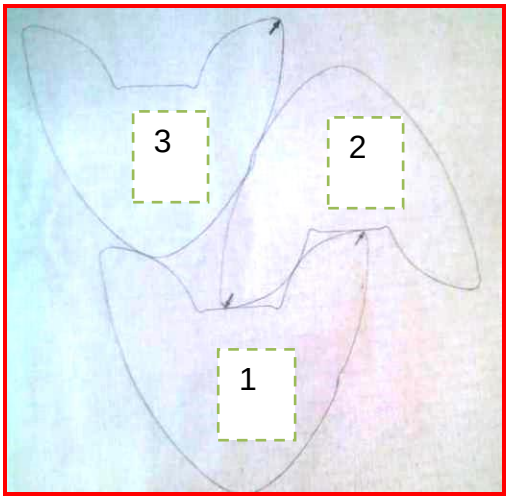


14. Look two interlocking types both are 180 degree methods in the first case wastage is high and point of contact between two trace is not more than two; in second case wastage is low and point of contact between two trace is more than two.

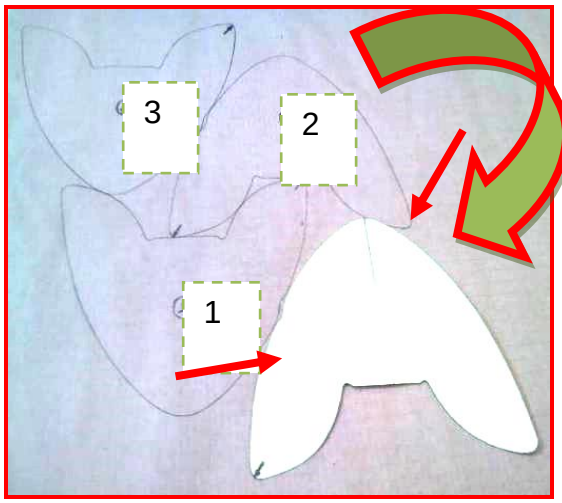


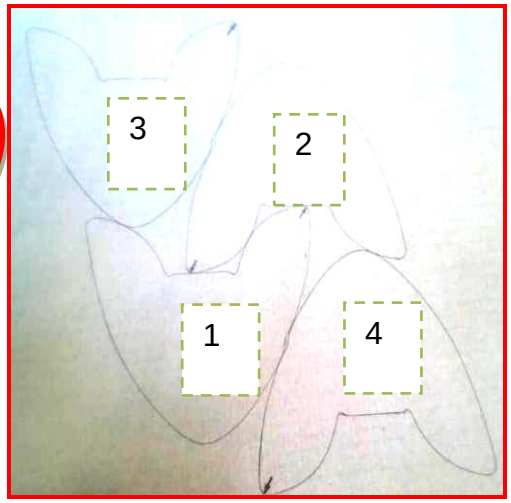
15. 3rd trace again rotated through 180^0 and a 3rd pattern is drawn so that it touches both 1st & 2nd at least two points, in either direction. (Depends on the availability of space on the graph for further pattern). Number it trace no. 3



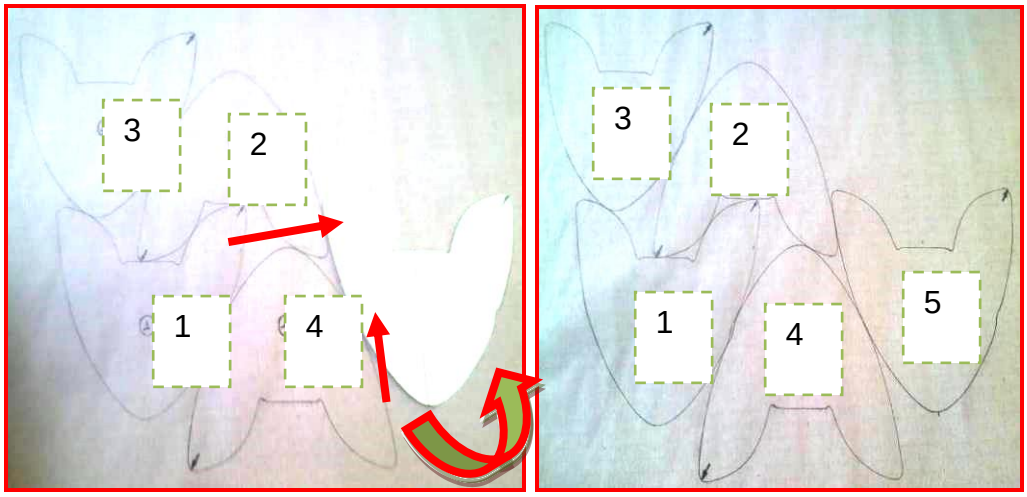


16. Interlock the 4th tracing. This should be interlocked with either 1st &2nd or 2nd & 3rd, but should touch any of them at least two points. Trace the pattern and mark the location points and number this trace no.4.

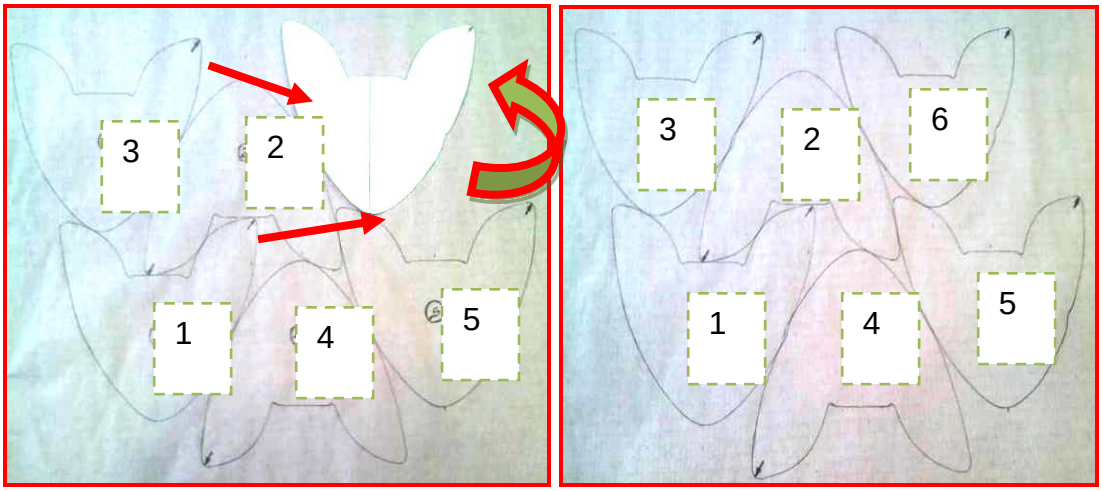




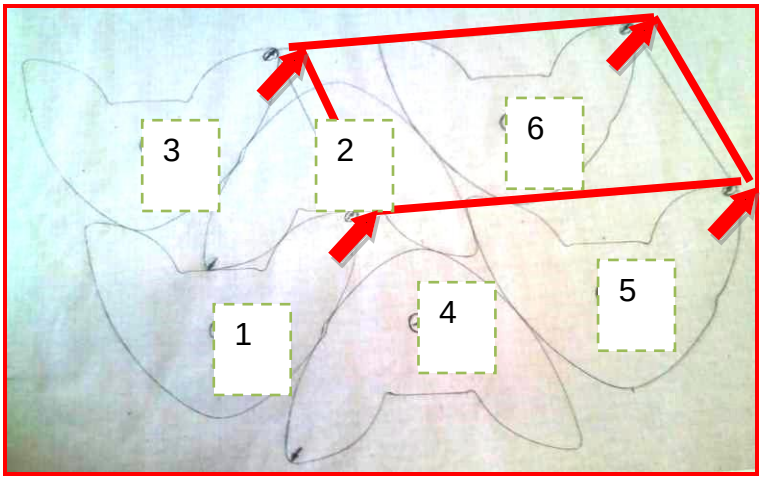
17. The fifth trace must face the same direction as no.1 and should touch 2nd &4th; tracing at least one point each it must face the two tracing in opposite direction. Mark the location points and number this trace no.5.

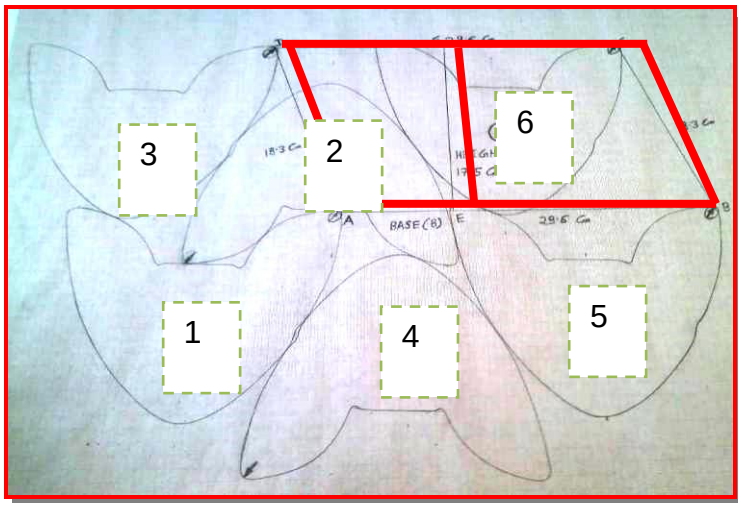


18. The sixth trace faces the same way as no .5 should touch 2nd&5th or 4th &5th, Mark the location points and number this trace no.6.thus, one ends up with 4 tracing the same direction and two in the opposite direction.



19. A parallelogram is drawn using location points (same direction) on the four patterns as corners of the parallelogram.





Area of parallelogram (ABCD) = base (B) * height (H)

= AB * EF

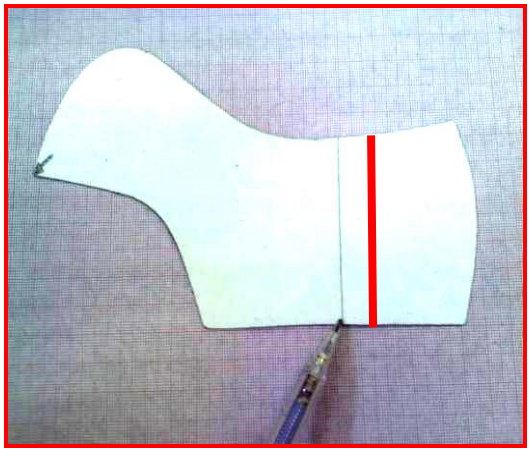
= 29.6 cm * 17.5 cm

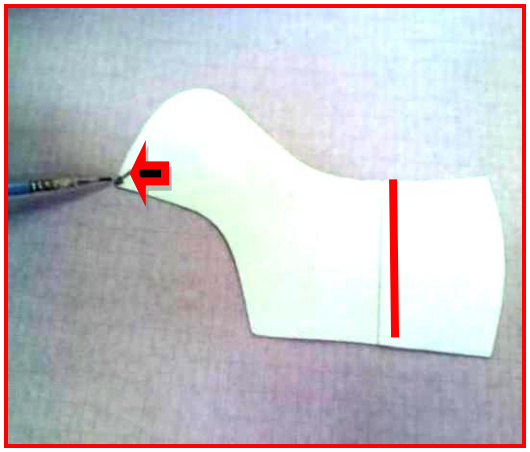
= 518 sq. cm.

B. Derby outside quarter cut component consumption estimation shown below

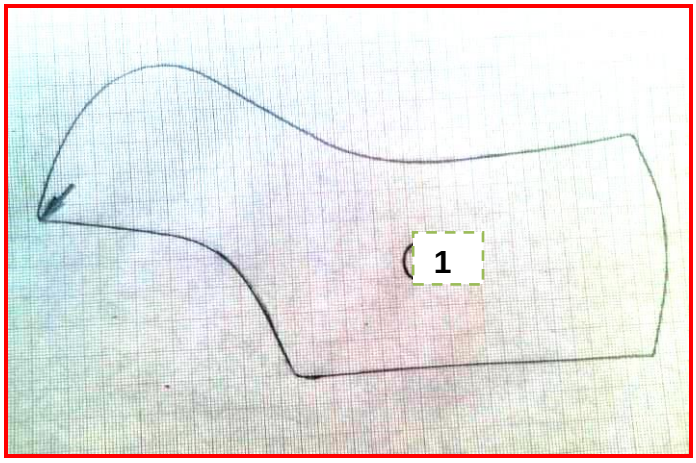
The steps are as follows:

1. Trace the straight line and mark location point on the pattern

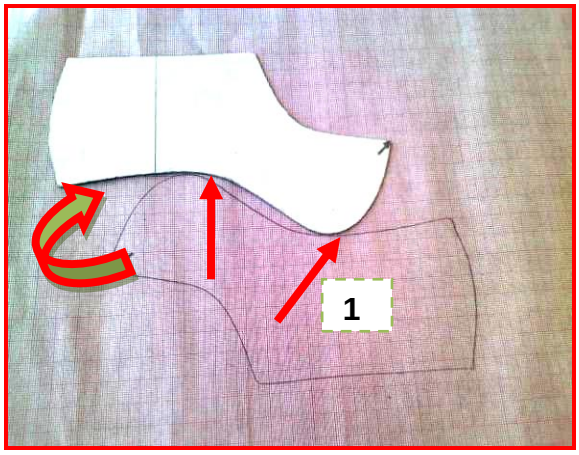


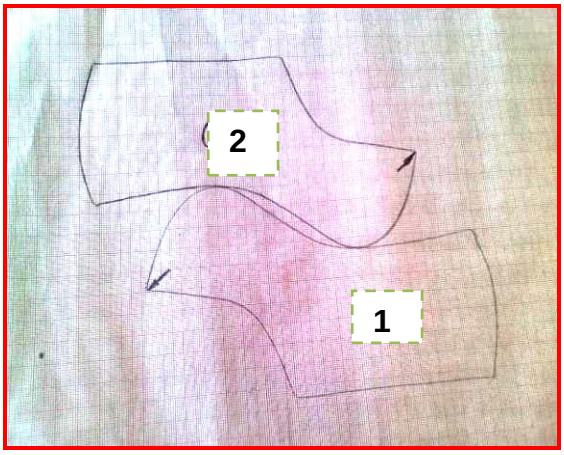


2. Lay the pattern to be traced down on the graph paper in such a way that the line on the pattern is aligned with the line on the paper.
3. Trace round the 1ST pattern with a sharp pencil to get a clear line, mark the location point.

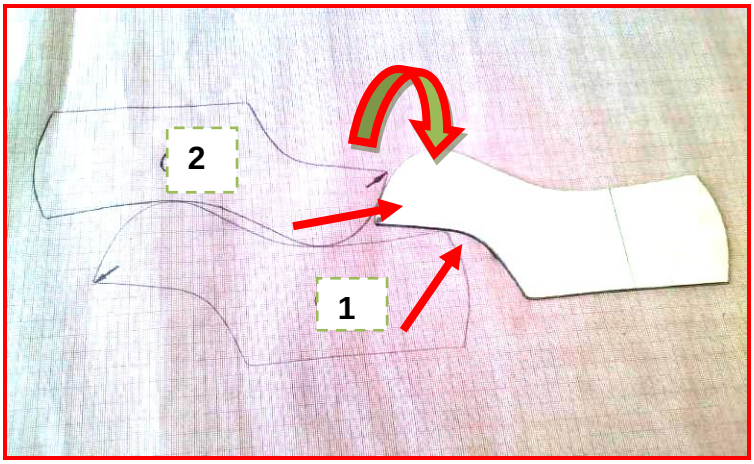


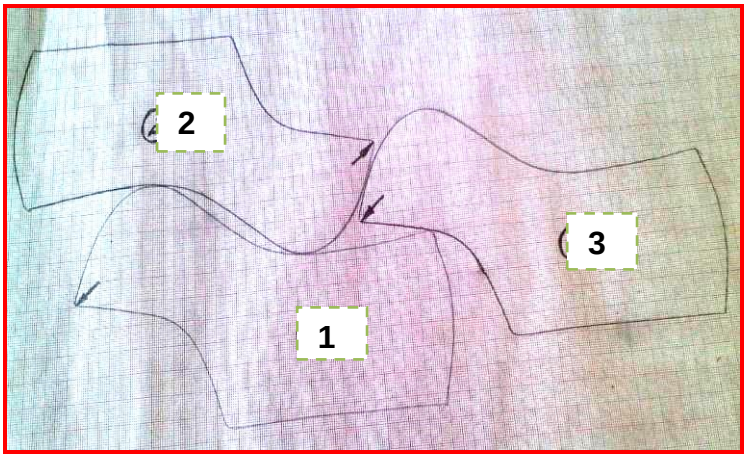
4. The 2nd pattern is then rotated through exactly 180^{O}and interlocking with the first pattern. The second traces must touch the 1st at least two points. Mark the location points on the tracing and mark the trace no.2



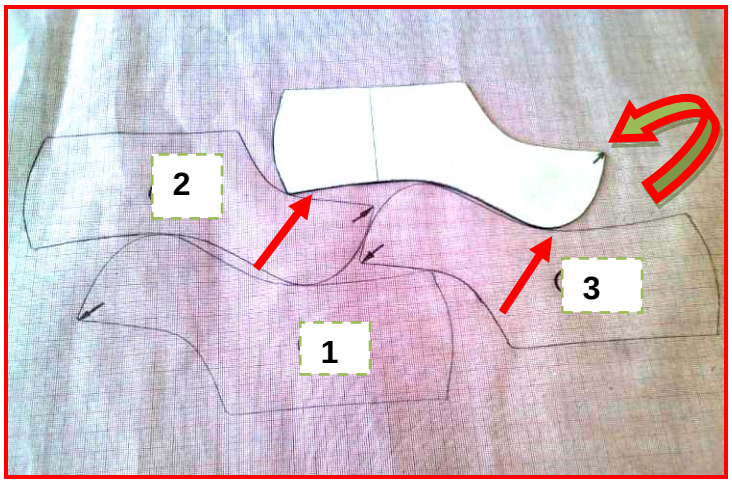


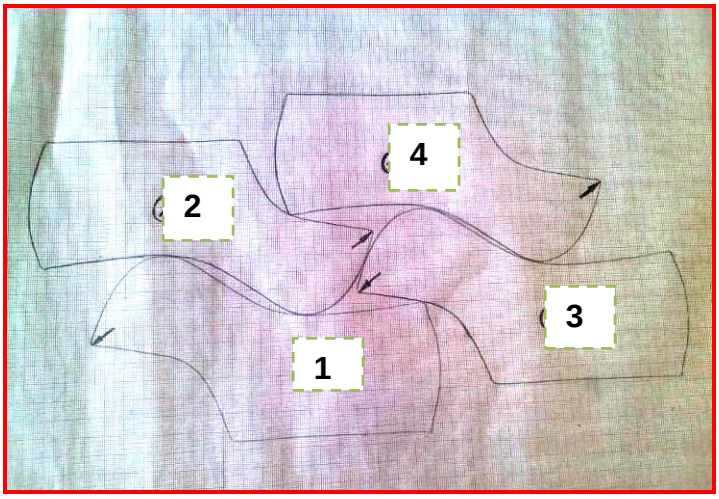
5. 3rd trace again rotated through 180^0 and a 3rd pattern is drawn so that it touches both 1st & 2nd at least two points, in either direction. (Depends on the availability of space on the graph for further pattern). Number it trace no. 3



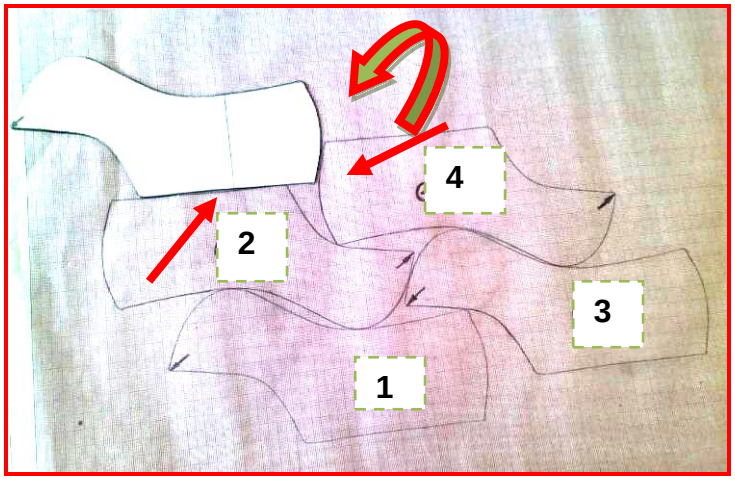


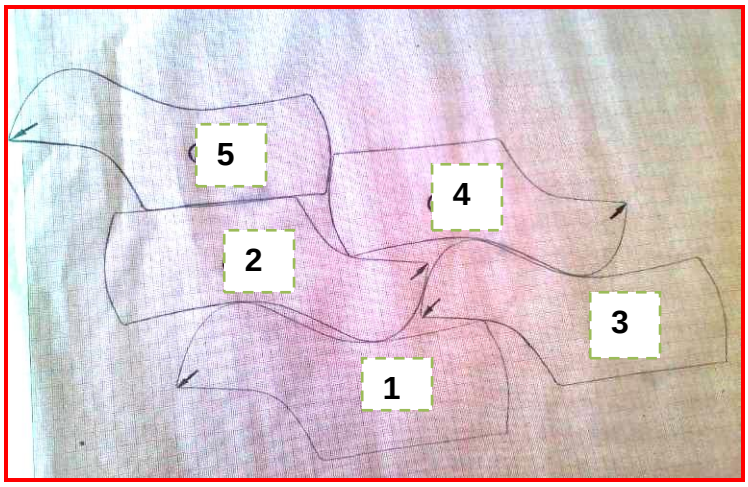
6. Interlock the 4th tracing. This should be interlocked with either 1st &2nd or 2nd & 3rd, but should touch any of them at least two points trace round and Mark the location points and number this trace no.4.



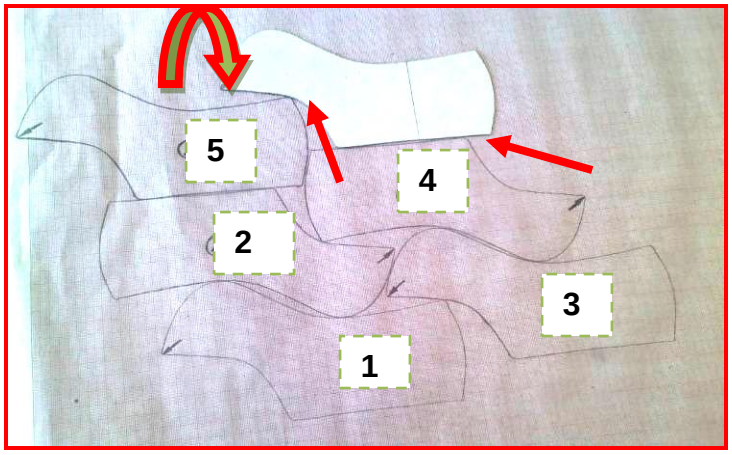


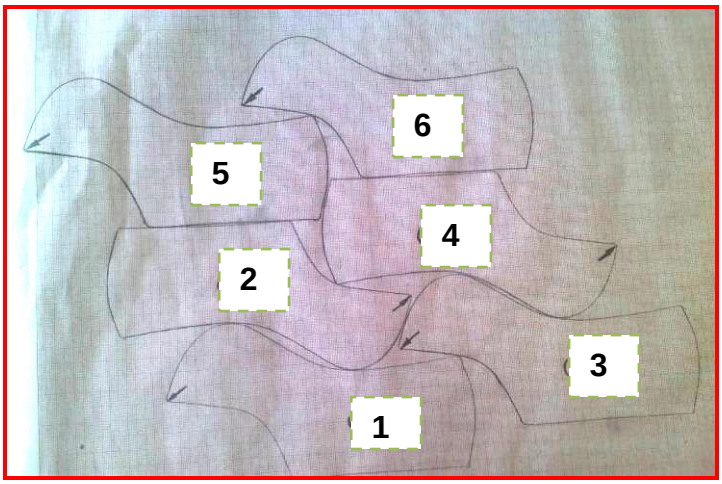
7. The fifth trace must face the same direction as no.1 and should touch 2nd &4th; tracing at least one point each it must face the two tracing in opposite direction. Mark the location points and number this trace no.5.



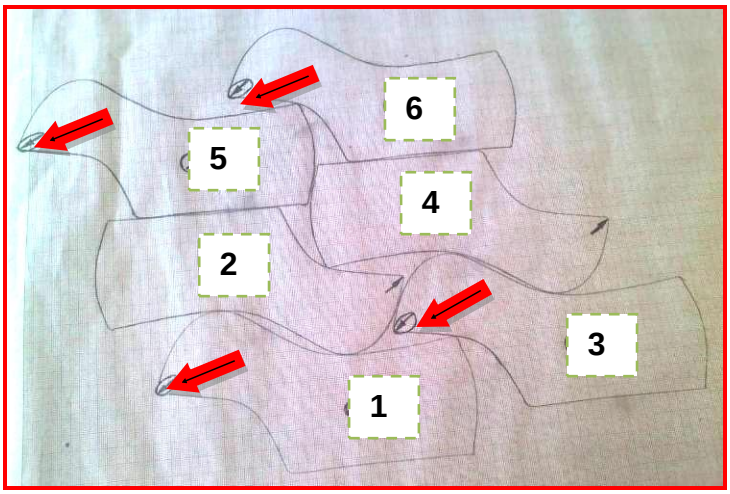


8. The sixth trace faces the same way as no .5 should touch 2nd&5th or 4th &5th, Mark the location points and number this trace no.6.thus, one ends up with 4 tracing the same direction and two in the opposite direction.

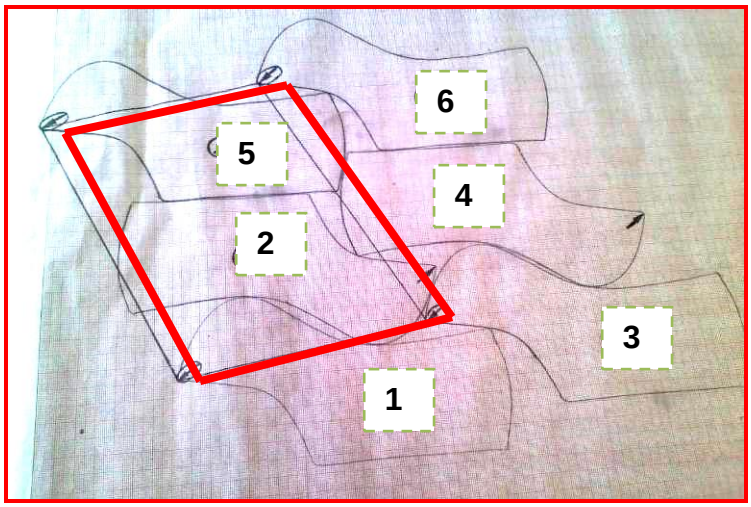




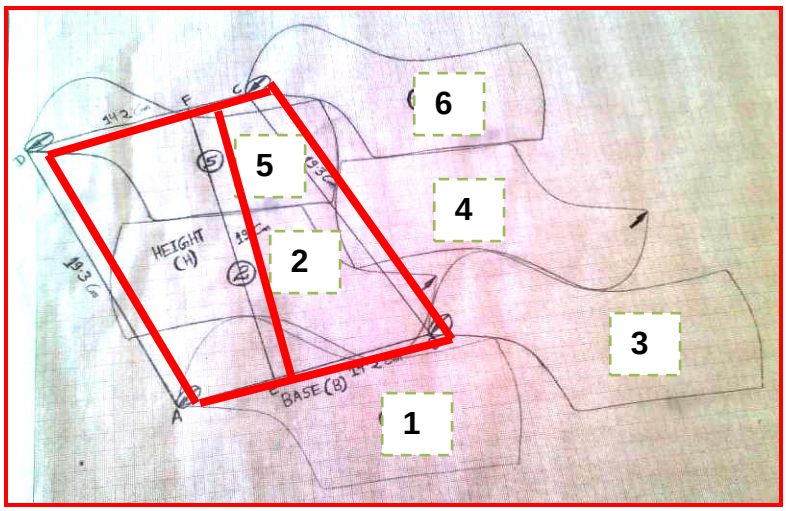
9. Select the four patterns in the same direction and mark the same four points on different four patterns



10. A parallelogram is drawn using location points on the four patterns in the same direction as corners of the parallelogram.



11. Area of parallelogram is calculated as follows



Area of parallelogram (ABCD) = base (B) * height (H)

= AB * EF

= 14.2 cm * 19 cm

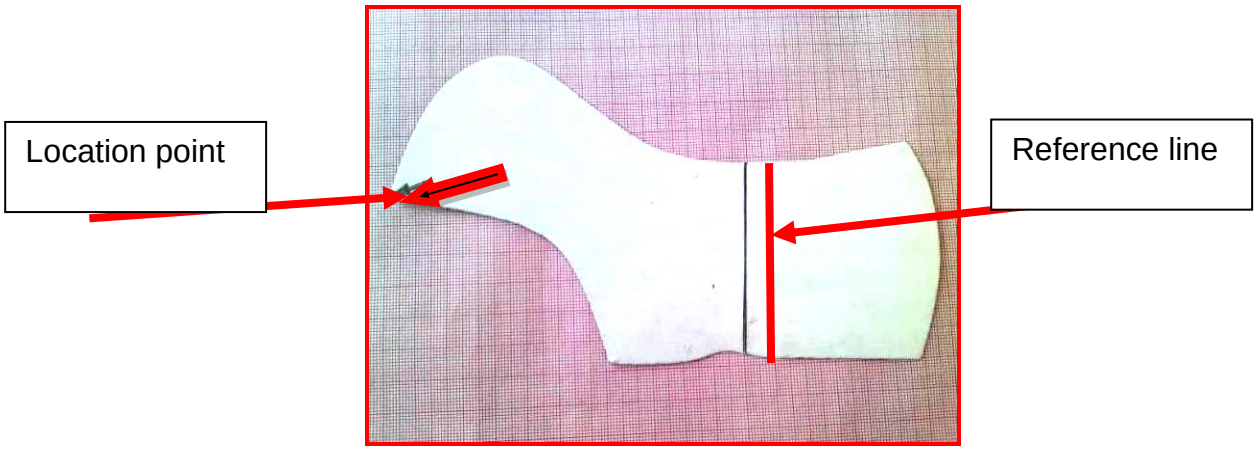
= 269.8 sq. cm.

This shows that the area of parallelogram is equal to the area of two patterns of outside quarter including 1st wastage.

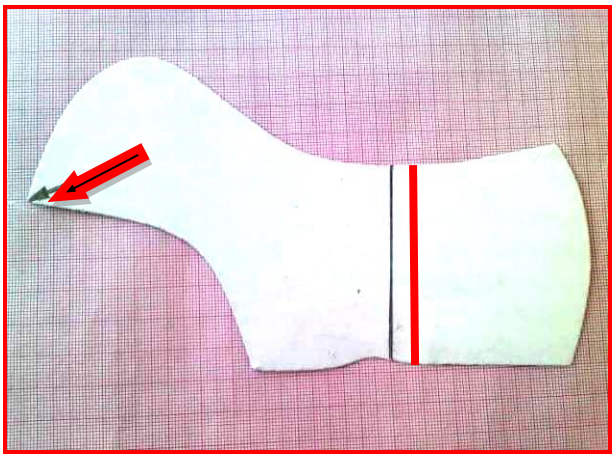
C. Derby inside quarter cut component consumption estimation shown below

The steps are as follows:

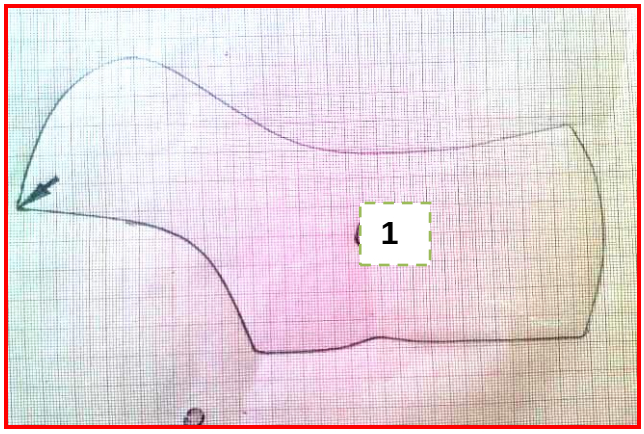
1. Trace the straight line and mark location point on the pattern



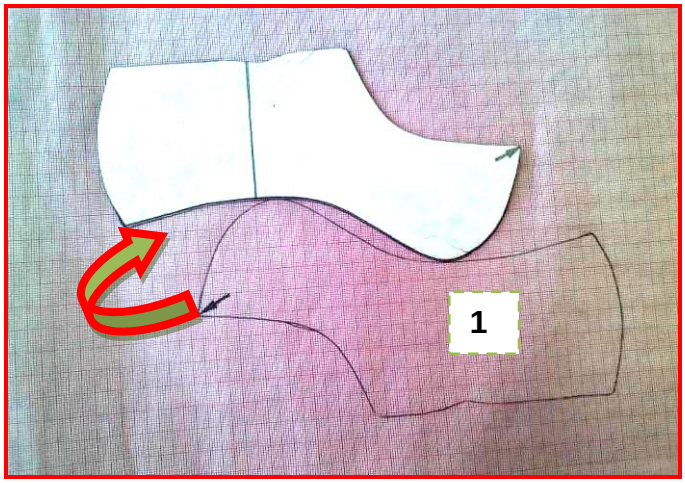
2. Lay the pattern to be traced down on the graph paper in such a way that the line on the pattern is aligned with the line on the paper.

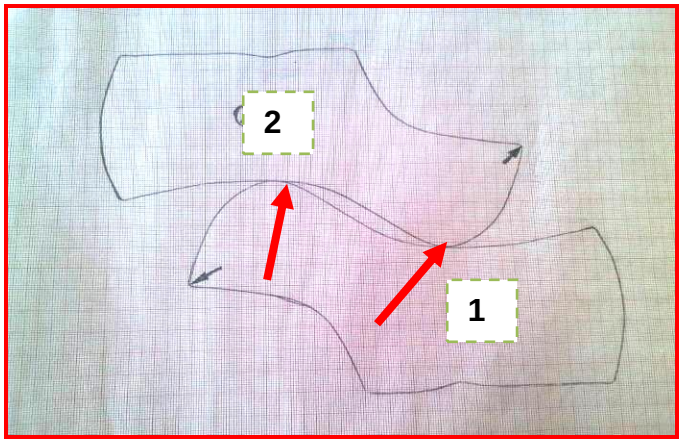


3. Trace round the 1ST pattern with a sharp pencil to get a clear line, mark the location point.

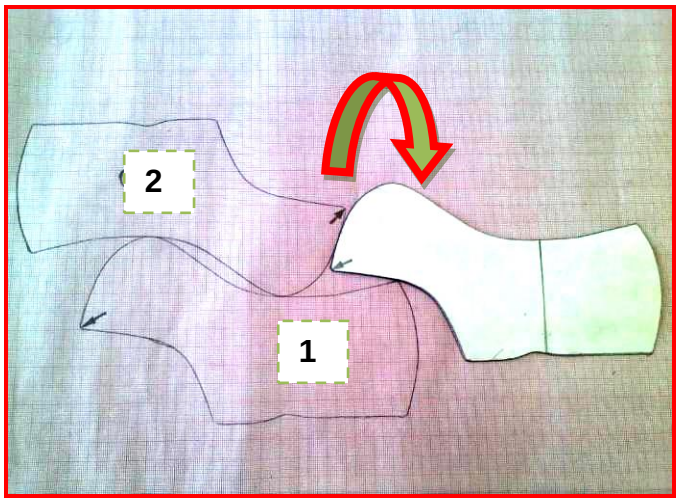


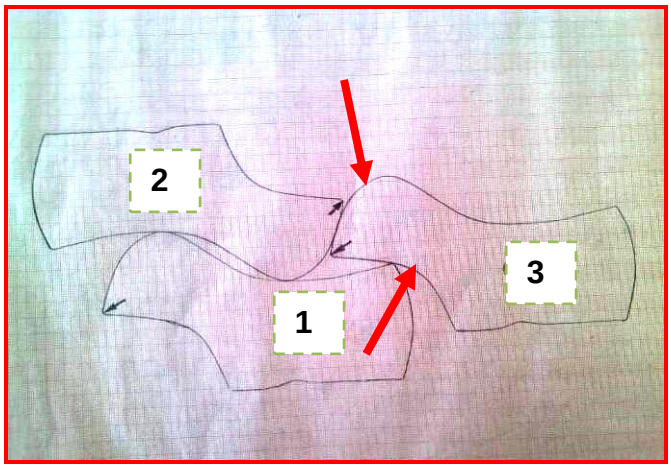
4. The 2nd pattern is then rotated through exactly 180O and interlocking with the first pattern. The second traces must touch the 1st at least two points. Mark the location points on the tracing and mark the trace no.2



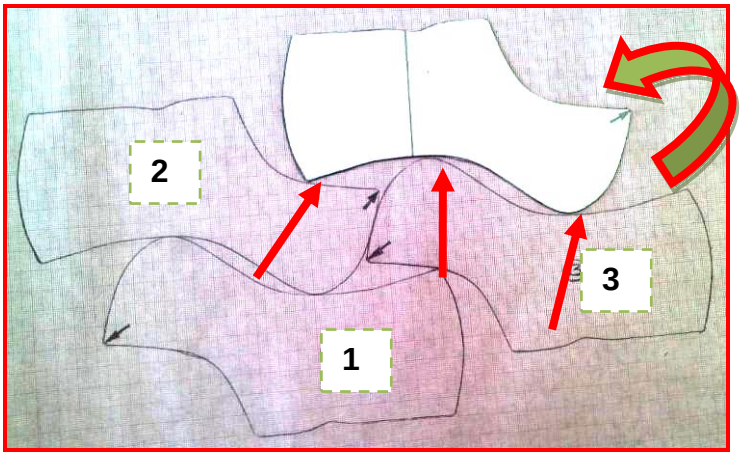


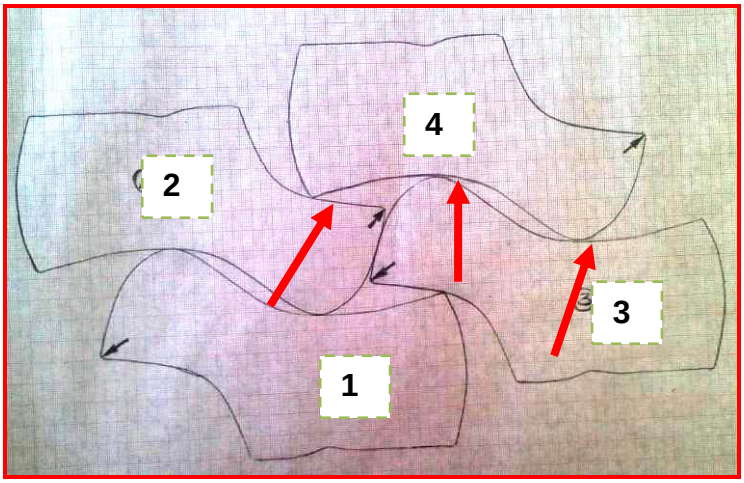
5. 3rd trace again rotated through 180^0 and a 3rd pattern is drawn so that it touches both 1st & 2nd at least two points, in either direction. (Depends on the availability of space on the graph for further pattern). Number it trace no. 3



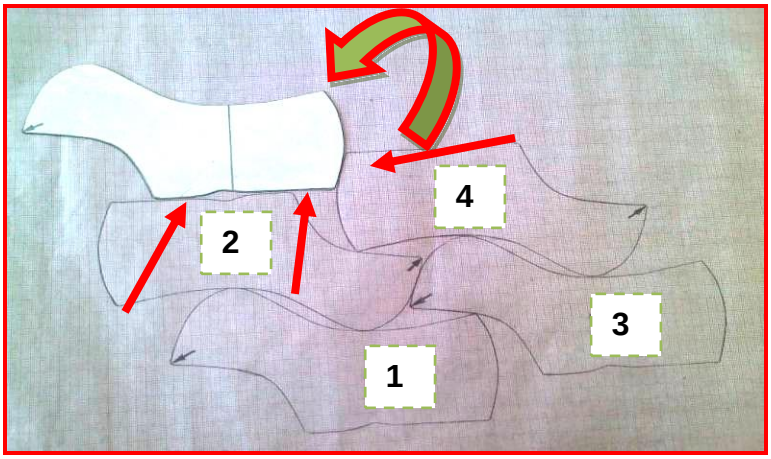


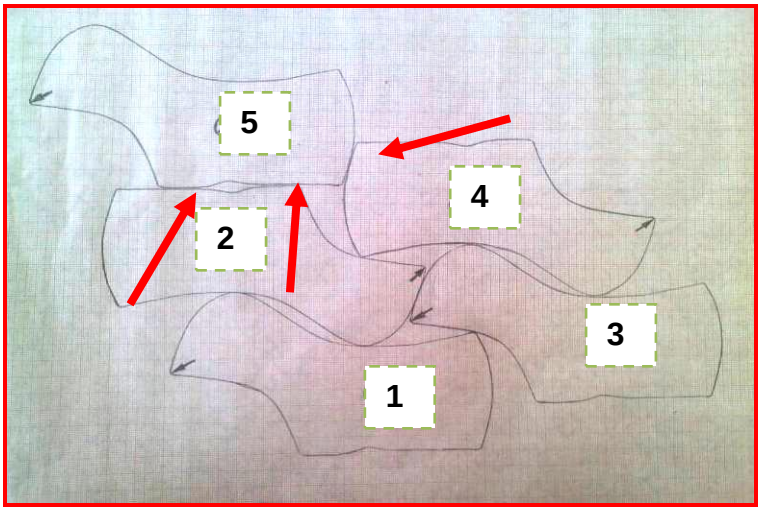
6. Interlock the 4th tracing. This should be interlocked with either 1st &2nd or 2nd & 3rd, but should touch any of them at least two points trace round and Mark the location points and number this trace no.4.



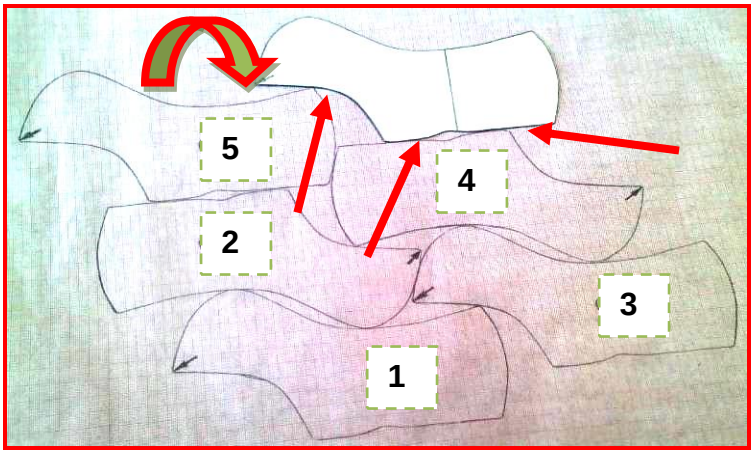


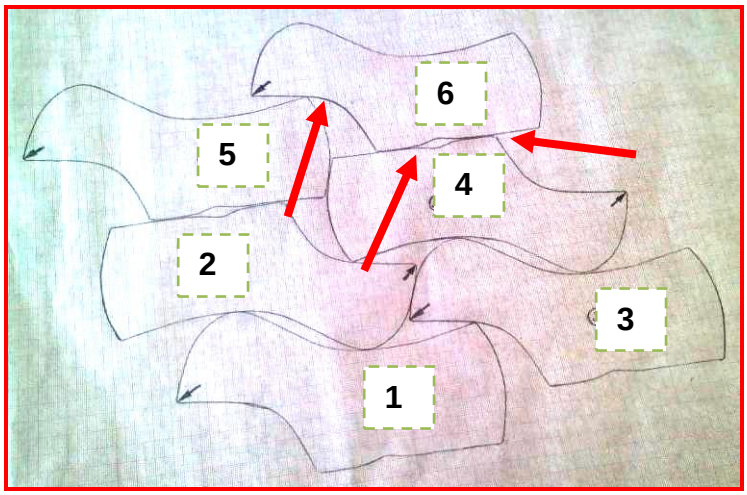
7. The fifth trace must face the same direction as no.1 and should touch 2nd &4th; tracing at least one point each it must face the two tracing in opposite direction. Mark the location points and number this trace no.5.



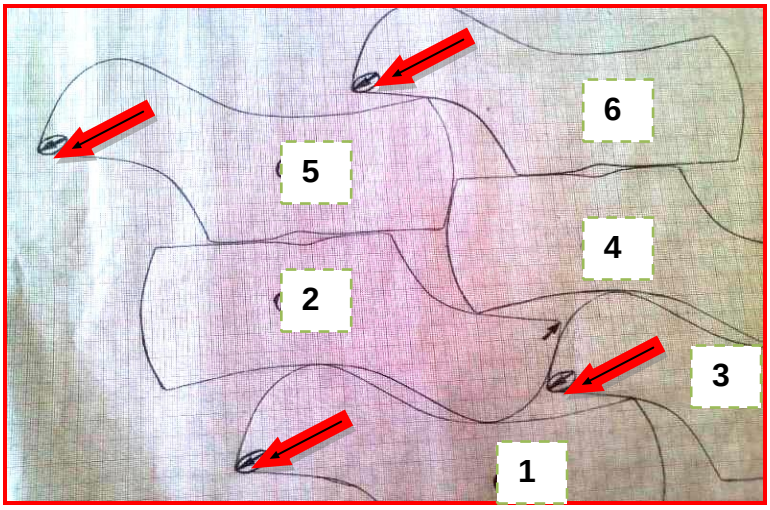


8. The sixth trace faces the same way as no .5 should touch 2nd&5th or 4th &5th, Mark the location points and number this trace no.6.thus, one ends up with 4 tracing the same direction and two in the opposite direction.

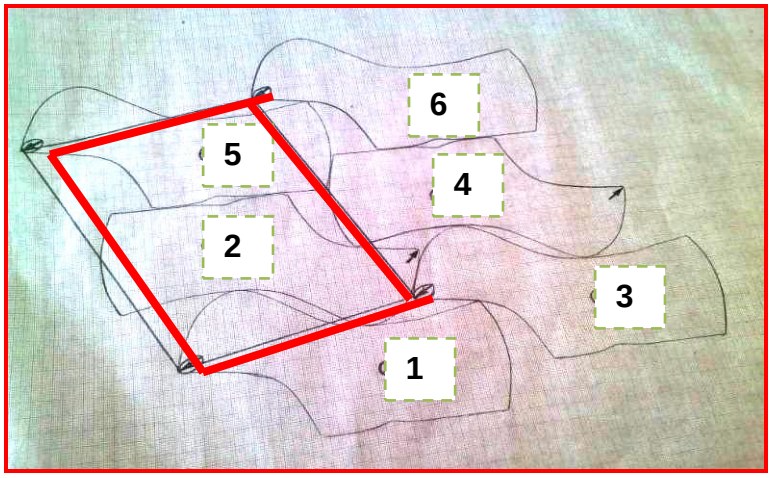




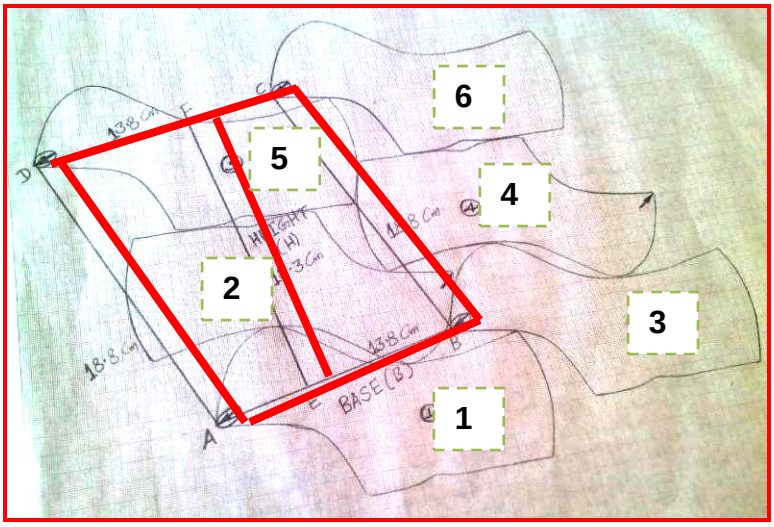
9. Select the four patterns in the same direction and mark the same four points on different four patterns



10. A parallelogram is drawn using like points on the four patterns as corners of the parallelogram.



The dimension of parallelogram



Area of parallelogram (ABCD) = base (B) * height (H)

= AB * EF

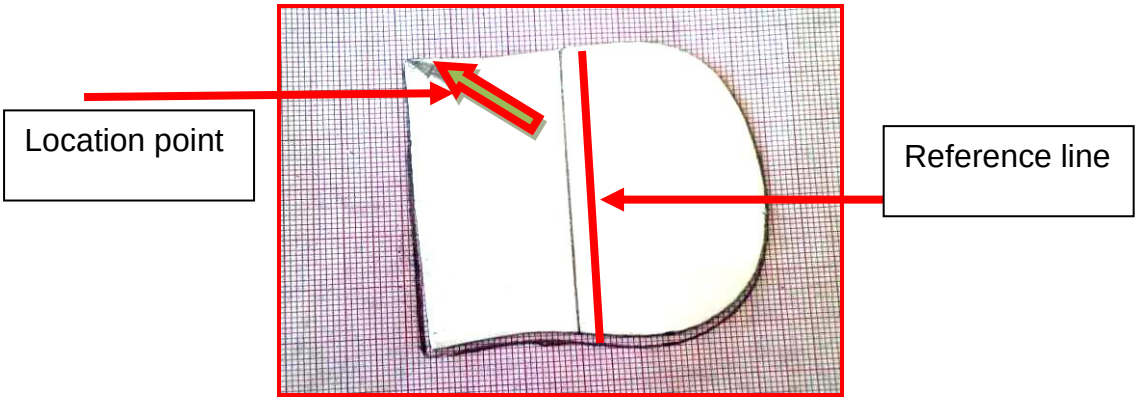
= 13.8 cm * 18.3 cm

= 243.39 sq. cm.

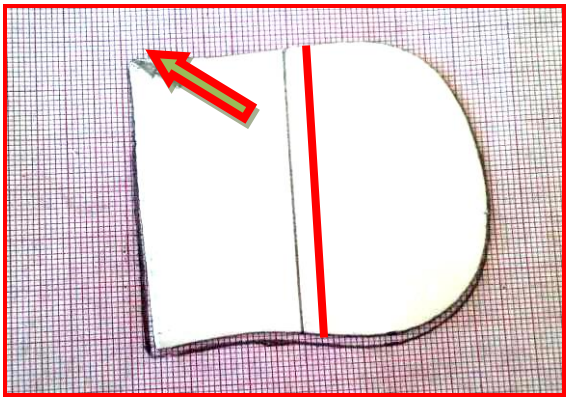
D. Derby Tongue cut component consumption estimation shown below

The steps are as follows:

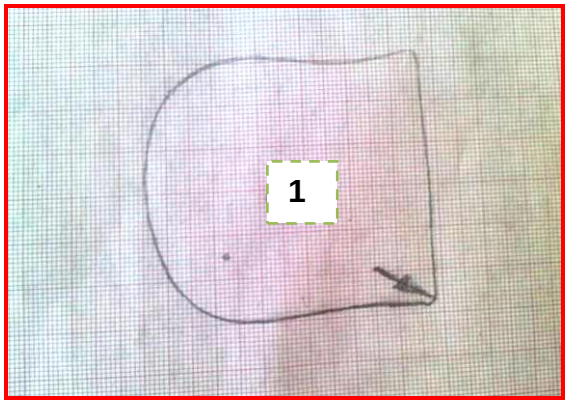
1. Trace the straight line and mark location point on the pattern



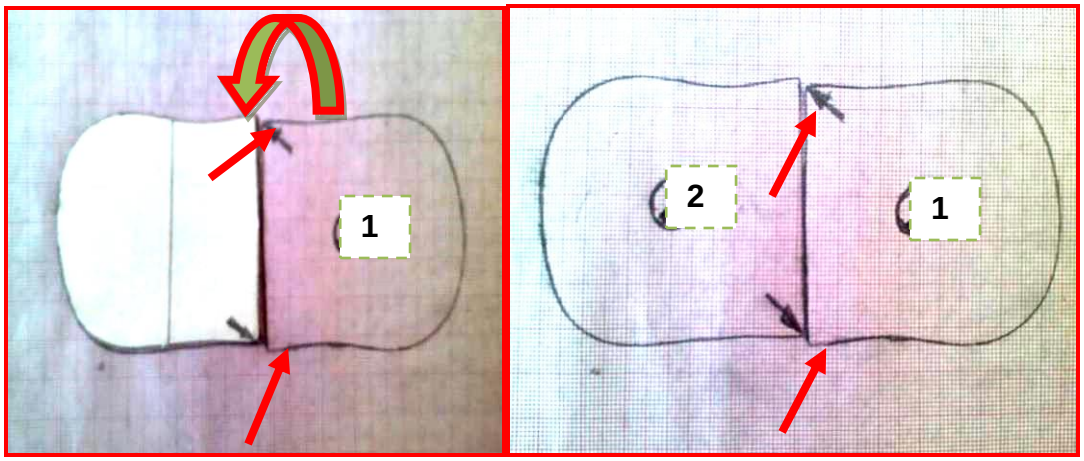
2. Lay the pattern to be traced down on the graph paper in such a way that the line on the pattern is aligned with the line on the paper.



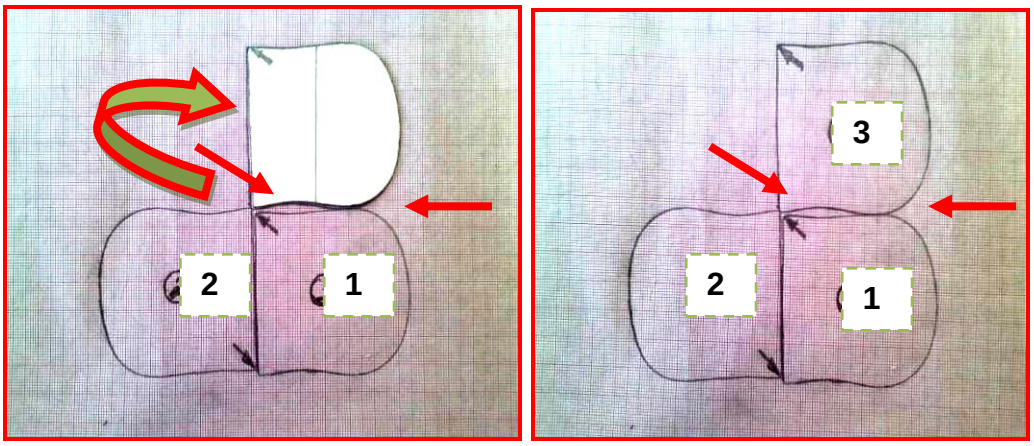
3. Trace round the 1ST pattern with a sharp pencil to get a clear line, mark the location point.



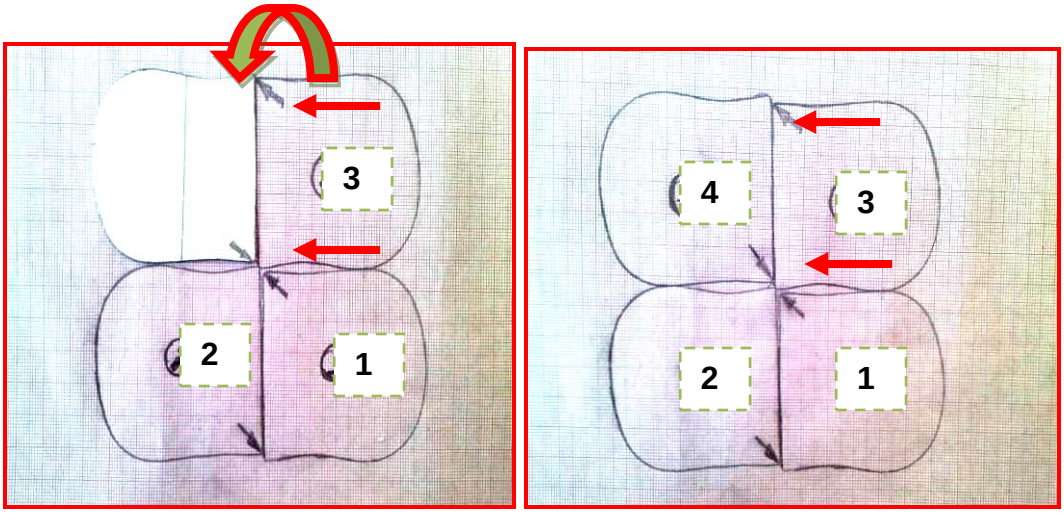
4. The 2nd pattern is then rotated through exactly 180^{O}and interlocking with the first pattern. The second traces must touch the 1st at least two points. Mark the location points on the tracing and mark the trace no.2



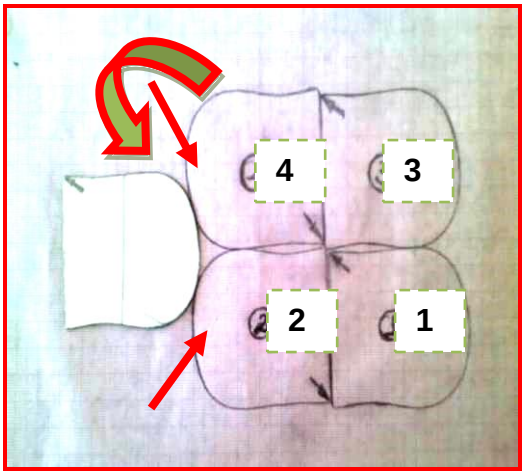
5. 3rd trace again rotated through 180^0 and a 3rd pattern is drawn so that it touches both 1st & 2nd at least two points, in either direction. (Depends on the availability of space on the graph for further pattern). Number it trace no. 3

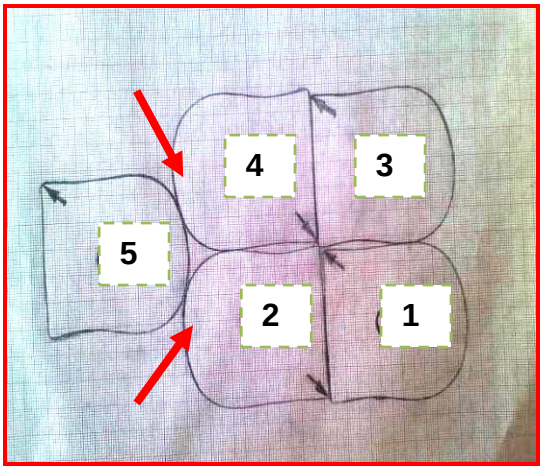


6. Interlock the 4th tracing. This should be interlocked with either 1st &2nd or 2nd & 3rd, but should touch any of them at least two points trace round and Mark the location points and number this trace no.4.

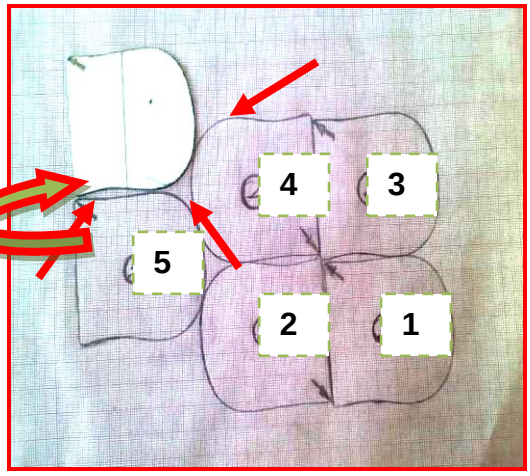


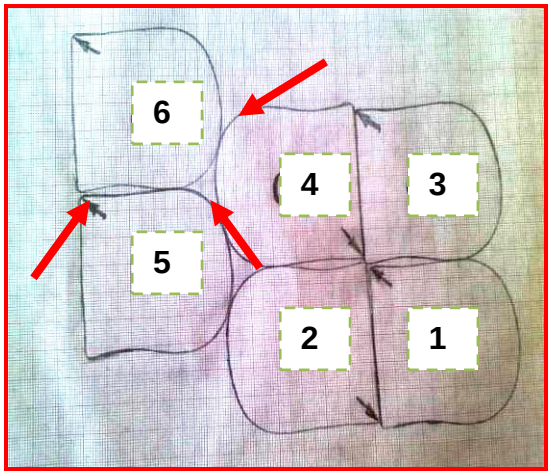
7. The fifth trace must face the same direction as no.1 and should touch 2nd &4th; tracing at least one point each it must face the two tracing in opposite direction. Mark the location points and number this trace no.5.



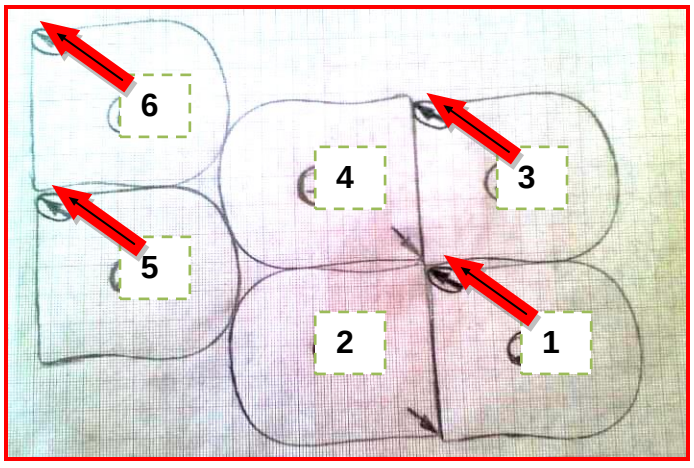


8. The sixth trace faces the same way as no .5 should touch 2nd&5th or 4th &5th, Mark the location points and number this trace no.6.thus, one ends up with 4 tracing the same direction and two in the opposite direction.



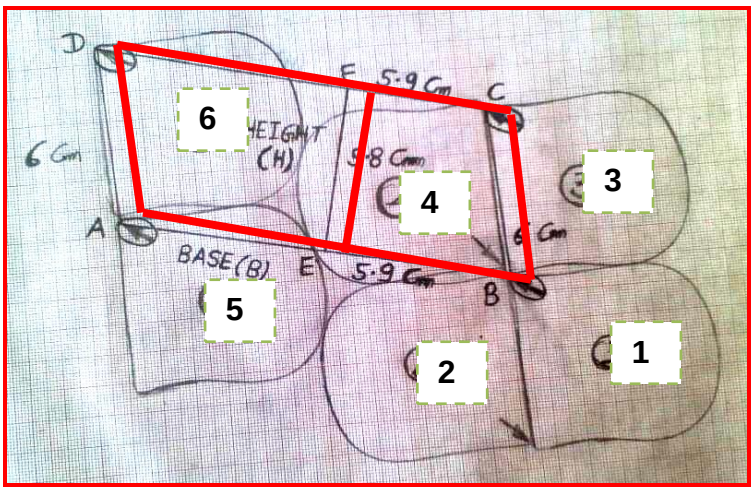


9. Select the four patterns in the same direction and mark the same four points on different four patterns



10. A parallelogram is drawn using location points on the four patterns as corners of the parallelogram.

The dimension of parallelogram



Area of parallelogram (ABCD) = base (B) * height (H)

= AB * EF

= 5.9 cm * 5.8 cm

= 34.22 sq. cm.

R.S.M ALLOWANCE SHEET **Date** 18/05/2010

Upper/Lining UPPER Article / Model No WR-19-9101 Size 41

Average skin size (A) Material 1 41.8Dm^2 Leather grade C Leather Type Sheep Upper

Material 2_____ Leather grade_____Leather type_____

Material 3_____ Leather grade_____Leather type _____

S.No	Parts	No. of comps.	Scaling Dimension	Pattern Scale Area(S)	Gross pattern area(G)Dm2		
					Material1	Materia	Material

		per pair	(cm)	Dm2		l2	3
01	Vamp	2	29.6×17.5	5.18	6.88		
02	Tuong	2	5.9×5.8	.34	.42		
03	Quarter inside	2	13.3 x 18.3	2.43	3.07		
04	Quarter outside	2	14.2×19	2.7	3.43		
			Total Gross Area(G)		13.8		
			3rd Wastage 13%		1.79		
			Allowance (T)		15.59Dm2 =1.68 sq.ft		

SECOND WASTE

Waste additional to the first waste. This depends on the following factors :

(i) The shape of the skin to be used, because the pattern shape however fitted together will not coincide in outline with that of a skin which results in edge waste.

(ii) The size (or area) of the skin in relation to the size of the individual pattern shapes, since the larger the area, the smaller the waste and the smaller the area the larger the waste.

(iii) General shoe making considerations in which certain parts are to be cut from certain portion of the skin or in certain direction according to the direction of stretch or shade matching and color matching in individual pieces as a result of which the interlocking arrangement may be destroyed.

Pattern scale area when added with the second waste allowance is called GROSS AREA (G). This depends on different kind of leather also. For calculating G we use certain empirical formulas as :

For F/G side.

$$G = S\ (1.205 + S / A)$$

where, S = Pattern scale area

A = Area of the skin

1.205 = This is an area addition that forms part of the mathematical equation. This is constant factor for a particular kind of skin.

If $S / A > 0.185$ i.e. if the pattern item size is bigger than the skin size e.g. ladies ¾ cut court shoe vamp to be cut from goat leather then $G = S\ (1.02 + 2\ S / A)$.

In the case of suede

$$G = S\ (1.098 + S / A)$$

THIRD WASTE

It relates to the cuttability grades of leather. On a first grade leather normally an allowance of 3% is given while on the other grades i.e. the grade after first grade % allowance vary by 5%.

A table of cutting value is given below :

Grade	Cutting Value	Wastage
A or 1	100% to 97%	Up to 3%
B or 2	96% to 92%	8%
C or 3	91% to 87%	13%
D or 4	86% to 82%	18%
E or 5	81% to 77%	23% etc.

Adjustment for Size and Fittings

Different shoe sizes and fittings will require different cutting areas.

- The difference in cutting area between one size and the next, and also between one fitting and the next will be in regular step in respect of any particular pattern.

For example in English size system for gents sizes 5% material allowance is given on the material allowance for each full size and 2.5% for each half size while in French system (Paris points) in gents sizes 3.5% material allowance is given for each size.

- Some extra allowance may be given for some other factors for example

- Bicolor or multicolor styles used in a style. Some extra allowance may be given for bicolor or multicolor styles as in this case edge waste will be more. In some cases one can treat to different color as different color batches. Here also some extra allowance may be added.
- Further percentages are added to allow for different shoe sizes and fittings.

Calculation of Weighted Norms

As we have discussed earlier that the consumption from one side to another increases or decreases for 5% and for half sizes 2.5% in English sizing system whereas in French it changes by 3.5%.

The norm of each size calculated from the costing norm is called weighted norm. This is illustrated in the given example.

Example

The costing norm for oxford size 8 is 25 SDM calculate the weighted norms for size 6 size 7 size 9 and 10 of the same article.

Solution

Size	6	7	**8**	9	10
Norm	22.56	3.75	**25**	26.25	27.56
	23.75 – 5% of 23.75)	(25 – 5% of 25)		(25 + 5% of 25)	(26.25+5%of 26.25)
	= 23.75 – 1.19	= 25 – 1.25		= 25 + 1.25)	= 26.25 + 1.31
	= 22.56 SDM	= 23.75 SDM		= 26.25 SDM	= 26.56 SDM

Hence the weighted norms for size 6, 7, 9, 10 are 22.56 SDM, 23,75 SDM, 26,25 SDM, 26.56 SDM respectively.

Points to Watch while Calculating Material Consumption, by RSM

- Do not turn over the pattern, while doing pattern scaling.
- Use the most economical interlocking position.
- Always ensure that the center line drawn on the patterns are parallel to the lines on the graph paper and the center line should never be thick.
- Make sure that the patterns do not overlap.
- Sometimes it may be necessary to position a 7^{th} pattern in between to achieve the best interlock. This can be shown in the diagram by the dotted line. (to be shown with same pattern).

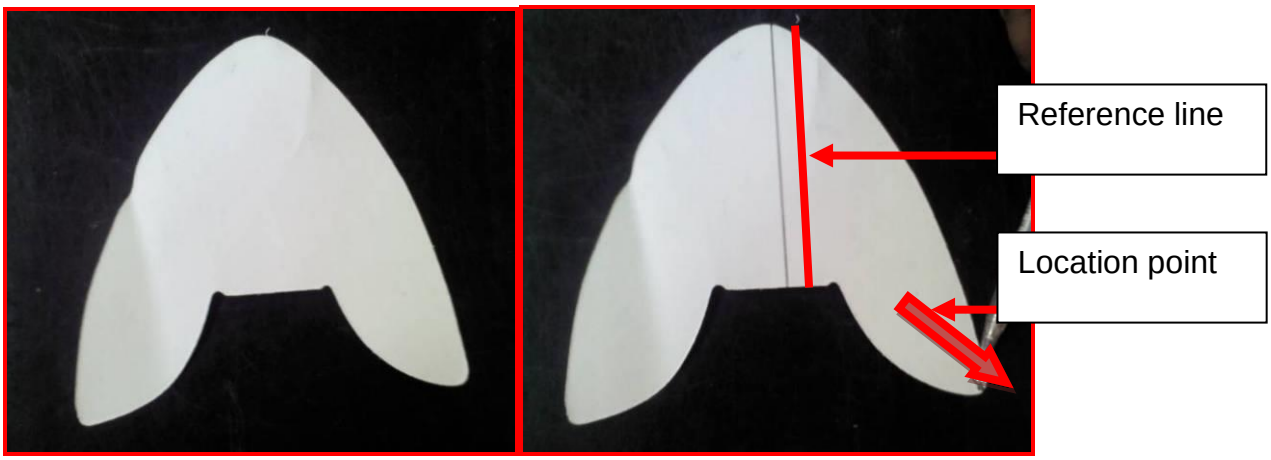
- Whichever method is used, it is important that each new delivery of leather must be assessed to find the cuttability and area discrepancy in leather.

II. PATTERN SCALING FOR 0 METHOD

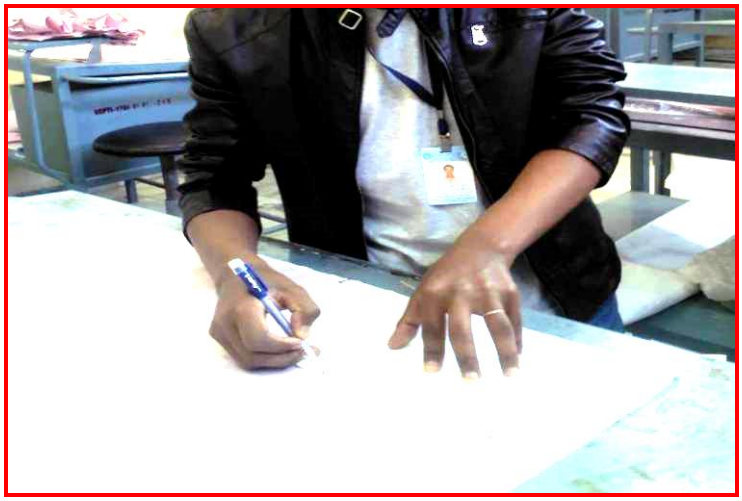
A. Derby vamp cut component consumption shown below

Steps are as follows:

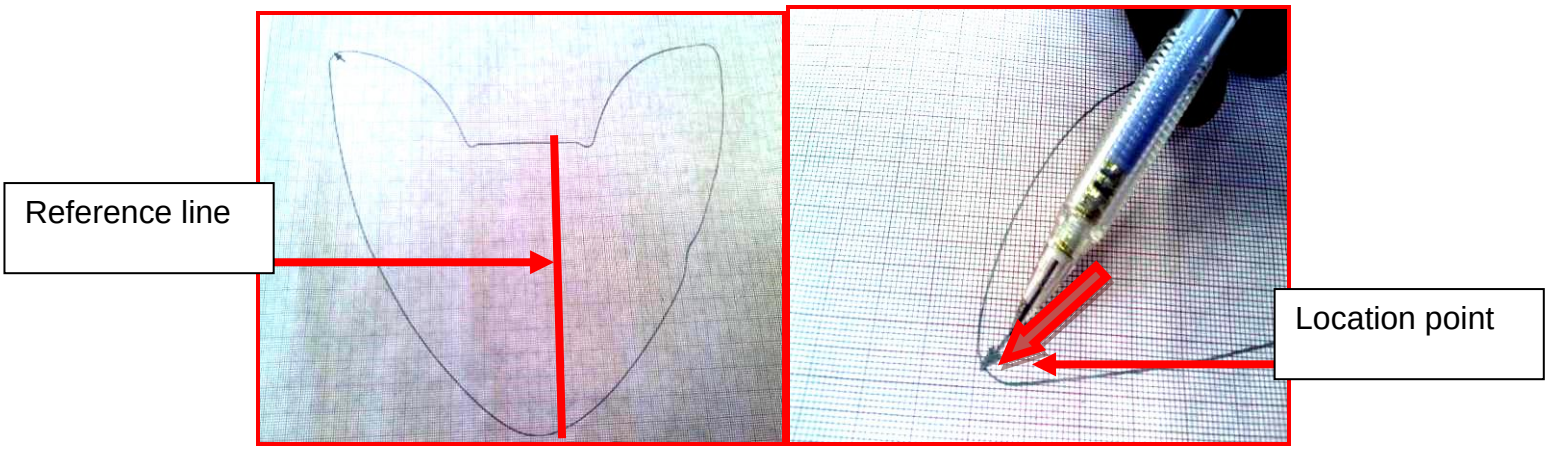
13. Trace the straight line and mark location point on the pattern

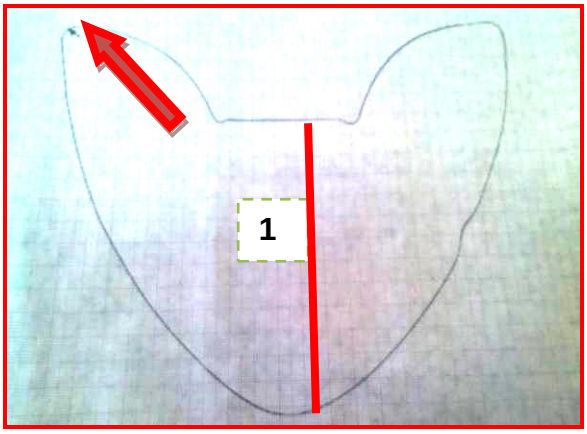


14. Lay the pattern to be traced down on the graph paper in such a way that the line on the pattern is aligned with the line on the paper.

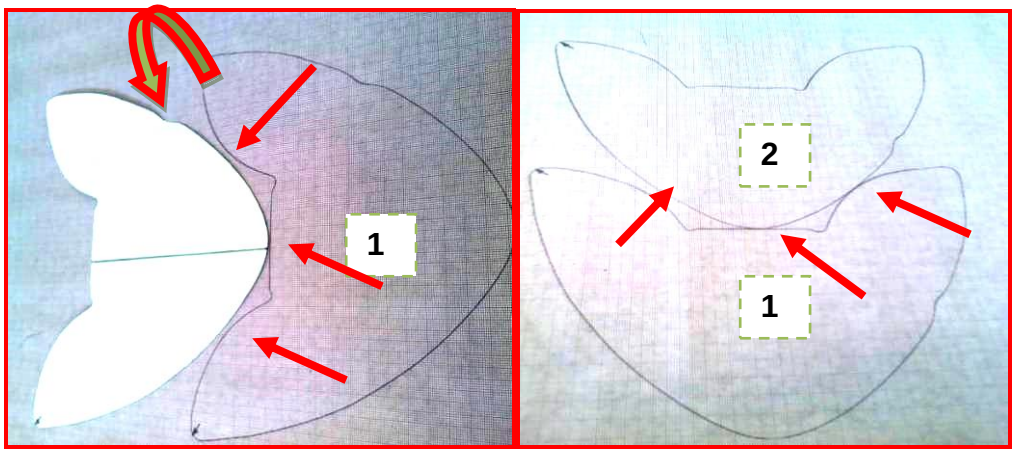


15. Trace the pattern with a sharp pencil to get a clear line, mark the location point.

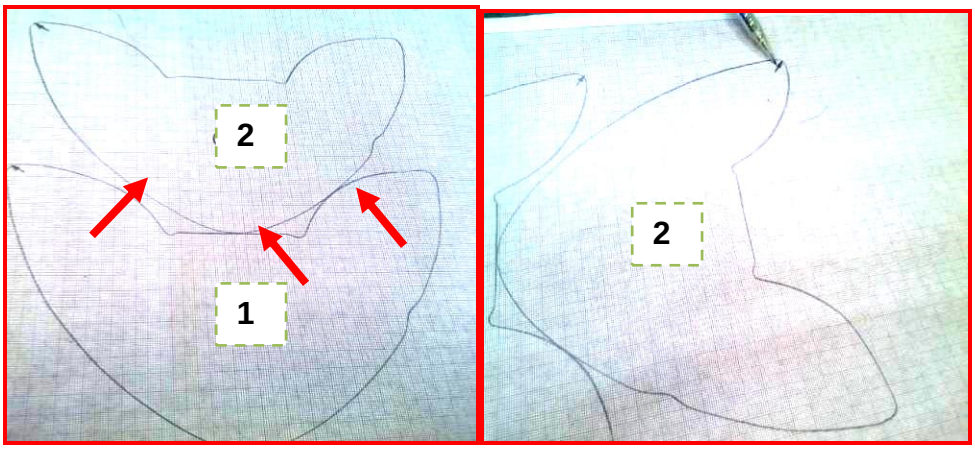




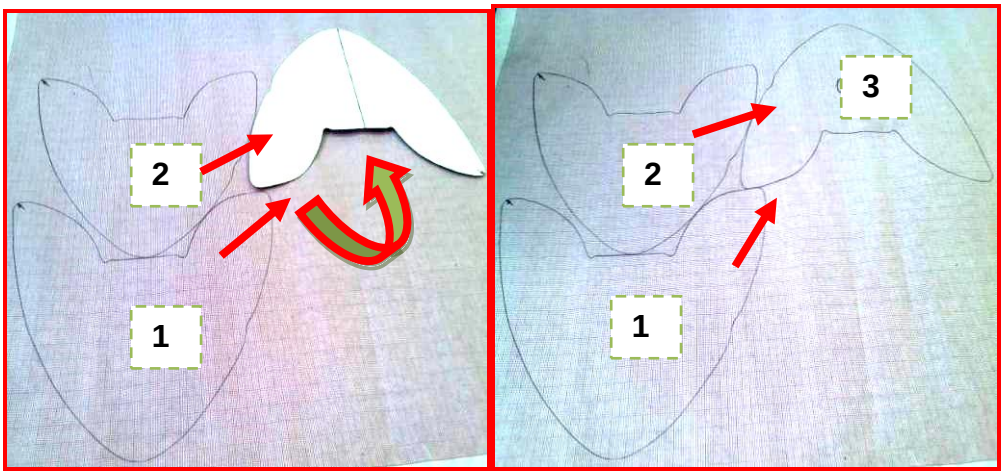
16. The next tracing is drawn in the same way as no.1 in the same direction (i.e. without rotating). Second pattern should touch the first pattern at two possible points.



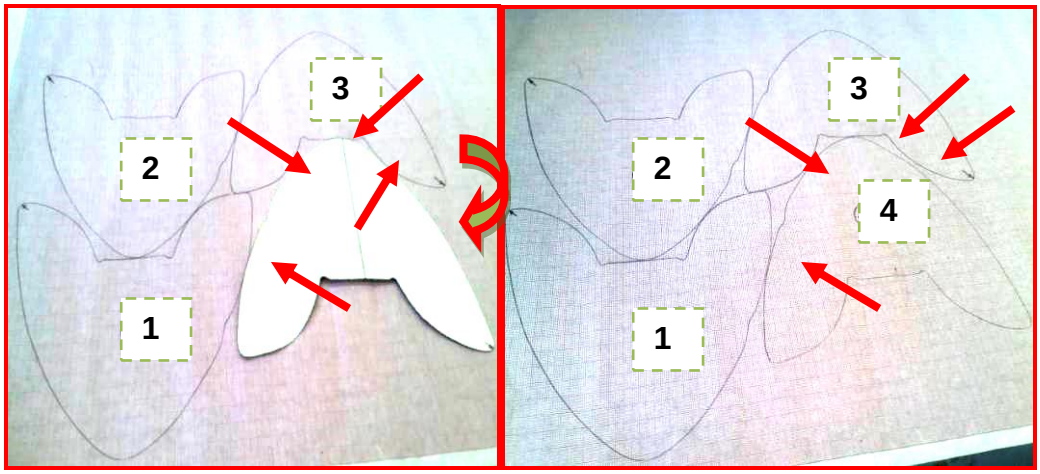
17. Mark the location point and number as pattern no.2.



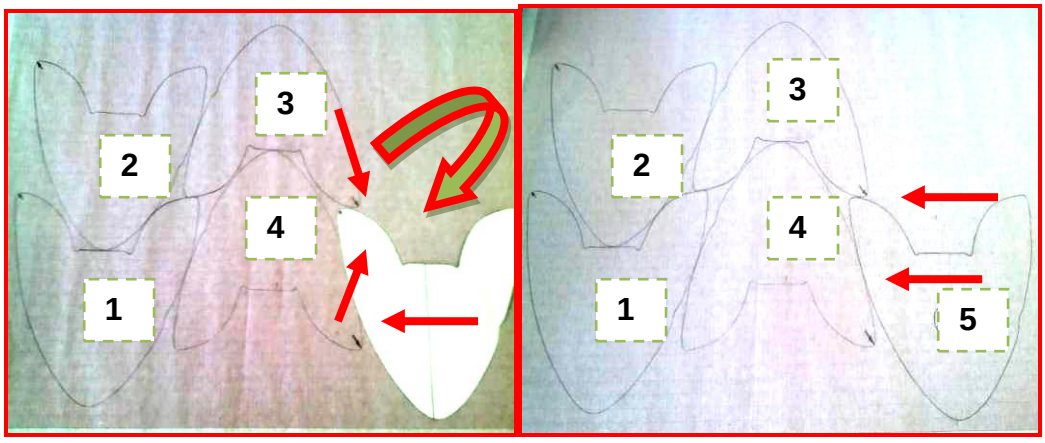
18. To trace the 3rd pattern, the pattern is rotated by 180 and it must touch 1st & 2nd at least at two points, in either direction, aligning the centre line. The location points and number is marked.

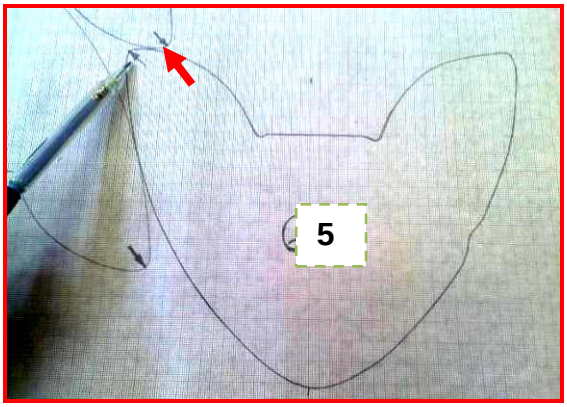


19. The 4th tracing will be same as no.3 and it must touch 1 & 3 & 2 & 3, at least at two points. Location point is marked and number as 4.

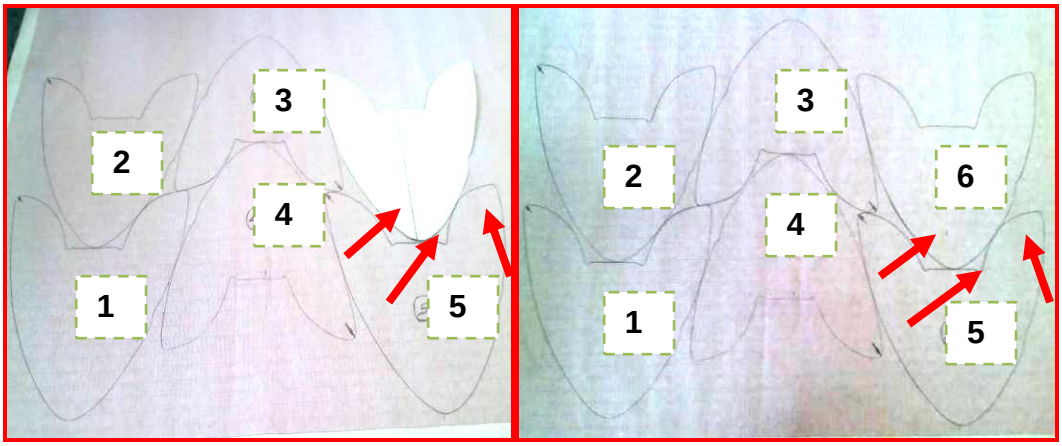


20. The 5th pattern is again rotated by 180 i.e. in the same direction as no.1. It should touch 3 & 4 at least at two points.

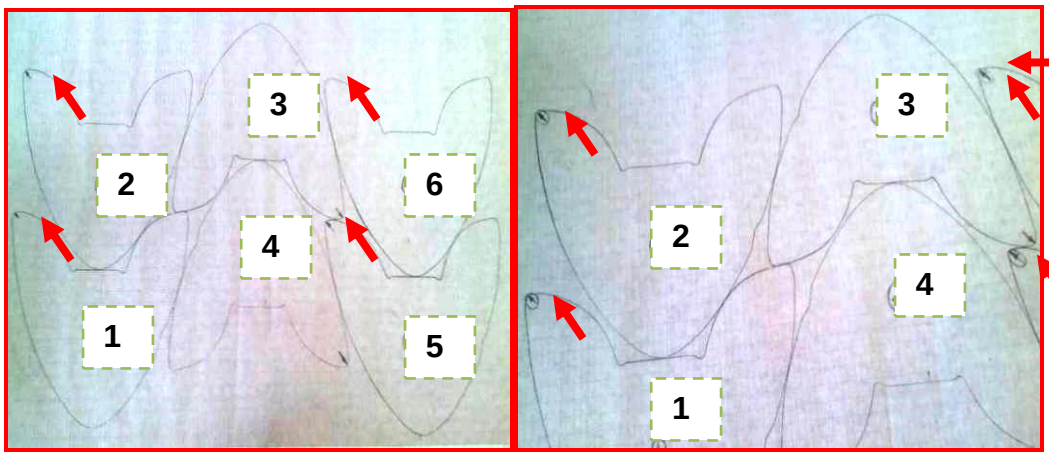




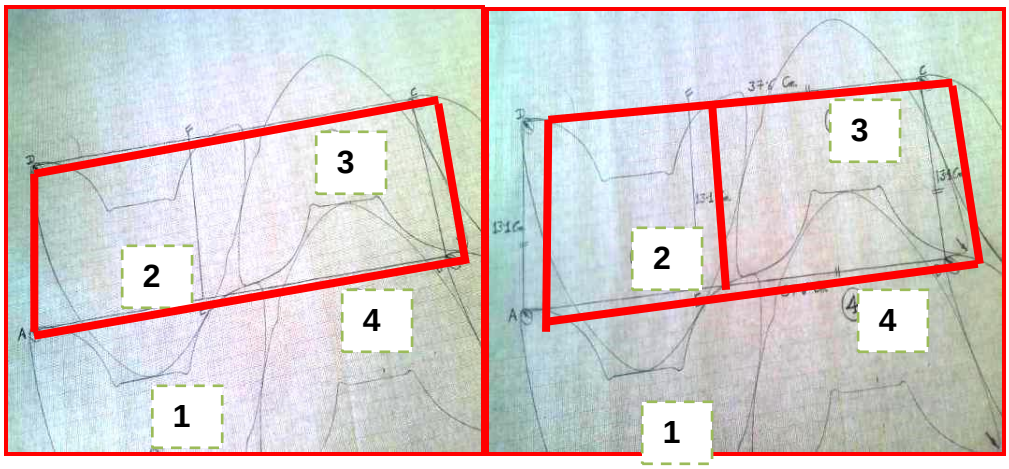
21. The 6th tracing must face the same direction as No.5 and touch 4 & 5, or 3 & 5 at least at two points.



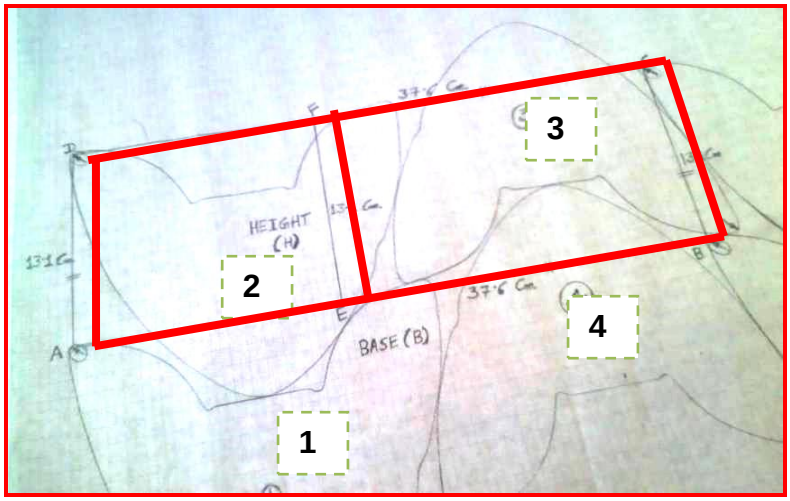
22. The sequence is repeated until a nest of interlocking patterns is produced that has four patterns facing in the same way.



23. A parallelogram is drawn using location points (same direction) on the four patterns as corners.



24. The area of the parallelogram is calculated (length & height) and this is used as the basis for allowance calculation. The area of parallelogram (ABCD) is called the scale area of the pattern item.



Area of parallelogram (ABCD) = base (B) * height (H)

= AB * EF

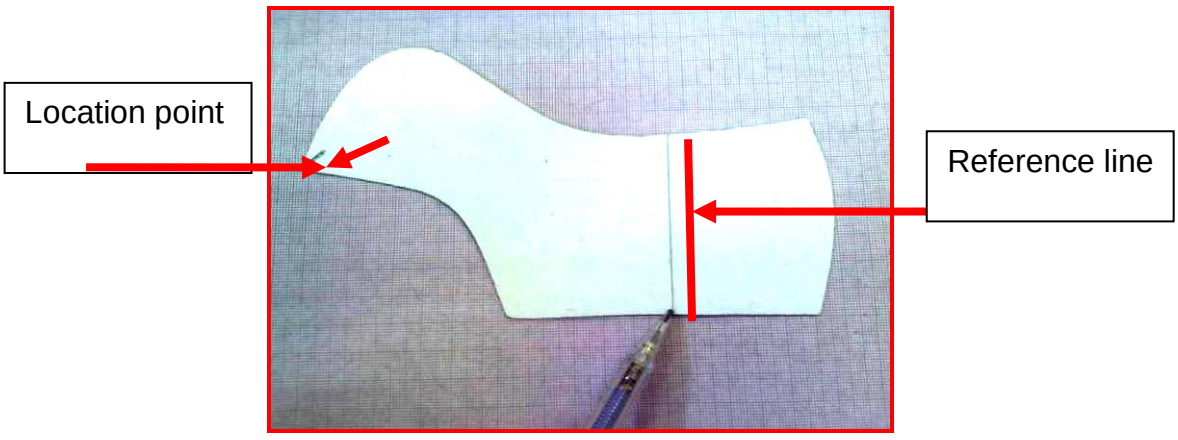
= 37.6 cm * 13.1 cm

= 492.56 sq. cm.

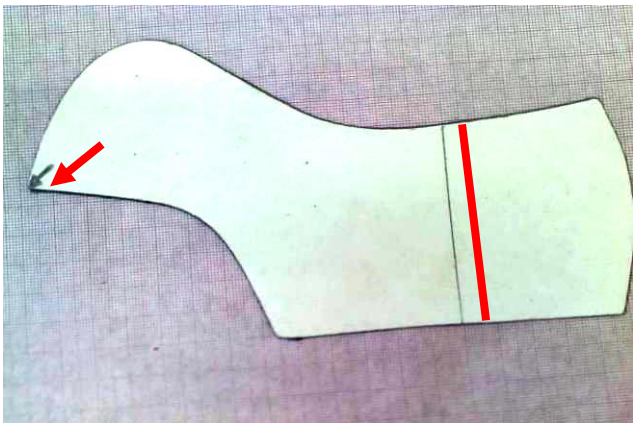
B. Derby outside cut component consumption estimation shown below

Steps are as follows:

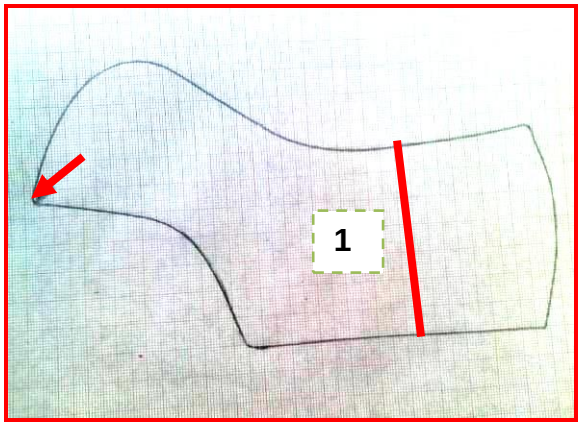
1. Trace the straight line and mark location point on the pattern



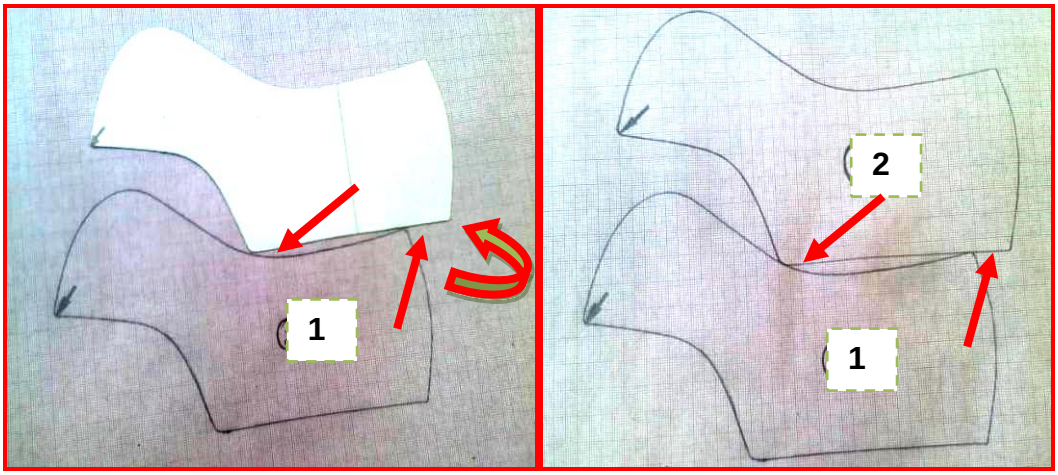
2. Lay the pattern to be traced down on the graph paper in such a way that the line on the pattern is aligned with the line on the paper.



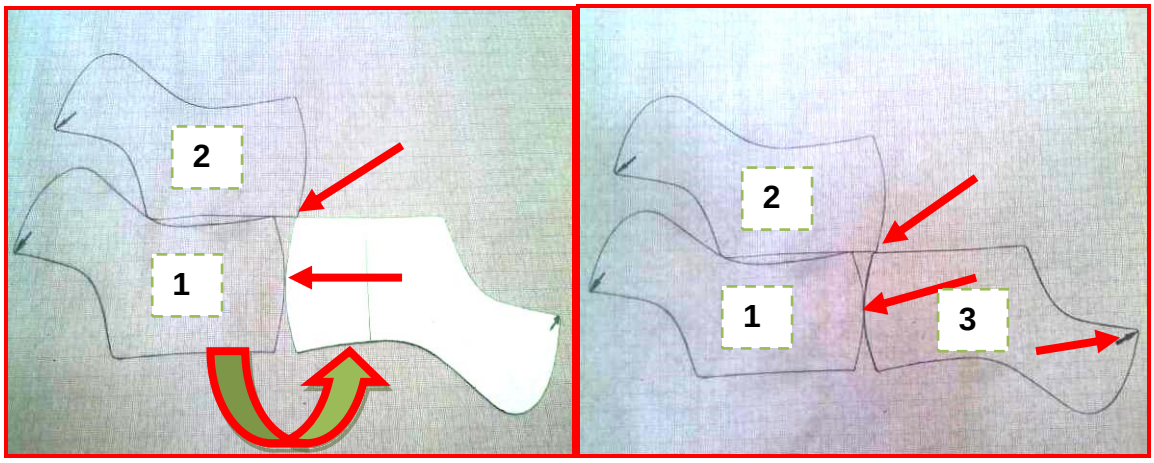
3. Trace round the pattern with a sharp pencil to get a clear line, mark the location point.



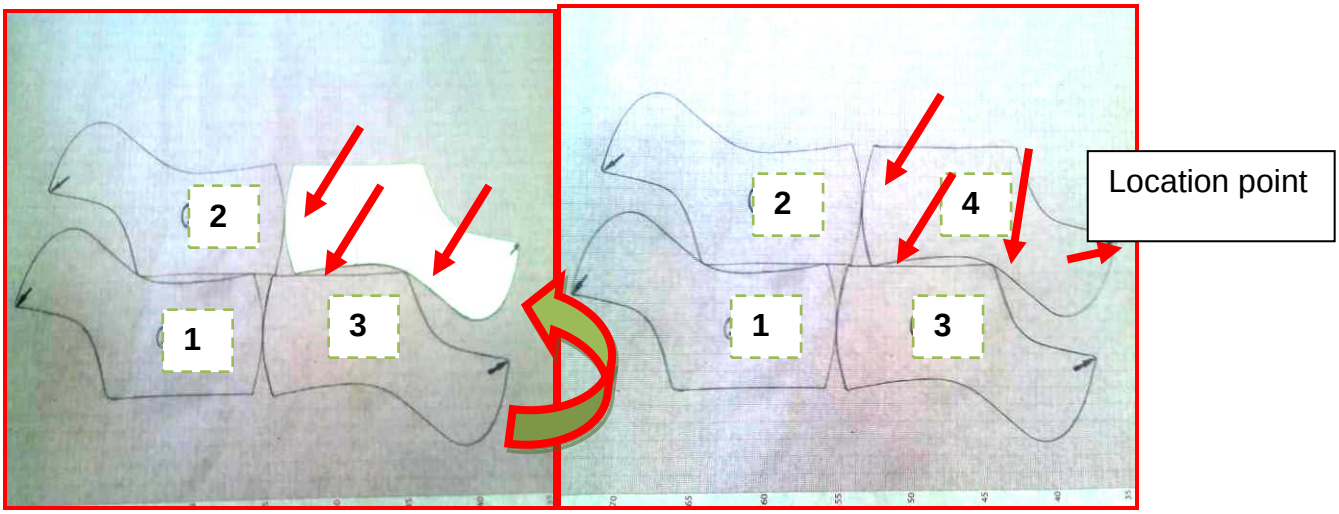
4. The 2nd tracing is drawn in the same way as no.1 in the same direction (i.e. without rotating). Second pattern should touch the first pattern at two possible points. Mark the location point and number as pattern no.2.



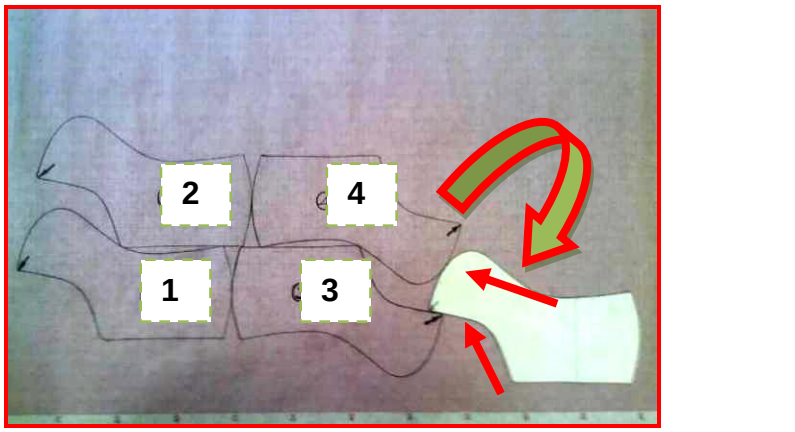
5. To trace the 3rd pattern, the pattern is rotated by 180 and it must touch 1st & 2nd at least at two points, in either direction, aligning the centre line. The location points and number is marked.

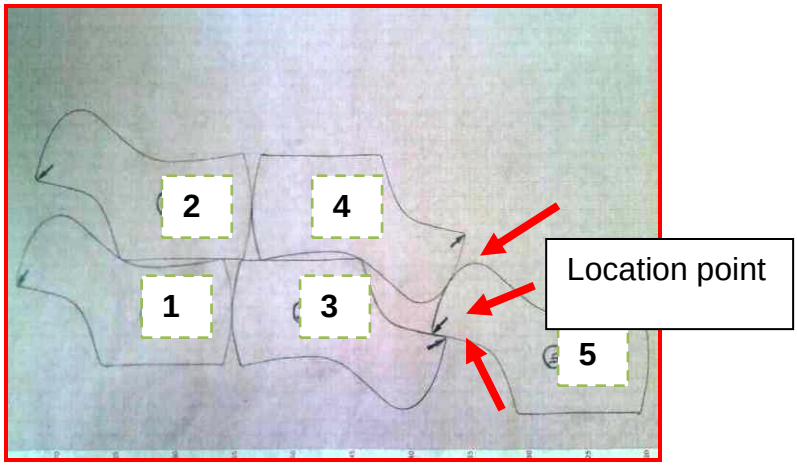


6. The 4th tracing will be same as no.3 and it must touch 1 & 3 & 2 & 3, at least at two points. Location point is marked and number as 4.

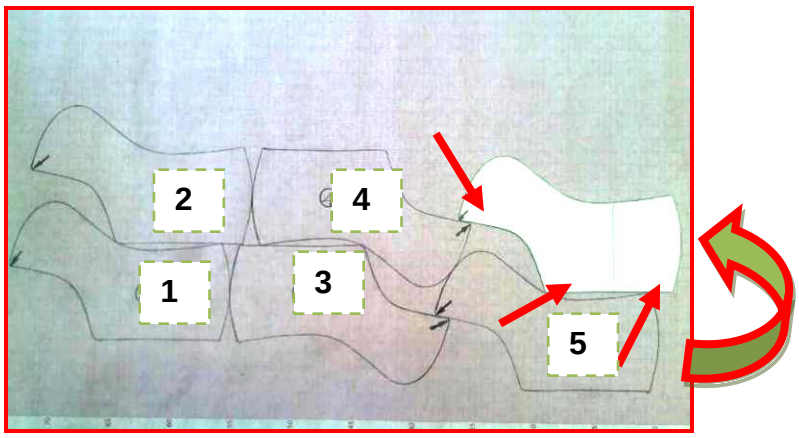


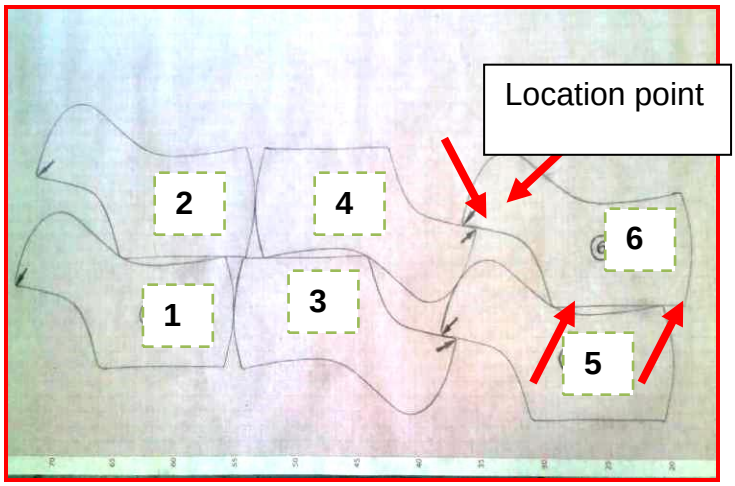
7. The 5th pattern is again rotated by 180 i.e. in the same direction as no.1. It should touch 3 & 4 at least at two points.



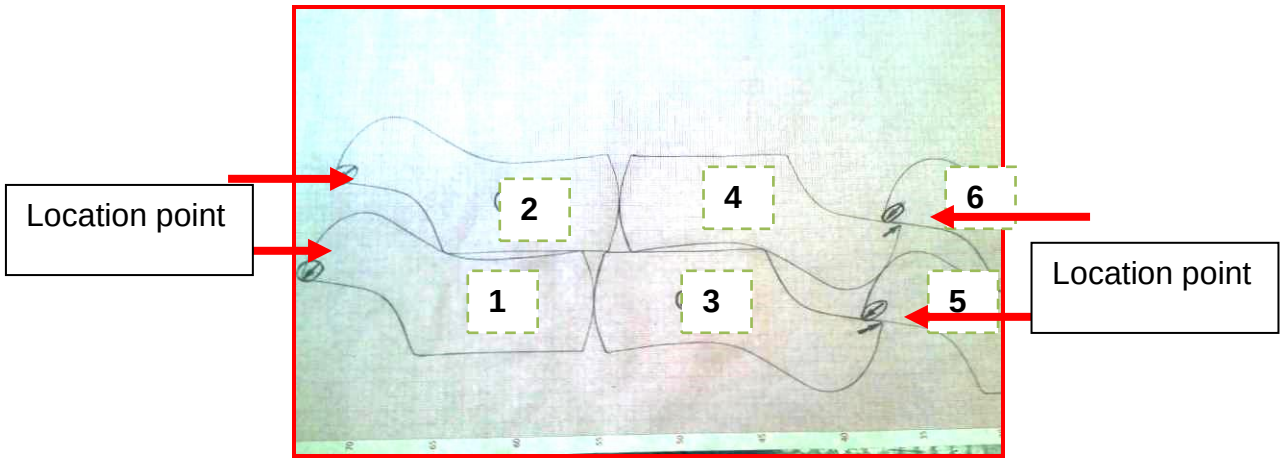


8. The 6th tracing must face the same direction as No.5 and touch 4 & 5, or 3 & 5 at least at two points.

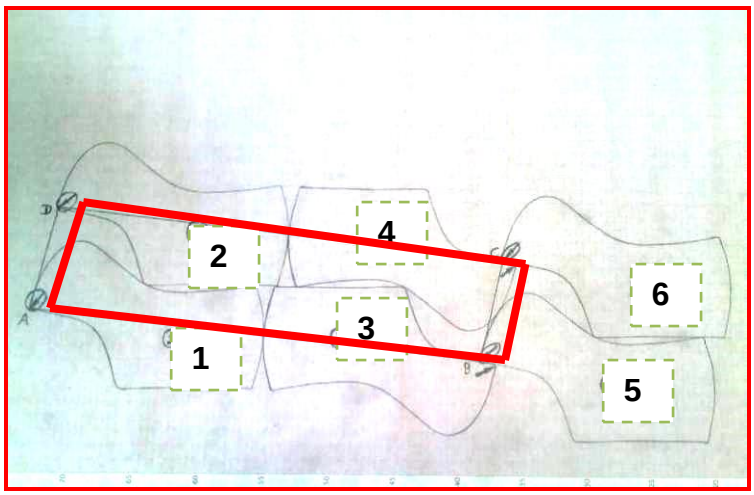




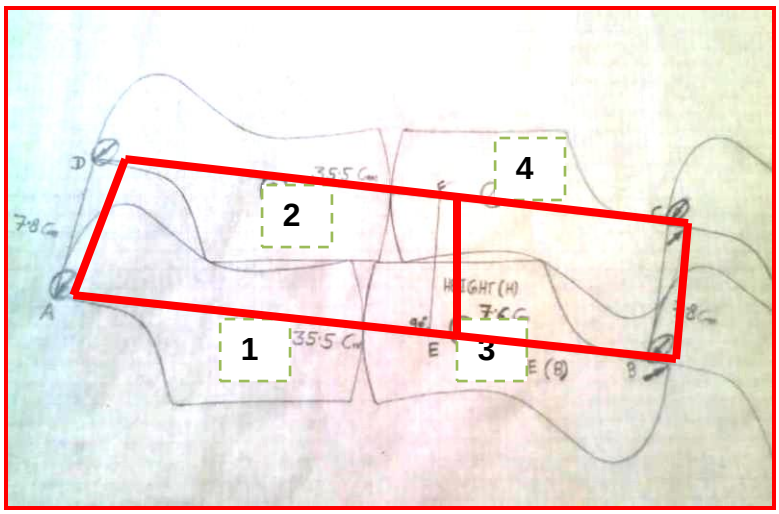
9. The sequence is repeated until a nest of interlocking patterns is produced that has four patterns facing in the same way.



10. A parallelogram is drawn using location points (same direction) on the four patterns as corners.



11. The area of the parallelogram is calculated (length & height) and this is used as the basis for allowance calculation. The area of parallelogram A(ABCD) is called the scale area of the pattern item.



Area of parallelogram (ABCD) = base (B) * height (H)

= AB * EF

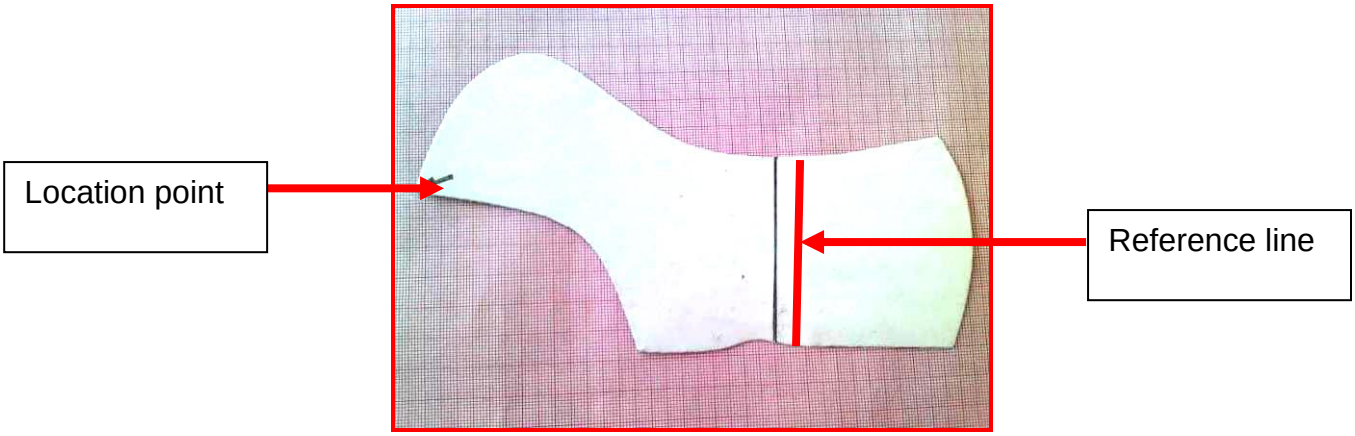
= 35.5cm * 7.6 cm

= 269.8 sq. cm.

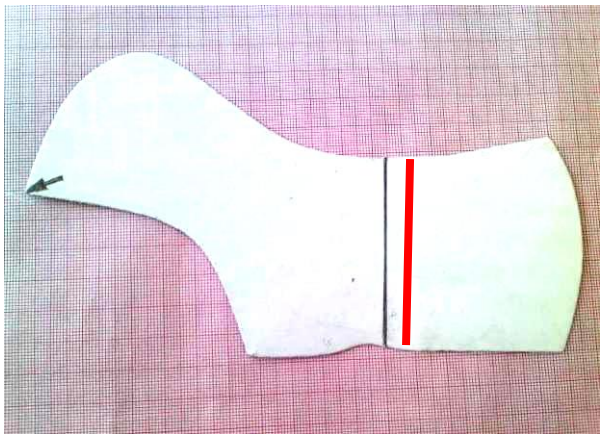
C. Derby inside cut component consumption estimation shown below

Steps are as follows:

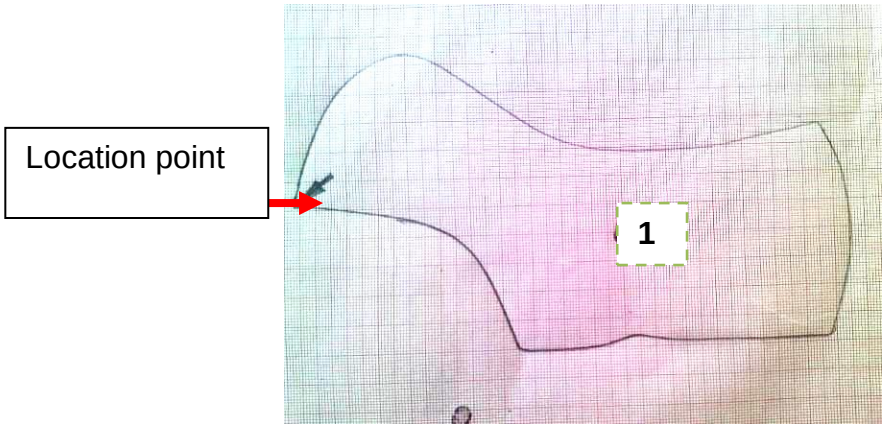
1. Trace the straight line and mark location point on the pattern



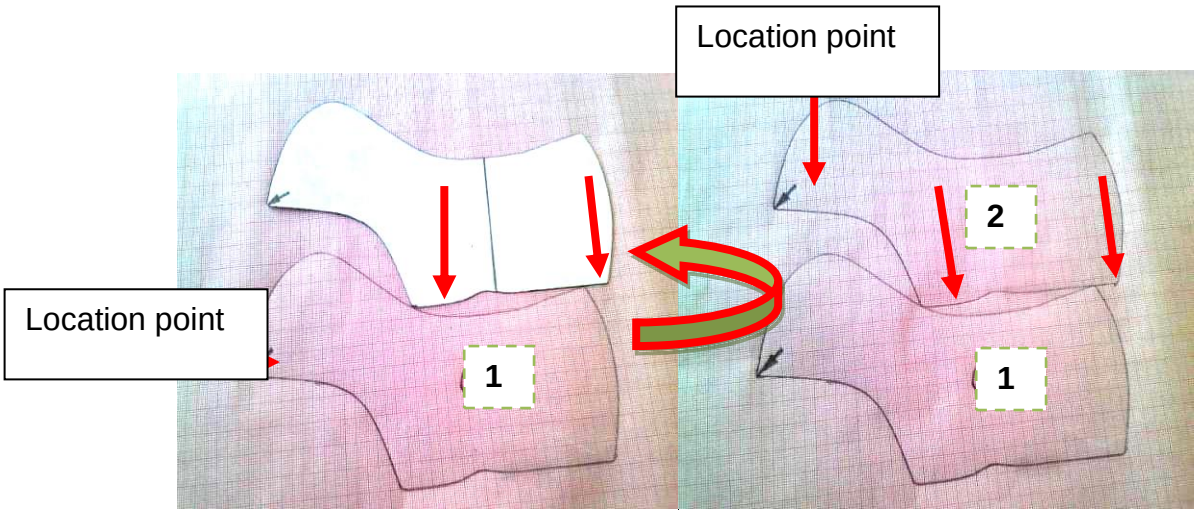
2. Lay the pattern to be traced down on the graph paper in such a way that the line on the pattern is aligned with the line on the paper.



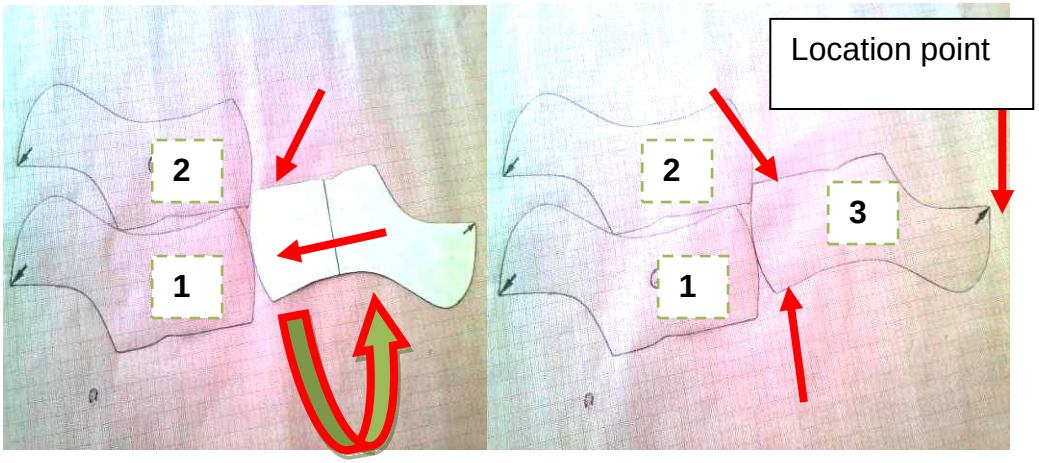
3. Trace round the 1ST pattern with a sharp pencil to get a clear line, mark the location point.



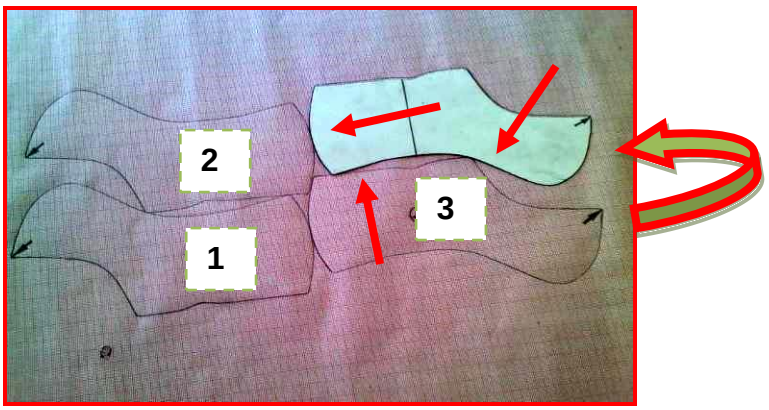
4. The 2nd tracing is drawn in the same way as no.1 in the same direction (i.e. without rotating). Second pattern should touch the first pattern at two possible points. Mark the location point and number as pattern no.2.

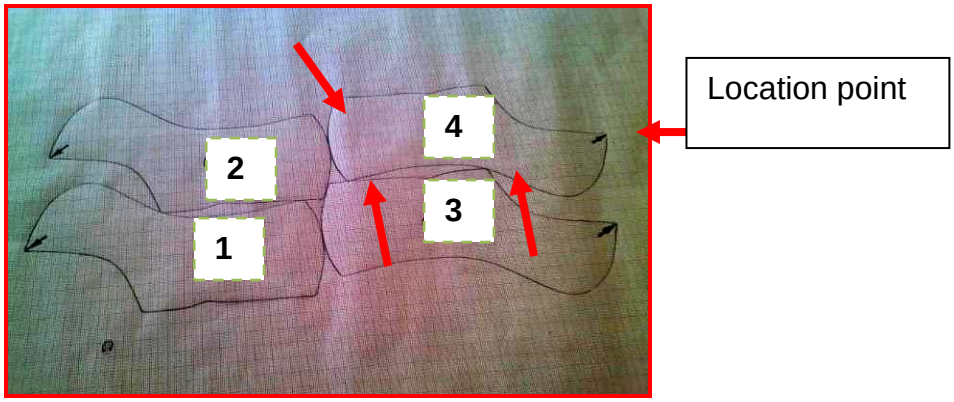


5. To trace the 3rd pattern, the pattern is rotated by 180 and it must touch 1st & 2nd at least at two points, in either direction, aligning the centre line. The location points and number is marked.

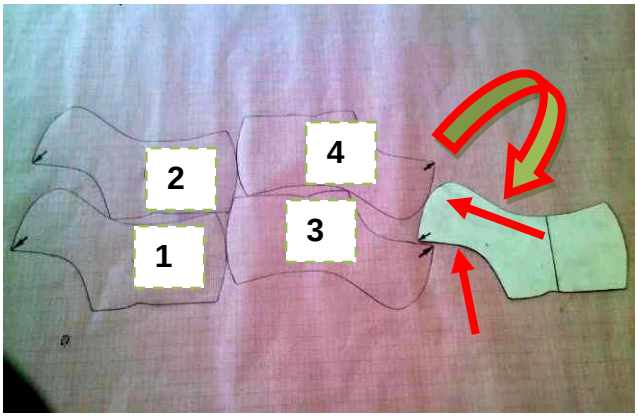


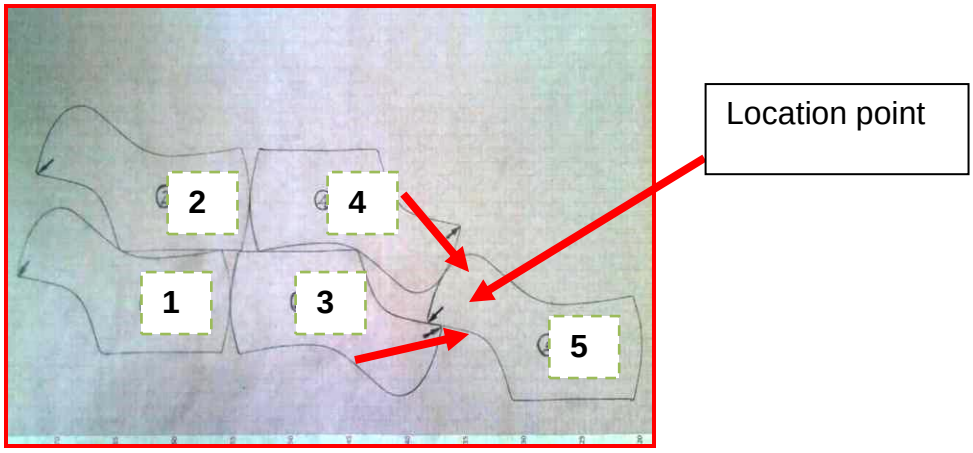
6. The 4th tracing will be same as no.3 and it must touch 1 & 3 & 2 & 3, at least at two points. Location point is marked and number as 4.



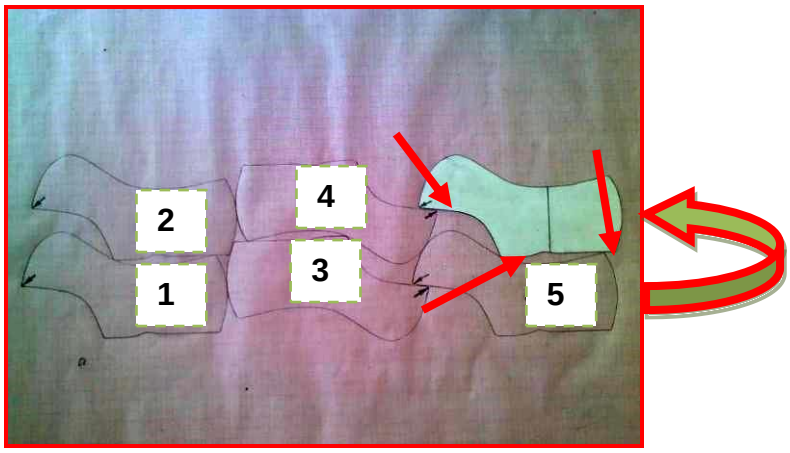


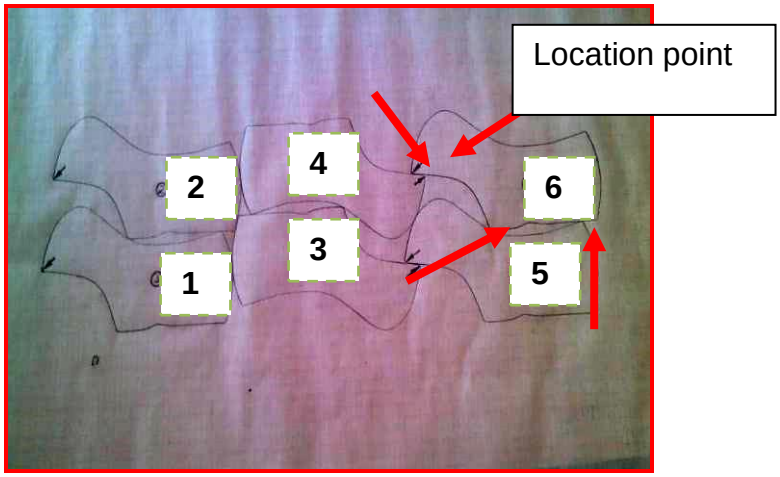
7. The 5th pattern is again rotated by 180 i.e. in the same direction as no.1. It should touch 3 & 4 at least at two points.



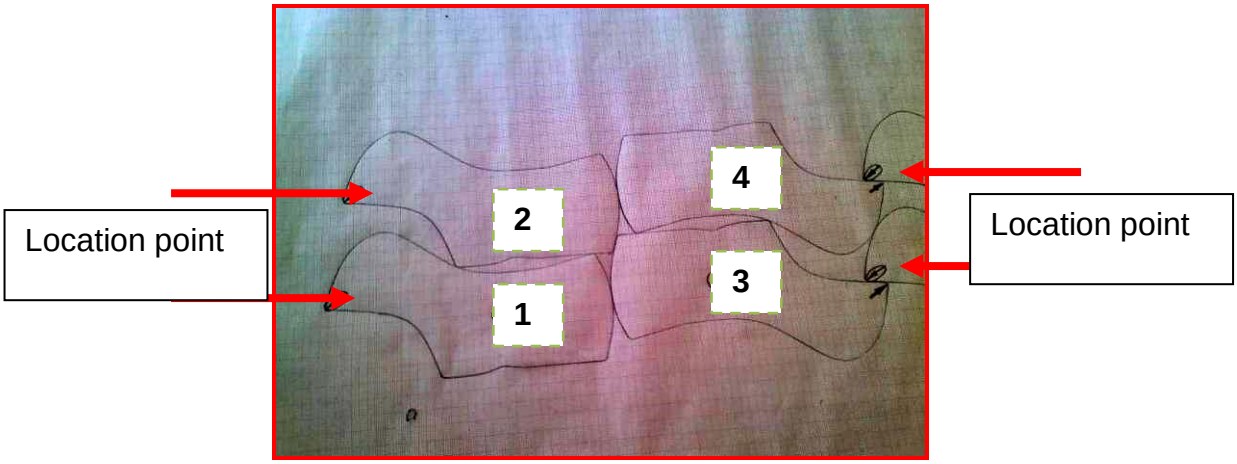


8. The 6th tracing must face the same direction as No.5 and touch 4 & 5, or 3 & 5 at least at two points.

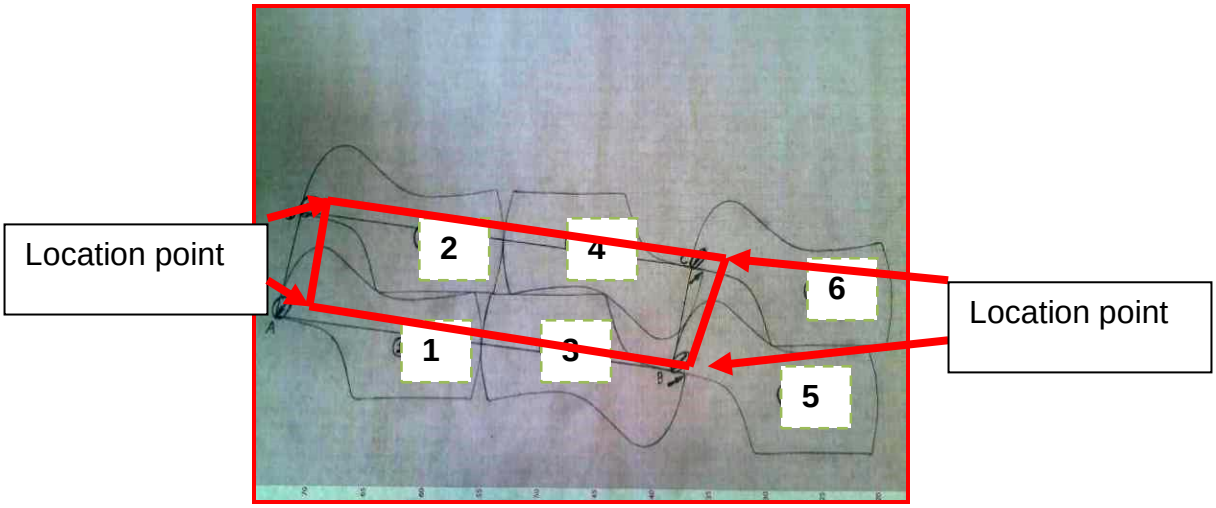




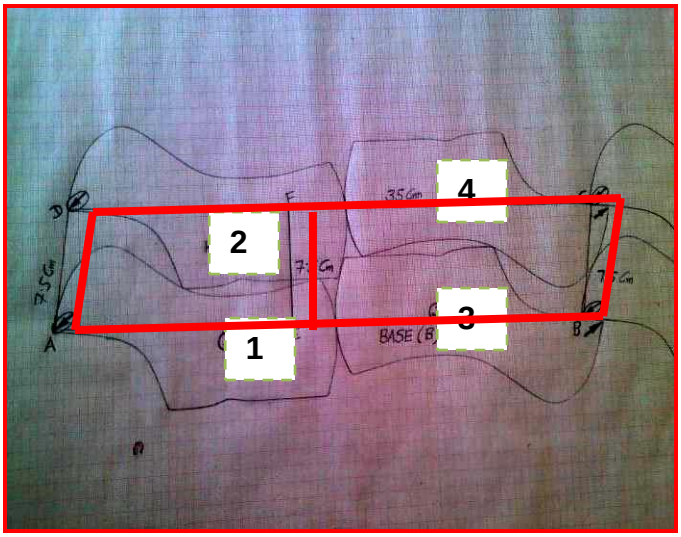
9. The sequence is repeated until a nest of interlocking patterns is produced that has four patterns facing in the same way.



10. A parallelogram is drawn using location points (same direction) on the four patterns as corners.



11. The area of the parallelogram is calculated (length & height) and this is used as the basis for allowance calculation. The area of parallelogram A(ABCD) is called the scale area of the pattern item.



Area of parallelogram (ABCD) = base (B) * height (H)

= AB * EF

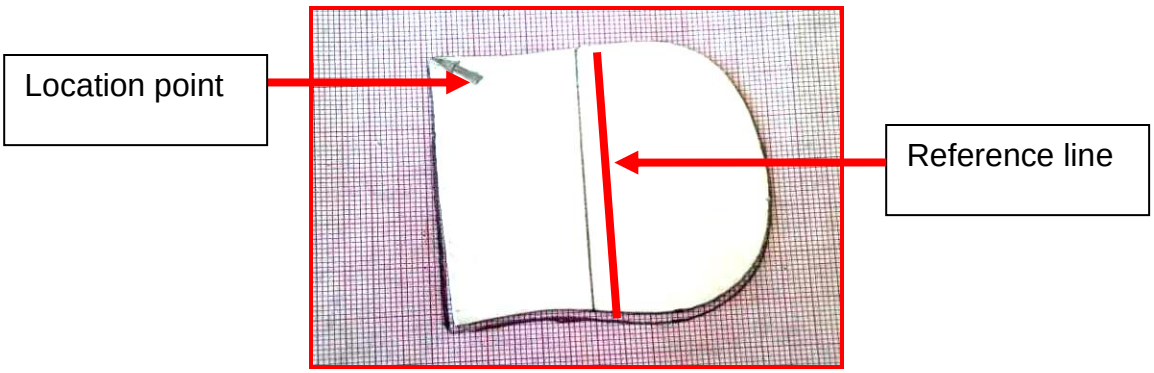
= 35 cm * 7.5 cm

= 262.5 sq. cm.

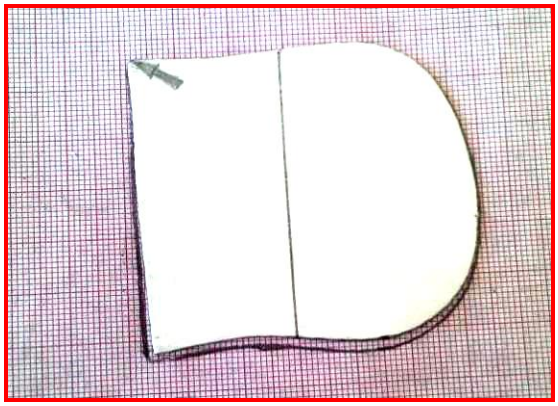
D. Derby tongue cut component consumption estimation shown below

Steps are as follows:

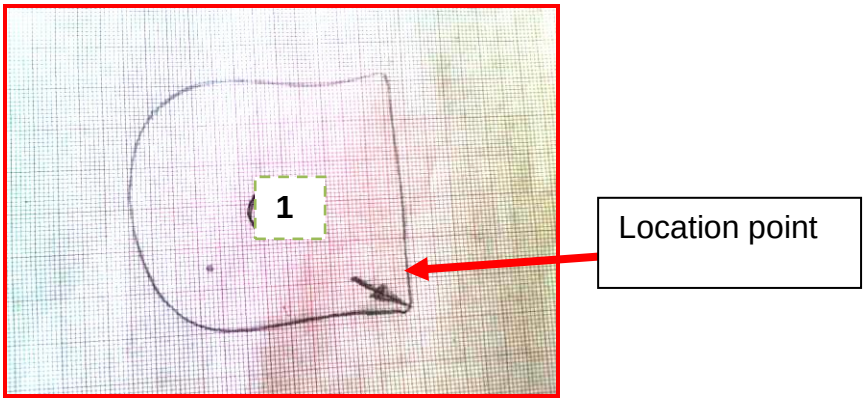
- Trace the straight line and mark location point on the pattern



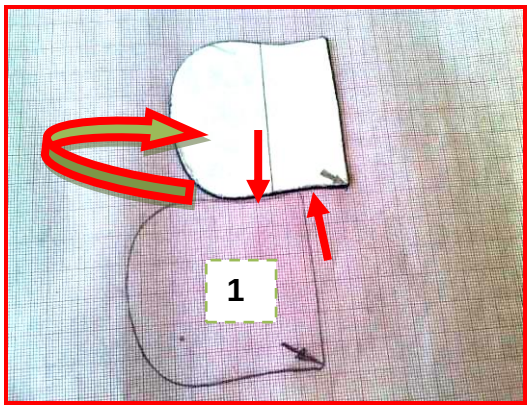
- Lay the pattern to be traced down on the graph paper in such a way that the line on the pattern is aligned with the line on the paper.



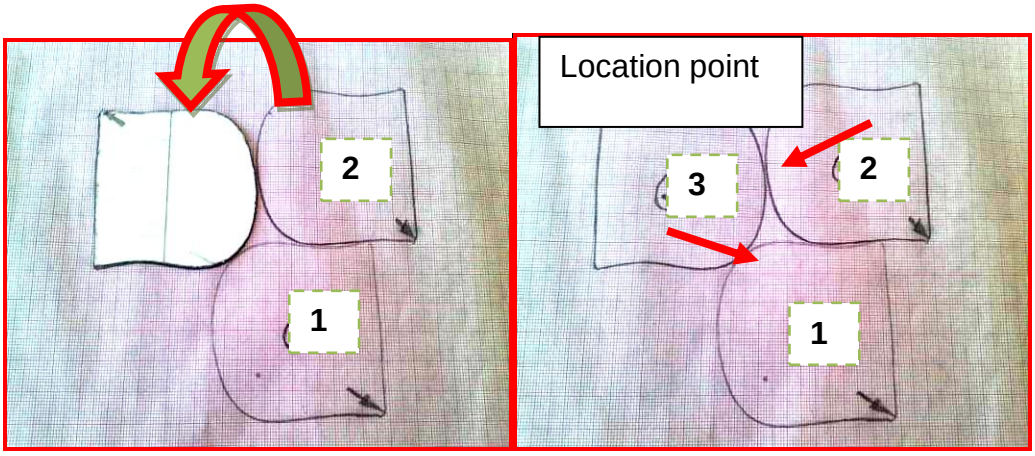
- Trace round the 1ST pattern with a sharp pencil to get a clear line, mark the location point.



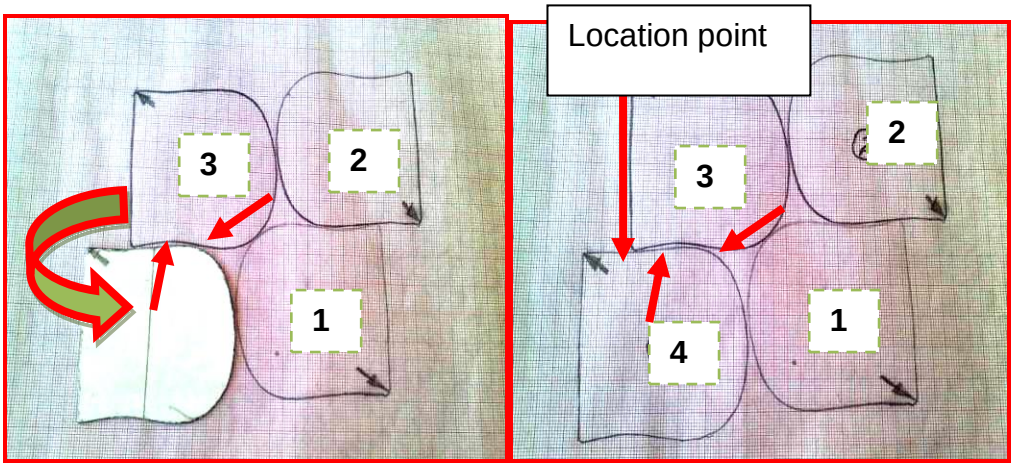
- The 2nd tracing is drawn in the same way as no.1 in the same direction (i.e. without rotating). Second pattern should touch the first pattern at two possible points. Mark the location point and number as pattern no.2.



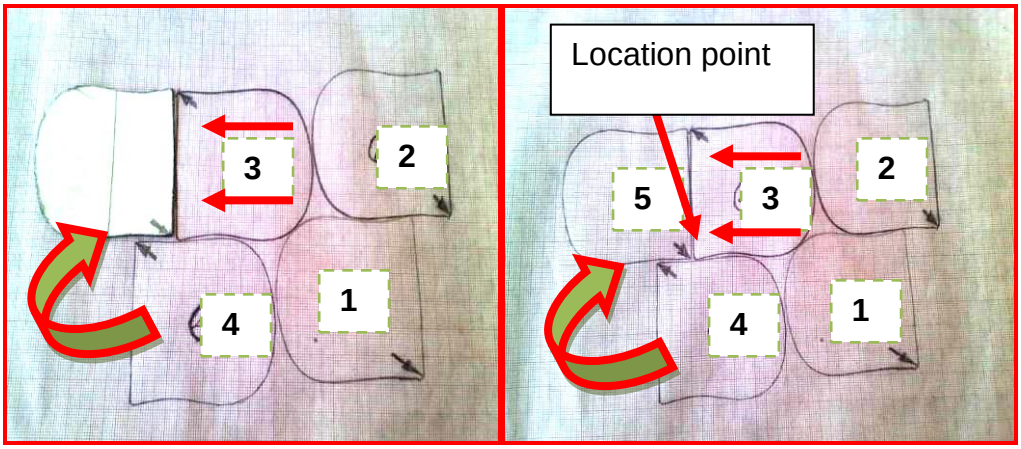
- To trace the 3rd pattern, the pattern is rotated by 180 and it must touch 1st & 2nd at least at two points, in either direction, aligning the center line. The location points and number is marked.



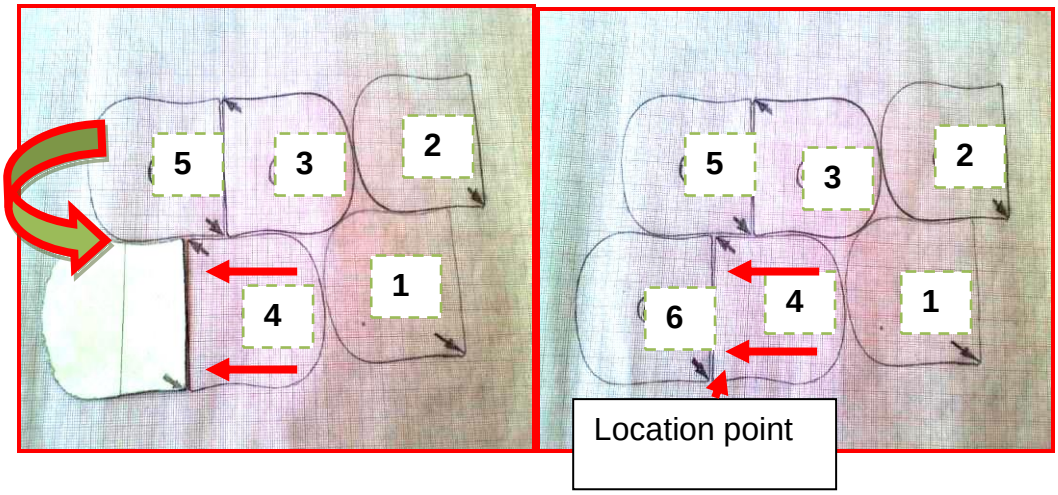
- The 4th tracing will be same as no.3 and it must touch 1 & 3 & 2 & 3, at least at two points. Location point is marked and number as 4.



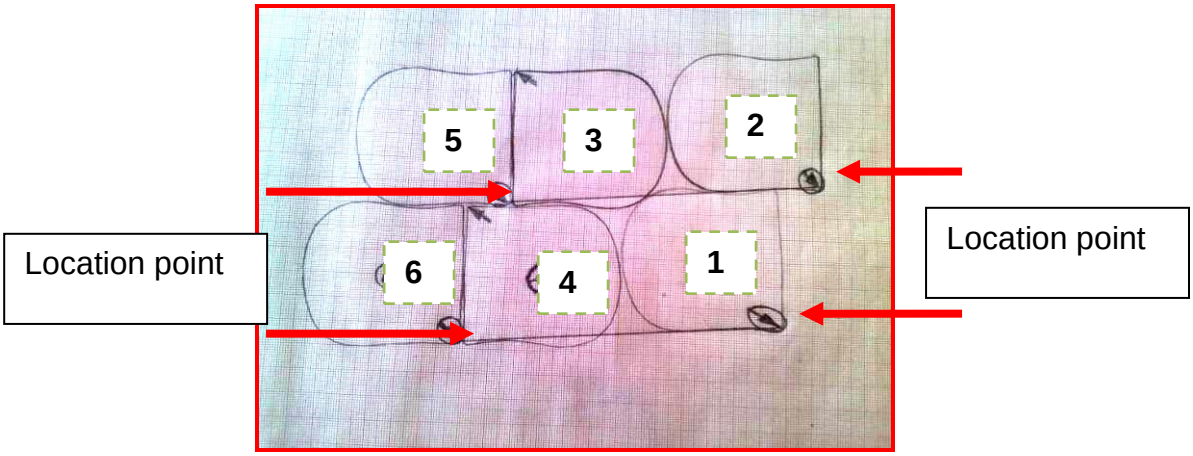
- The 5th pattern is again rotated by 180 i.e. in the same direction as no.1. It should touch 3 & 4 at least at two points.



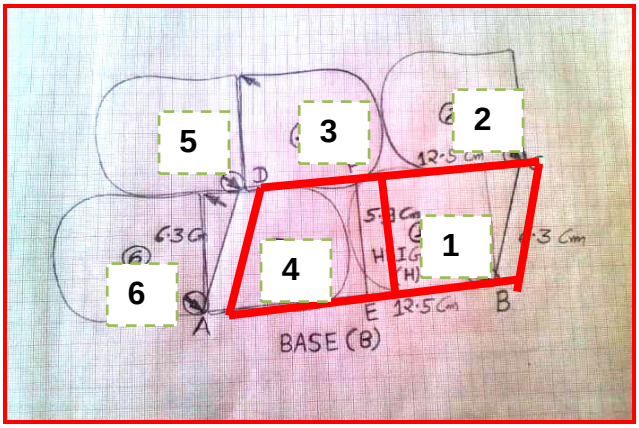
- The 6th tracing must face the same direction as No.5 and touch 4 & 5, or 3 & 5 at least at two points.



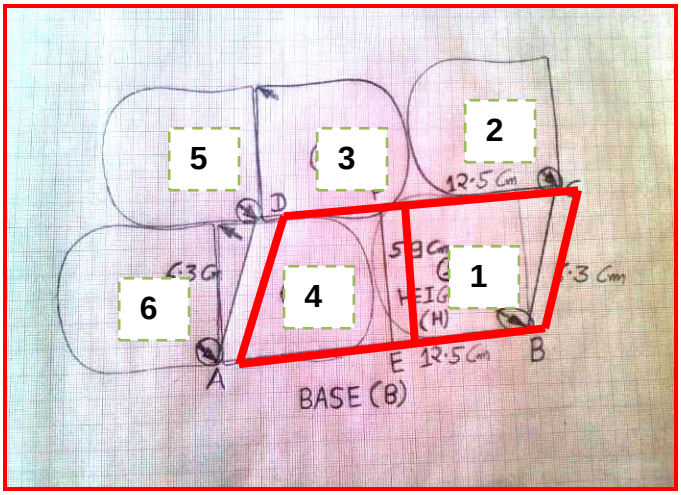
- The sequence is repeated until a nest of interlocking patterns is produced that has four patterns facing in the same way.



- A parallelogram is drawn using location points (same direction)on the four patterns as corners.



- The area of the parallelogram is calculated (length & height) and this is used as the basis for allowance calculation. The area of parallelogram A(ABCD) is called the scale area of the pattern item.



Area of parallelogram (ABCD) = base (B) * height (H)

= AB * EF

= 12.5 cm * 5.9 cm

= 73.75 sq. cm.

R.S.M ALLOWANCE SHEET 0 DEGREE **Date** 18/11/2012

Upper/Lining UPPER Article / Model No WR-19-9101 Size 41

Average skin size (A) Material 1 41.8Dm^2 Leather grade C Leather Type Sheep Upper

Material 2_____ Leather grade_____Leather type_____

Material 3_____ Leather grade_____Leather type _____

S.No	Parts	No. of comps. per pair	Scaling Dimension (cm)	Pattern Scale Area(S) Dm2	Gross pattern area(G)Dm2		
					Material1	Material2	Material 3
01	Vamp	2	37.6×13.1	4.93	6.52		
02	Tongue	2	5.9×12.5	.74	.90		
03	Quarter inside	2	35 x 7.5	2.63	3.33		
04	Quarter outside	2	35.5×7.6	2.7	3.43		
			Total Gross Area(G)		14.18		
			3rd Wastage 13%		1.84		

Allowance (T)	16.03 Dm2 =1.73 sq.ft		

Prepared By ---------- Checked By ---------- Approved By ----------

R.S.M ALLOWANCE SHEET FOR MINIMUM VALUE OF PATTERN SCALE

Date 18/11/2012

Upper/Lining UPPER Article / Model No WR-19-9101 Size 41

Average skin size (A) Material 1 41.8Dm^2 Leather grade C Leather Type Sheep Upper

Material 2_____ Leather grade_____Leather type_____

Material 3_____ Leather grade_____Leather type _____

S. No.	Parts	No. of comps. per pair	Scaling Dimension (cm)	Pattern Scale Area(S) Dm2	Gross pattern area(G)Dm2		
					Material1	Material2	Material 3
01	Vamp	2	37.6×13.1	4.93	6.52		
02	Tongue	2	5.9×5.8	.34	.42		
03	Quarter inside	2	13.3 x 18.3	2.43	3.07		
04	Quarter outside	2	35.5×7.6	2.7	3.43		
			Total Gross Area(G)		13.44		

3rd Wastage 13%	1.75		
Allowance (T)	15.2 Dm2 =1.63 sq.ft		

Prepared By ---------- Checked By ---------- Approved By ----------

NOTE:-

As shown in the three tables above the consumption of one pair of derby shoe is:-

1. **Using 180 degree methods = 1.68 Sq.ft.**
2. **Using 0 degree methods = 1.73 Sq.ft.**
3. **Using combination of 0 and 180 degree = 1.63 Sq.ft.**

The right estimation is with the less value that is 1.63 Sq.ft. from combination of two methods.

Information Sheet 3	Documenting the grade of material

Introduction

Leather grading is the process of sorting out of finished leather into different groups e.g. A, B, C or I, II, III etc., as per the quality and cutting value. Cutting value is defined as the % usable area i.e. the % area of leather which is free of any defect. Average grade depends on the different methods of grading system.

Methods of leather grading

1. **Method of Grading by Tannery**

Tannery's Method of Grading

Tanneries grade the leather in two ways.

- Table Run (T.R.)
- Selected Grade (S.G.)

Table Run

A table run of leather is a mixed selection of various grades. The buyer and the tannery normally agree on a price which is on the middle grade.

Example: If grade 1, 2,3,4,5 was to be accepted then the buying price would be based on third grade. The leather received from the tannery would also be expected to contain reasonable % of all grades. The average grade is third grade.

When buying T. R. leather it is essential to re grade the leather into the individual grades, to assess, if the company has received value for money.

Selected Grade (S.G.)

In this method the buyer orders the grade of leather required for a particular shoe style. Although the buyer has ordered a particular grade, it is still recommended that the

leather be graded to check for grade variation. In this way, accurate evaluation of the price will be obtained and any price variation can be claimed from the tannery.

Remember there is no standard for tanners grading and these standards vary between tanneries. When regarding has been completed it is recommended that a price variance account be kept to monitor the gains or losses, resulting from such regarding.

2. Method of Grading within a Shoe Factory

There are basically two methods of grading.

(i) Grading without reference to design

(ii) Grading with reference to design

Grading Without Reference to Design

In many factories grading is done similarly to the method used in tanner's that is the leather is graded on area defects only. The design is not considered at all while doing leather grading.

Grading with Reference to Design

In this method the leather grader takes into account the design of the shoe to be cut, and grades the leather to those requirements. For example a shoe with 20 per/pair, it is profitable to cut this from a lower grade leather may be 4^{th} grade leather as per the tanneries method of grading. But, when we issue that leather to a cutter we upgrade the leather we may issue it as 2^{nd} grade leather as in this case the total defective (waste) area of leather is reduced since we are in a position to utilize the defective area too due to so many small components. This method is called grading with reference to design.

As we have seen earlier, the cutting value is calculated as a percentage on 1^{st} grade skin we have an allowance of up to 3% defected area.

The following table shows the various grading allowances.

Note: This will be discussed in detail in performing Leather grading learning guide.

The grades after 1st grade all vary by 5%.

Grade	Cutting Value	Wastage
A or 1	100% to 97%	Up to 3%
B or 2	96% to 92%	8%
C or 3	91% to 87%	13%
D or 4	86% to 82%	18%
E or 5	81% to 77%	23% etc.

As shown in the table above the average grade for TR leather is 3rd or C grade.

Self-Check 3	Written Test

Instructions: Write all your answers in the provided answer sheet on page 7.

Test I: Short Answer Questions

Directions: Answer all the questions listed below. Examples may be necessary to aid some explanations/answers.

13. ---------- is the process of sorting out of finished leather into different groups .
    (1 point)
14. In----------method the leather grader takes into account the design of the shoe to be cut.
    (1 point)
15. In ----------method the buyer orders the grade of leather required for a particular shoe style.
    (1 point)

- Tanneries grade the leather in ----------
  (1 point)

Note: **Satisfactory rating – 100%**

You can ask you teacher for the copy of the correct answers

LG#15	LO #6- **Perform synthetic material estimation**

Instruction sheet

This learning guide is developed to provide you the necessary information regarding the following content coverage and topics:

- Describing difference between synthetic and leather material characteristics.
- Performing tracing method.
- Performing consumption of synthetic material.
- Recording the grade of material.

This guide will also assist you to attain the learning outcomes stated in the cover page. Specifically, upon completion of this learning guide, you will be able to:

- Describe difference between synthetic and leather material characteristics.
- Perform tracing method.
- Perform consumption of synthetic material.
- Record the grade of material.

Learning Instructions:
Read the specific objectives of this Learning Guide. • Read the specific objectives of this Learning Guide. • Read the information written in the “Information Sheets 1”. • Accomplish the “Self-check. Request the key answer / key to correction from your teacher or you can request your teacher to check it for you. • If you earned a satisfactory evaluation proceed to “Information Sheet 2”. However, if your rating is unsatisfactory, see your teacher for further instructions or go back to Information Sheets 1. • Read the information written in the “Information Sheet 2”. • Accomplish the “Self-check 2”. Again you can request the key answer / key to correction from your teacher or you can request your teacher to check it for you. • If you earned a satisfactory evaluation proceed to “Information Sheet 3”. However, if your rating is unsatisfactory, see your teacher for further instructions or go back to Information Sheet 2. • Read the information written in the “Information Sheet 3”. • Accomplish the “Self-check 3”. Request the key answer / key to correction from your teacher or you can request your teacher to check it for you. • If you earned a satisfactory evaluation proceed to “Information Sheet 4”. However, if your rating is unsatisfactory, see your teacher for further instructions or go back to Information Sheet 3. • Read the information written in the “Information Sheet 4”. • Accomplish the “Self-check 4”. Request the key answer / key to correction from your teacher or you can request your teacher to check it for you.

Information Sheet 1 Describing difference between synthetic and leather material characteristics

Leather

Leather is a durable and flexible material created by the tanning of animal rawhide and skin, often cattle hide. It can be produced through manufacturing processes ranging from cottage industry to heavy industry.

The physical properties which make leather a unique and valuable material for upholstery purposes are:

- High tensile strength
- Resistance to tear
- High resistance to flexing
- High resistance to puncture
- Good heat insulation
- Leather contains a great deal of air, which is a poor conductor of heat. This is an important comfort consideration.
- Permeability to water vapor

Leather fibers will hold large quantities of water vapor. This property enables leather to absorb perspiration, which is later dissipated a significant factor in comfort.

1. Thermostatic properties
   - Leather is warm in winter and cool in summer.

2. Mould ability

   - Leather can be moulded and will retain its new shape. It has both elastic and plastic properties in wear.

3. Resistance to wet and dry abrasion

   - These properties, concerned with wear and maintenance, are controlled by the tannage and surface finish. These have now reached high levels of excellence.

4. Resistance to fire

   - Leather is inherently resistant to heat and flame.

5. Resistance to fungi

   - Leather is resistant to mildew.

6. Resistance to chemical attack

   - The atmosphere of modern cities is polluted from the burning of carbon fuels with sulphur dioxide gas, which can accelerate the deterioration of leather. Modern leathers are tanned and dressed to resist these harmful chemicals.

Fabrics

Textile fabrics, whilst taking second place to leather or shoe materials, have assumed an ever growing importance since this century. Among the raw materials used for shoe fabrics cotton still holds the best place. That is because it is cheaper and also suitable for the purpose. For instance in the leather shoe production, vamp linings are made of fabrics. Other low priced foot wears are also use fabric as an upper. Fabrics can be classified as depending on their production process as:

- Woven fabrics

- Non-woven fabrics
- Knitted
- Coated Fabric

- The vast majority of fabrics used in the shoe industry for upper are woven. Knitted and non-woven fabrics mainly used for linings and components.

- Textiles and synthetics are now a day's used widely as upper & lining materials. Today, between 80 to 90% of the worlds shoes are sold with synthetic material of one type or another and the same trend occurring with upper materials. Synthetic materials are taking over the market rapidly due to several reasons. Some of them are listed below:

- Cheaper seam leather.
- Uniformity in thickness, surface and physical properties.
- Available in variety of colors & routine to meet the market demand.
- Fabrics, both natural & manmade give certain properties to footwear that could not be achieved with leather. Since, Hides & skins are available as by-product of the meat industry leather will always be used as a footwear material. Nevertheless, the new materials will have an increasing place in footwear manufacturing and we shall therefore, study them in detail.

Textile (or fabric) –

The term describes any woven non-woven or knitted materials. Textile (or fabric) derived from Fibres. Fibres may be of natural or synthetic (man-made) origin e.g. cotton, wool, silk, jute are the natural fibres whereas, nylon, viscose, Orion etc. are the synthetic fibres. Fibres are produced either as staples or filaments. Staples are fount non-continuous fibres. Whereas Filament – are long continuous fibres. The staples or filaments are then converted into yarn to be converted into fabrics. Fabrics are manufactured from yarns by weaving, knitting and braiding and from fibres by felting. Based on these the fabrics are classified as:

Woven fabric: In woven fabric, thousands of yarn is interlaced at right angles to each other. Ends are warp threads, which run lengthwise down the cloth range. Picks are weft threads, which run across the fabric width. The edges of the fabrics need to be reinforced to withstand the strain of weaving. The types of woven fabric are Plain, Twill, Drill and Satin.

Non-woven fabric: Non-woven fabrics are produced directly from fibres, bypassing the yarn style although they are often more expensive than woven & knitted fabrics. For the footwear industry the main disadvantages of uncoated non-woven are their lack of strength and their poor handle. Non-woven's are widely used however, as base fabrics for coating were there limitations are partly overcome.

The two main types of non-woven are felts & bonding fiber fabrics. Felts are generally too weak for upper linings. Their main application is as bottom fillers.

Knitted fabric: There are mainly of two types - Warp knitting and weft knitting. Fabrics in both categories consist of a series of interlocked loops. The horizontal row of loops is called courses & the vertical lines are called Wales. The footwear industry uses rather more warp knitted than weft knitted. The three main warp knit structures are: tricot, lock nit and satin. Tricot is used for linings laminated to other fabrics. It has a soft handle, good drape and elasticity. Term tricot may be applied to many other types of warp knitted fabrics, most of which are used with foam or other fabrics to give combined upper materials & linings. Lock nit is known for its smooth face and good resistance to laddering. This is laminated with foam to produce the skin fit linings used in slippers and general footwear.

Coated Fabric (or Synthetic): The term is used to describe a whole range of manmade leather also known as coated fabrics. The base for these fabrics is either knitted or woven cotton in the form of sheets, drills or satin. To these a coating of synthetic resin is applied. Colors, types and finishes & embossing that can be given to coated fabrics are unlimited and are difficult to differentiate from leather.

In coated fabrics the coating provides the attractive finish and good wearing properties, whereas, the fabric provides most of the strength.

The two main types of coated fabrics are PVC coated & PU coated fabrics. PUCF's have a more attractive appearance and handle than PVC coated fabrics and are

permeable. They are however, generally weaker, and the PU coating is less robust than PVC.

Coated fabrics like textiles have to be further processed with a backing to give the weight & thickness required.

Insole materials

In footwear industry the following boards are used for insole making.

- Insole board/cellulose board
- Shank board/backer board
- Leather board

Leather Insole board/Cellulose board: - Cellulose board for insole is made from wood pulp, resin and bonded with latex. As with leather boards it is supplied in sheet in various thicknesses, and in different grade. This material has better dimensional stability than leather boards. (I.e. does not shrink or grow). It is a flexible board. Common trade names are Texon, Bontex.

Typically women's insole use cellulose board of thickness 1.25 – 1.75 mm and men's insoles boards of thickness 1.5 – 2.25 mm. from a standard sized sheet of dimensions 150 x 100 cm about 33 pairs of men's insole can be obtained which translates to a usages norm of 450 square centimeter per pair of insoles. Similarly for women's insoles about 38 pairs can be produced from a sheet of 150 x 100 centimeter which is equivalent to usage norm of 395 square centimeters per pair of insole.

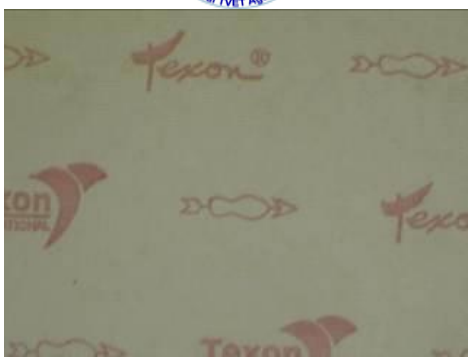
The characteristics of this material are:

a) Its ability to absorb moisture

b) Uniformity of substances

c) Resistance to shrinkage or growth (in change of humidity and heat)

d) Resistance to hardening or cracking due to moisture or perspiration.



Shank board/Becker board: - This is a very hard and strong fiber board, able to withstand the tremendous loads which occur in the waist and heel of the shoe. It is again produced in much the same as way as paper. However the main raw material is mixture of waste and recycled paper which, together with the vegetal bonding resins used in its manufacture, make shank board a very environmental friendly product. The molding quality of this type of board is less than cellulose board.

The standard sheet size of shank boards are 100 x 100 centimeter and the thickness is 2 – 3 mm.

The following raw materials are used for the manufacture of backer board;

- Paper pulp
- Dye
- Hard resin binder
- Aluminum sulphate
- Preservative

1.1.3. Leather: - leather is not much used because of high cost and the lack of uniformity in thickness. Leather insole were usually cut from bellies (sometimes shoulders), and are now used only in very high quality footwear e.g. men's welted.

1.1.4. Leather board: - A flexible manufactured board made up with at least 75% leather fibers, which gives it the ability to absorb perspiration. It is made in sheets in various thicknesses (mm), and in different grade to suit particular shoe making requirements e.g. tack holding, cement bonding, and high pressure/heat for injection molding. Common trade names are Ferrersflex, Articor. Many grades of leather board are available and this material extensively used in the footwear trade as a insole material as well as toe puff and stiffener.

Leather board is manmade material widely used by shoe industry. It is a compound of fibrous substance, vegetable matter and leather scrape bound together with latex rubber. Resin and alum are used in it while mixing. It helps to make the board more waterproof. The alum takes part to thicken with the latex.

General characteristics of a leather board:

- Width, length, thickness can be made to order, as opposed to the varying thickness and sizes of leather pieces.
- It has most of the quality and properties of leather.
- Cheaper than leather.

- For superior flexibility and durability as compared with card board or any other types of boards.
- It retains the leather look, which other types of boards do not have.
- Economic in manufacturing, the ingredients being are waste materials and by-products of trimmings and shavings from chrome tanned leather.

Toe-puff and counter stiffener materials

The function of the toe puff is basically to provide shape to the forepart of the shoe, and in certain case, in the industrial boots, to give protection to the foot of the wearer. It is the mean by which the shape of the last forepart is reproduced in the finished shoe, and thus plays an important part in the appearance and the general performance of the majority of the footwear types. The choice of the toe puff for any given footwear type is influenced by many factors of the last shape, upper material type, production methods to be used, fashion and the views of individual customers; all must be considered before a decision can be reached.

Counter stiffener is a stiff material similar to that of the toe puff which may be molded to the shape of the last back part or, alternatively, inserted flat and molded during the subsequent process. It is normally inserted between the lining and the upper to support the back of the shoe and grip the foot.

Apart from the material used which is similar to that used for toe-puff except for the thickness, leather board can also be used.

- **Flat Stiffener**

  This could be both solvent activated and Heat Activated and Cut from the sheets as per pattern to insert at the time of lasting.

Laminated type

- **Semi Molded Stiffener**

  Stiffener is added in closing section itself, Stiffener is finger molded before insertion. This type of stiffener is thermoplastic and needs to be softened by heat at some stage of lasting process.

Semi-moulded stiffener

- **Fully Molded Stiffener**

  High quality shoemakers who wish to use high-grade leather board stiffeners often use this type of stiffener. The stiffener manufacturer molds it to the shape of the back of the last and the flange is molded in.

Fully moulded

- **Solvent Activated**

These puffs are impregnated with either nitrocellulose or polystyrene resin. Polystyrene has recently become popular as the impregnating resin in solvent activated puffs. Production of the polystyrene sheet material is similar to that for the nitrocellulose type. The solvent blend to activate the puff should contain toluene, which dissolves more readily then the resin.

With all solvent activated materials, thorough activation is essential so that the materials easily conforms the shape of the back & fore part of the last. It is also essential that some portion of solvent is still present while lasting. However too much solvent's presence leaves the stain marks in the lining as well as upper.

The toe-puff must immediately be applied to the upper. The bonding takes place only when the toe-puff has sufficient amount of solvent in it.

- **Thermoplastic Materials:**

Adhesive coating on heat – activated puff (for heated press application) is based on P.V.A (poly vinyl acetate), E.V.A. (ethylene vinyl acetate), polyacrylate, polyurethane. Resin and plasticizer are added to impart the required adhesive properties. More recently, hot melt adhesive have been used. The adhesive is heated to 120-140 C and is applied as single coating.

Poly vinyl chloride (PVC)

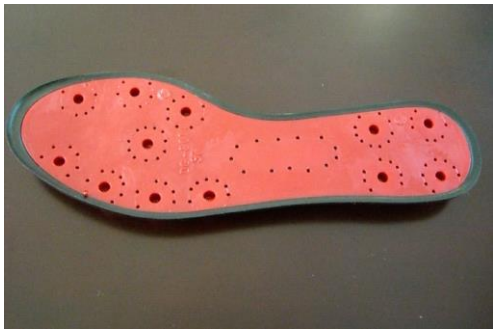
PVC molecules are formed in polymerization reaction of chlorine with ethylene. With subsequent addition of agents such as slipping agent, stabilizers, porously generators, colorants and fillers PVC has wide range of application in footwear industry.

It was the first synthetic materials to compete with natural rubber and leather because of easy processing and economic reason above .it is derived from oil and sodium chloride together with different auxiliaries.

- The material is used in compact form with specific gravity of 1.2 gram/cm3 in making sole for manufacturing of classic shoes like sandals, calf length boots and overshoes.
- In semi-expanded form with specific gravity of 0.8-0.9 gram/cm 3 , it finds application in the production of midsoles, while when super expanding with specific gravity 0.6 go/cm 3, it is used in making beach sandals

As super expanded ,PVC stands out for its light weight which allows obtaining comfort and low cost of the products one transferred on to the sole and /or midsoles of the shoe , especially when used in direct injection of slippers and beach sandals and it can be fully recycled .

Semi expanded and super expanded PVC requires screw –piston injection system while compact requires an extruder.



Poly urethane (PU)

Polyurethane was developed in mid 1990 as soling material which can be directly moulded on to the shoe bottoms or produced as molded unit. It has proved to be the best man-made for sole ever produced with regard to durability.

In the manufacturing process a hardened and resin is mixed in very exact rations. This chemical reaction, leads to the result being blown or expanded materials. An important factor to note is that when injecting directly –on to shoe bottoms no adhesive is needed as the liquid has distinct self adhesive properties. Further, when molded units are used, considerable problems are experienced in bonding the units to the shoe bottoms.

P.U is very light weight and mould contour can be used to simulate cork, resin rubber etc

Self-Check 1	Written Test

Name: _____ Date: _____

Time started: _____ Time finished: _____

***Instructions*:** Write all your answers in the provided answer sheet on page 7.

Directions: Answer all the questions listed below. **(Total marks 15)**

- **Fill in the blanks (5 marks)**

- Leather has both ---------- and ----------properties.
- The full name of PVC is ----------.
- The full name of EVA is ----------.
- The full name of PU is ----------.
- The standard sheet size of shank boards are ---------- centimeter and the thickness is ----------.

- **Math the following words: (5 marks)**

- Thermal conductivity property — 1. Paper pulp & dye
- Mould property — 2. Warp & weft knitting
- Fabrics — 3. Hot in winter & cold in summer
- Shank board — 4. Elasticity & plasticity property
- Knitted fabric — 5. Woven & non-woven material

- **One word answer: (5 marks)**
- Write down the name of two types of the fibers used for making fabric.
- Where does the felt material use mostly?
- Write down the types of the knitted fabric.
- Write down the name of one material used for making Insole board.
- Write down the name of one material used for making Shank board.

Information Sheet 2 Performing tracing method

Introduction

For both establishing the initial cost of a style and to control the consumption of the material by the clickers, it is necessary to determine the amount of material required.

If the standard is too generous the clicker will easily cut within it, but if the standard is too low and the clicker‘s best economic is more than the standard then a loss situation will be present and it reduce the productivity also.

Any systems for pre determine the material consumption allowance need the following attributes:

- Consistency between style and shoe size
- Consistency between materials types
- Accuracy in forecasting the best achievable cutting economy

There are systems to calculate materials allowance as shoe manufacture need to predetermine the consumption of upper and lining synthetic required for a particular design.

Tracing method is the common method used for calculating synthetic material consumption in footwear industry.

With the objective to calculate the cutting allowance for the given set of synthetic upper patterns, participant should know:

- How to interlock the patterns

- How to utilize the area of the supplied material for tracing or how to produce the rectangular traced patterns on the graphic paper.
- How to calculate the area of the individual traced patterns in sq. cm. And how to convert into sq.mtr.
- Finally how to add up the individual pattern areas to establish the cutting allowance for the article

METHODS OF COSTING:

The footwear industry is following the following common methods:

- Graphical Method
- Tracing Method

With the objective to calculate the cutting allowance for the given set of synthetic upper patterns. Having worked through the programme the participant shall know:

- How to interlock the patterns.
- How to utilize the area of the supplied material for tracing or how to produce the rectangle of the traced patterns on graph paper.
- How to calculate the area of the individually traced pattern in sq. cm. And how to convert into sq. mtr.
- Finally how to add up the individual pattern areas to establish the cutting allowance for the article.

1) Graphical Method:

Before commencing this programme the participant shall require:

- Graph Paper.
- 1 set of upper paper patterns.

- Calculator.
- Ruler.
- Pencil.
- Eraser.
- Roll of plain paper.

Procedure:

- Mark the reference line on each pattern.
- Mark the base lines (vertical and horizontal) on the graph paper.
- Take one paper pattern and trace on the graph paper matching the reference line of the pattern with any line of the graph paper and keeping 2 mm space from the vertical and the horizontal lines.
- Trace (horizontally) the similar pattern interlocking with the previous tracing either by 0-degree or by 180-degrees. The space between the two tracings and also from the base line should be 2 mm. The gap of 2mm is given because the synthetic materials are cut in layers. When the calculation is carried out for foam material or fabric laminated foam, the gap should be given as 4-5 mm.
- The third tracing (horizontally) should be done as above.
- Trace the same pattern (fourth tracing) vertically interlocking with the first tracing either by 0-degree or 180-degrees keeping the space in between as 2mm.
- Similarly fifth and sixth tracing is done interlocking with the previous tracings.
- Trace the horizontal and the vertical lines touching and blocking the outermost points of the tracings, thus making the rectangle.
- Mark the rectangle as ABCD where BC is base and CD is the height of the rectangle ABCD.

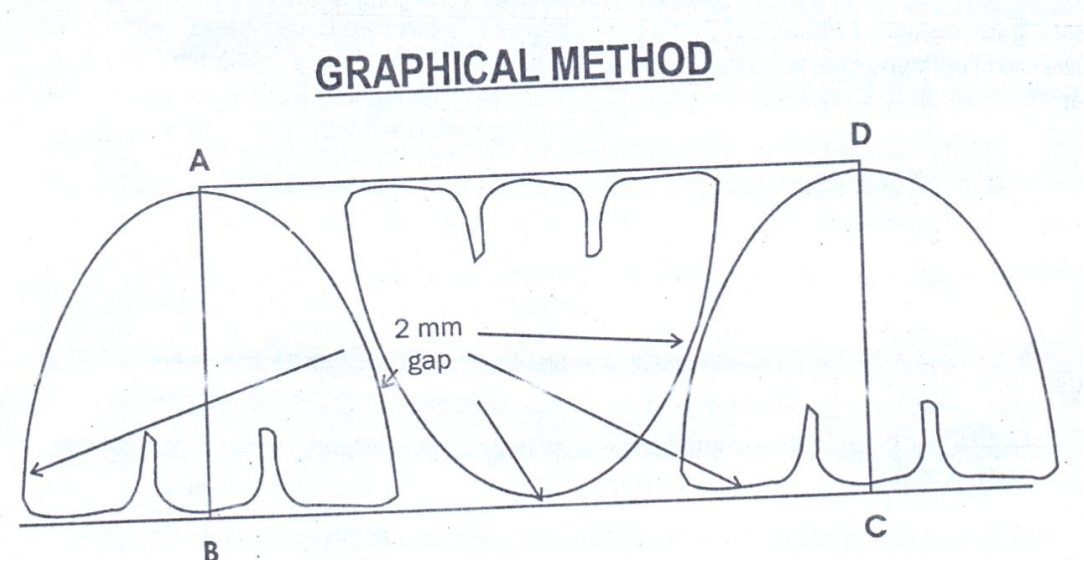
- Measure BC and CD in centimeter.
- Calculate the area of the rectangle ABCD by multiplying BC and CD.
- The area comes in sq. cm. Convert the value into sq. mtr. By dividing it by 10000.
- Thus the area of six patterns is calculated. By dividing this value by 6 area of one pattern is estimated.
- Repeat the same procedure for all the patterns and calculate the individual pattern areas.
- Add all the individual pattern areas (keeping in mind the no. of components per pair) to find out the cutting allowance of the given article.

Advantage of Graphical Method:

- This method is less time consuming.
- Accuracy of tracing is possible.
- The calculation is easy.

Disadvantage of Graphical Method:

- The width of the material is not taken into consideration.
- The cutting allowance calculated by this method is approximate and varies from the actual consumption.
- The line of tightness is not taking into consideration during tracing the pattern on the graph paper.



TRACING METHOD PROCEDURES:

- Mark the base lines (vertical and horizontal) on the plain/brown paper.
- The horizontal line is traced as per the width of the material to be used for cutting (for simplification half of the material width are sometimes traced) and the vertical line should be up to 3-4 rows of the tracing (max. one meter)
- Mark the reference line on the pattern parallel to the direction of tightness.
- Trace first pattern on the plain/brown paper keeping the reference line of the pattern parallel to the vertical base line of the plain/brown paper and keeping 2mm space from the vertical and horizontal lines. The gap of 2mm is given because synthetic materials are cut in layers. When the calculation is carried out for foam material, coated fabric laminated material etc., the gap should be given as 4-10 mm (as per the thickness of the material).

- Trace (horizontally) the similar pattern interlocking with the first tracing either by 0 degrees for best possible interlocking. The space between the two tracings and also from the baseline should be minimum 2mm.
- The third tracing (horizontally) should be done as above and the tracing is continued up to full or half of the width of the material.
- Trace the same pattern vertically interlocking with the first tracing either by 0 degrees or 180 degrees keeping the space in between as 2 mm (minimum).
- Similarly the tracing is done interlocking with the previous tracings (first row) and is carried out for 3-4 rows (maximum one meter). Sometimes only 2 rows are traced when the pattern is symmetrically interlocking.
- Trace the horizontal and vertical lines touching and blocking the outer most points of the tracings, thus making the rectangle.
- Mark the rectangle as ABCD where BC is base and CD is the height of the rectangle ABCD.
- Measure the base BC and the height CD in centimeter.
- Calculate the areas of the rectangle ABCD by multiplying BC and CD. They are comes in sq.cm. Convert the value in to sq.mtr. By dividing it by 10000.
- Now the number of patterns is counted. By dividing the area traced by number of patterns traced the area of one pattern is estimated. Now, area per pair is calculated as per the number of components per pair.
- Repeat the same procedure for all the patterns and calculate the pair per pattern areas.

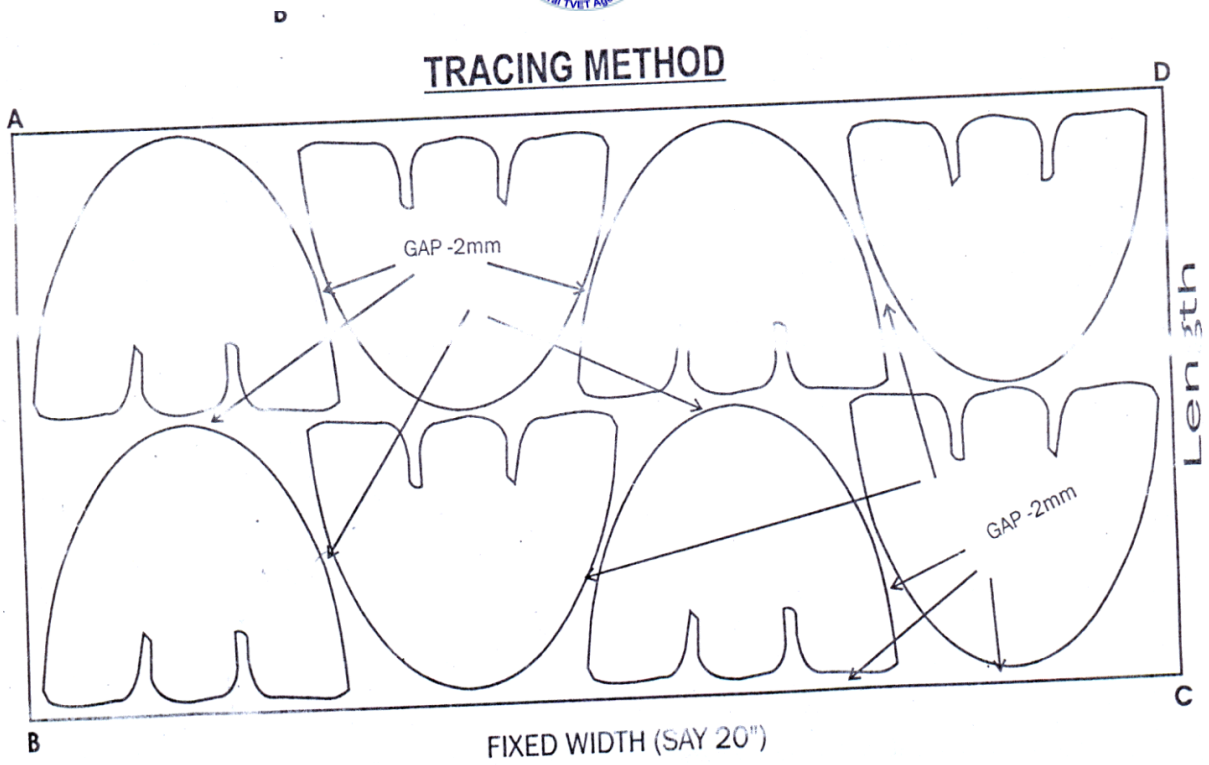
- Add all the individual areas per pair to find out the cutting allowance of the given article.

Advantage of Tracing Method:

- The width of the material is taken into consideration.
- The cutting allowance calculated by this method is realistic.
- The interlocking waste during cutting can be minimized by referring the tracing.

Disadvantage of Tracing Method:

- This method is time consuming.
- Accuracy of direction during tracing is difficult.


TRACING METHOD
A
D
GAP -2mm
Length
GAP -2mm
B
C
FIXED WIDTH (SAY 20")

Self-Check 2	Written Test

Name: _____ Date: _____

Time started: _____ Time finished: _____

***Instructions*:** Write all your answers in the provided answer sheet on pages13.

Directions: Answer all the questions listed below. **(10 marks)**

- **Fill in the blanks: (5 marks)**

1. Any systems for pre determine the material consumption allowance need ----------
   ------

2. The methods of synthetic costing are ----------, ----------.

3. ---------- method is time consuming.

4. The interlocking waste during cutting can be minimized by referring the ----------
   .

5. The calculation in ---------- method is easy.

- **Very short answers: (5 marks)**

1. Write down the one rule of graphical method.
2. Write down one merit of graphical method.
3. Write down one rule of tracing method.
4. Write down one demerit of tracing method.
5. Write down one objective of synthetic costing.

Note: **Satisfactory rating – 100%**

You can ask you teacher for the copy of the correct answers.

Information Sheet 3	Performing consumption of synthetic material.

SYSTEM AVAILABLE:

The footwear industry is use following the common methods:

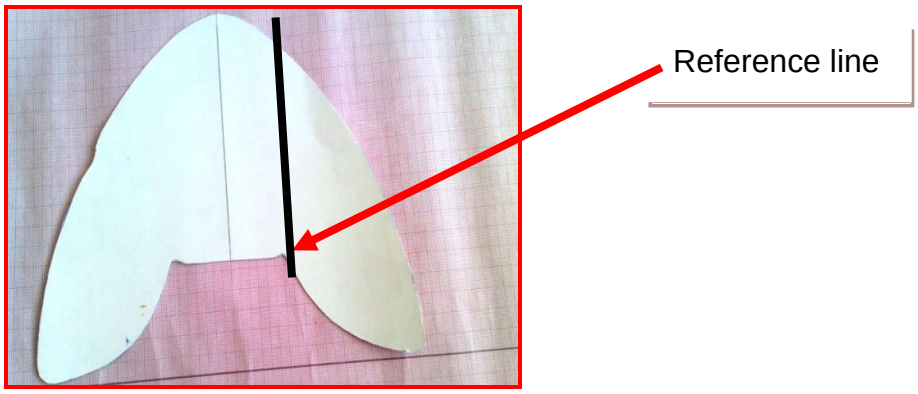
A. Graphic method

B. Tracing method

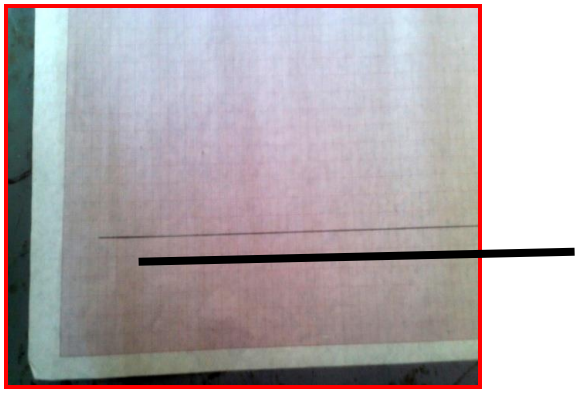
A .GRAPHIC METHOD PROCEDURE:

I. Vamp cut component

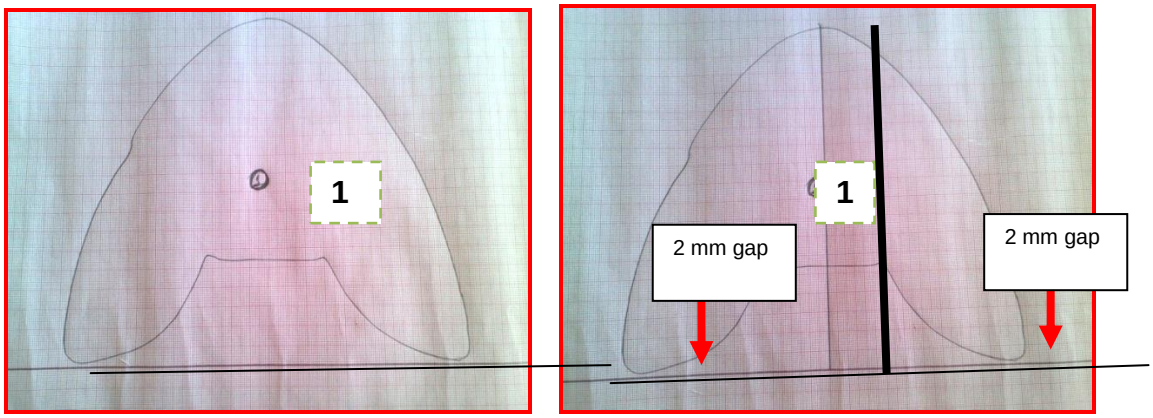
1) Mark the reference line (to be longest line) on the pattern.



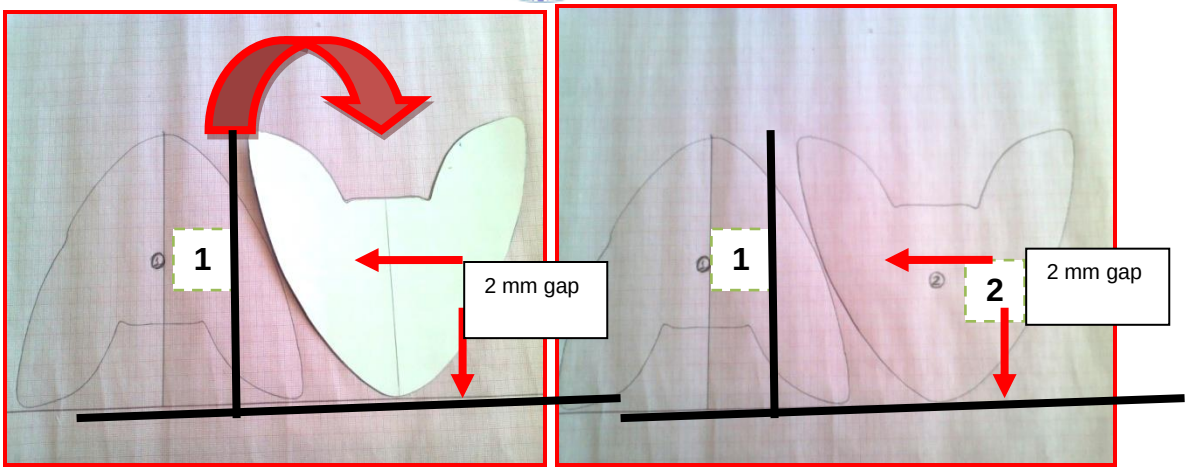
2) Mark the Base line on the graph paper.



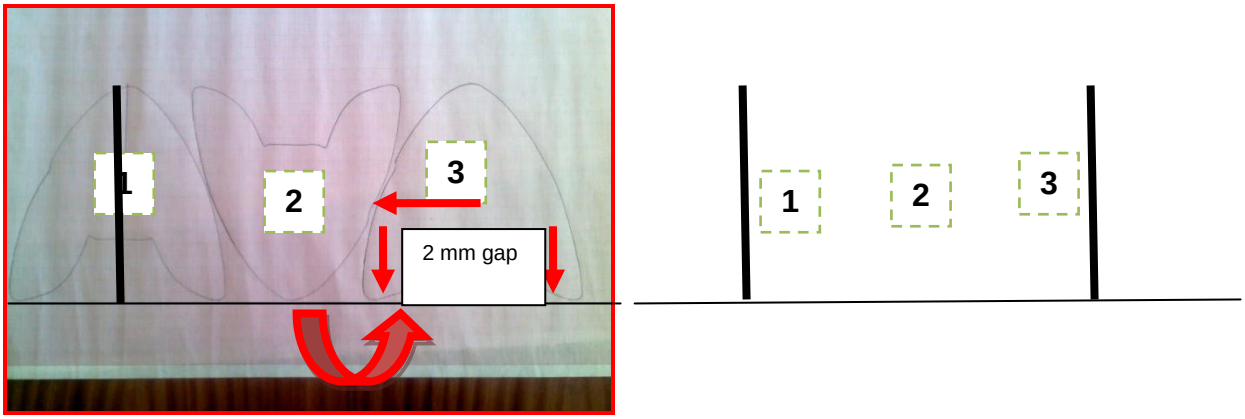
3) Trace first pattern on the graph paper matching the reference line pattern with any line othe graph paper and keeping 2mm space from the vertical and the horizontal lines. The gap of 2 mm is given because the synthetic materials are cut in layers. When the calculation is carried out for foam materials are cut in layers. When the calculation is carried out for foam materials, coated fabric laminated material etc., the gap should be given as 4-10mm (as per the thickness of the material). Mark the end points (reference points) of the reference line on the graph paper.

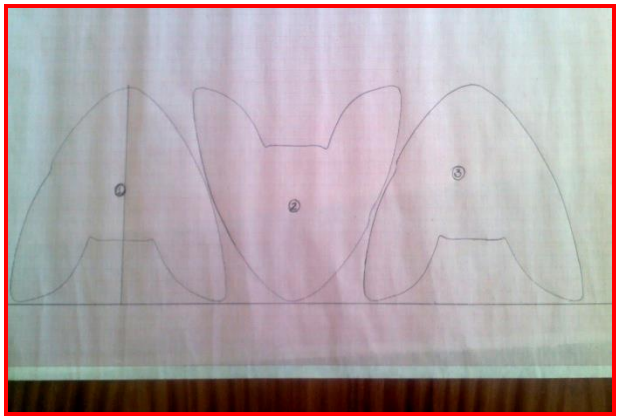


4) Trace (horizontally) the similar pattern interlocking (best possible) with the previous tracing by 180 degree. The space between the two tracings and from the base line should be 2 mm.

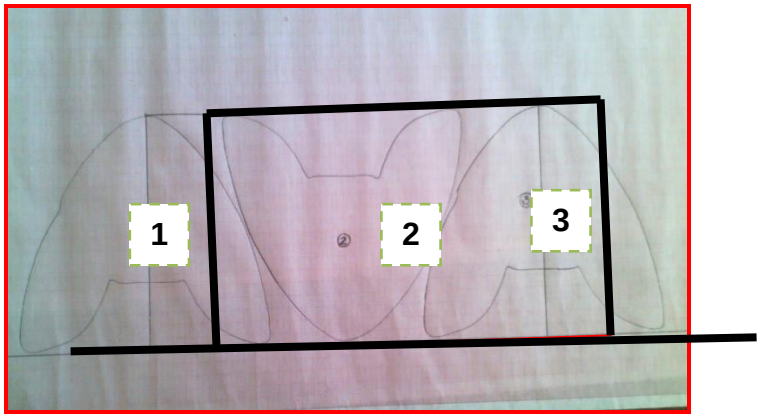


5) The third tracing (horizontally) should be done same first tracing as above and the space between the two tracings and also from the base line should be 2mm. mark the end points (reference points) of the reference line on the graph paper.

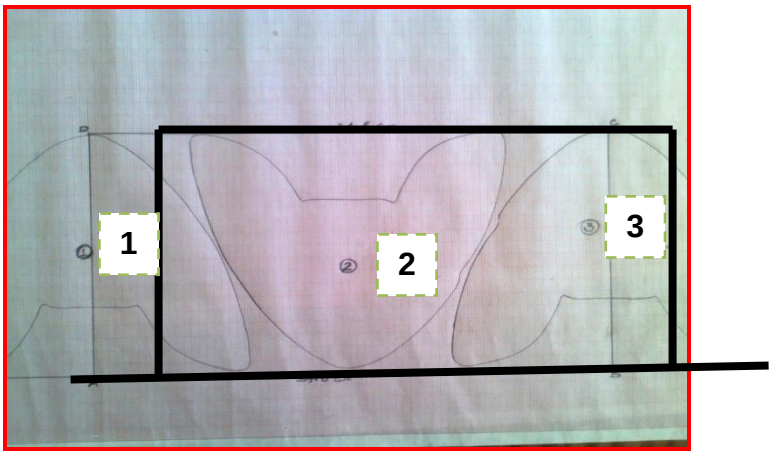




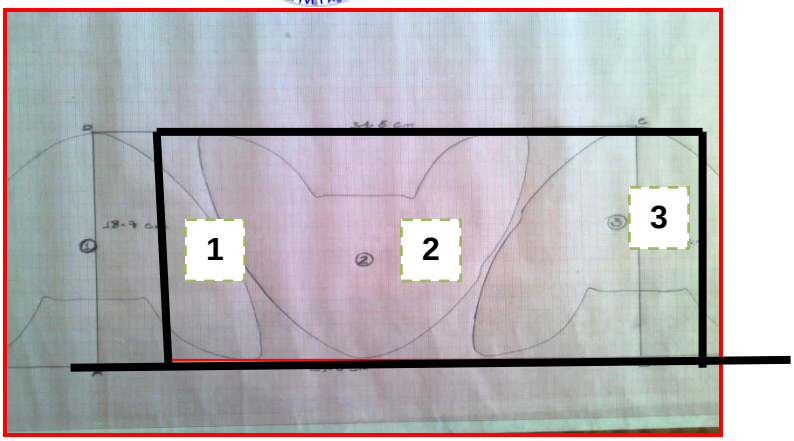
6) Join the reference point of first and third patterns to make the rectangle ABCD, where the base of the rectangle BC lines on the Base line of the graph paper.



7) This rectangle ABCD should cover the area of two components (one pair) of the pattern. In exceptional cases, if the rectangle is not including area of two components, project the reference line up to the highest points of the pattern to cover area of two components.



8) Measure the base AB and height BC in centimeter.



9) Calculate the area of rectangle ABCD by multiplying AB and BC. They are comes in sq.cm. Convert the value into sq.mtr. By dividing it by 10000.

   Area of rectangle ABCD = AB * BC

   = 34.6 cm * 18.7 cm

   = 647.02 cm2

   = .0647 m2

10) Thus, the area of two components (one pair) of the given pattern is calculated.

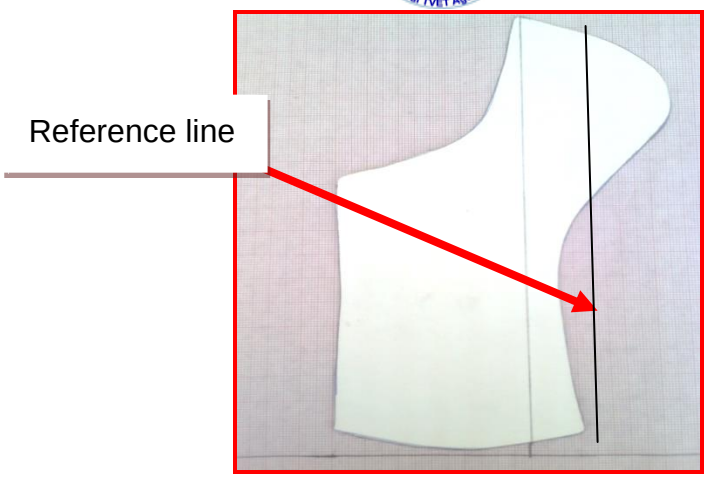
   - From calculation no. 9 the area of two cut component of vamp is 0.0647 m2.

11) Repeat the same procedure for all the patterns and calculate the respective areas of one pair (multiply by two in case there are four components required per pair)

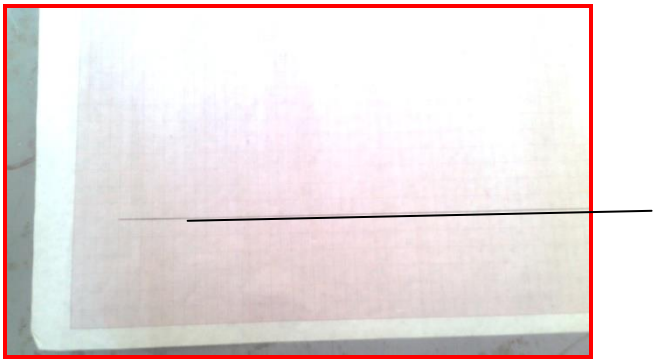
12) Add all the individual pattern areas per pair to find out the cutting allowance of the given article.

II. Outside quarter cut component

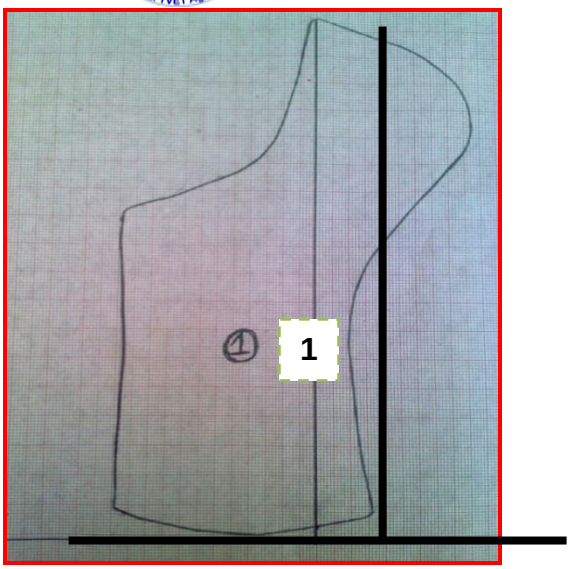
1) Mark the reference line (to be longest line) on the pattern.



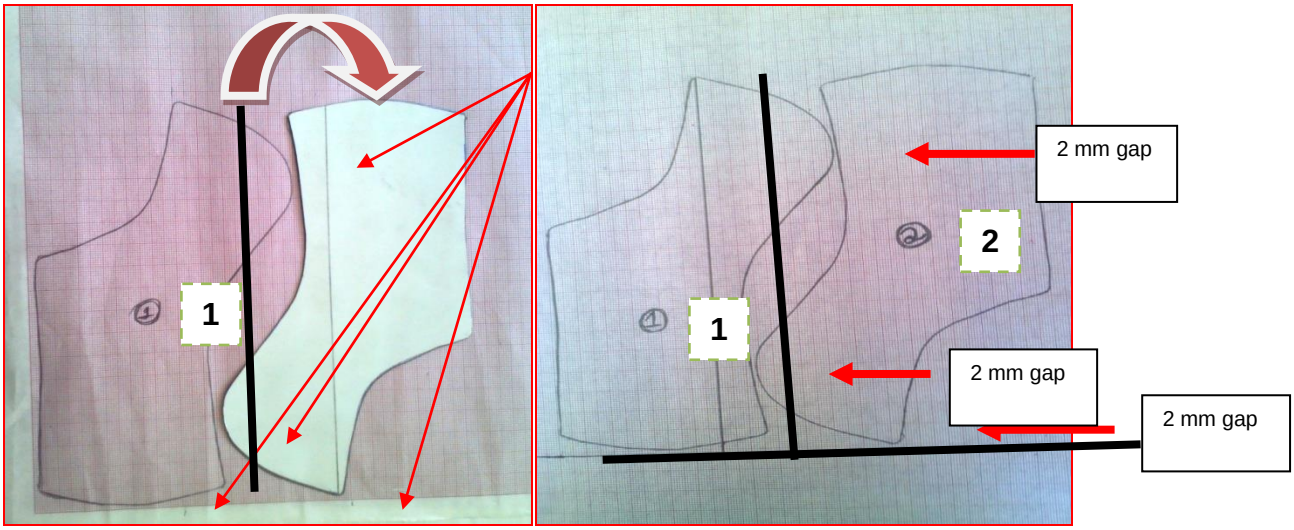
2) Mark the Base line on the graph paper.



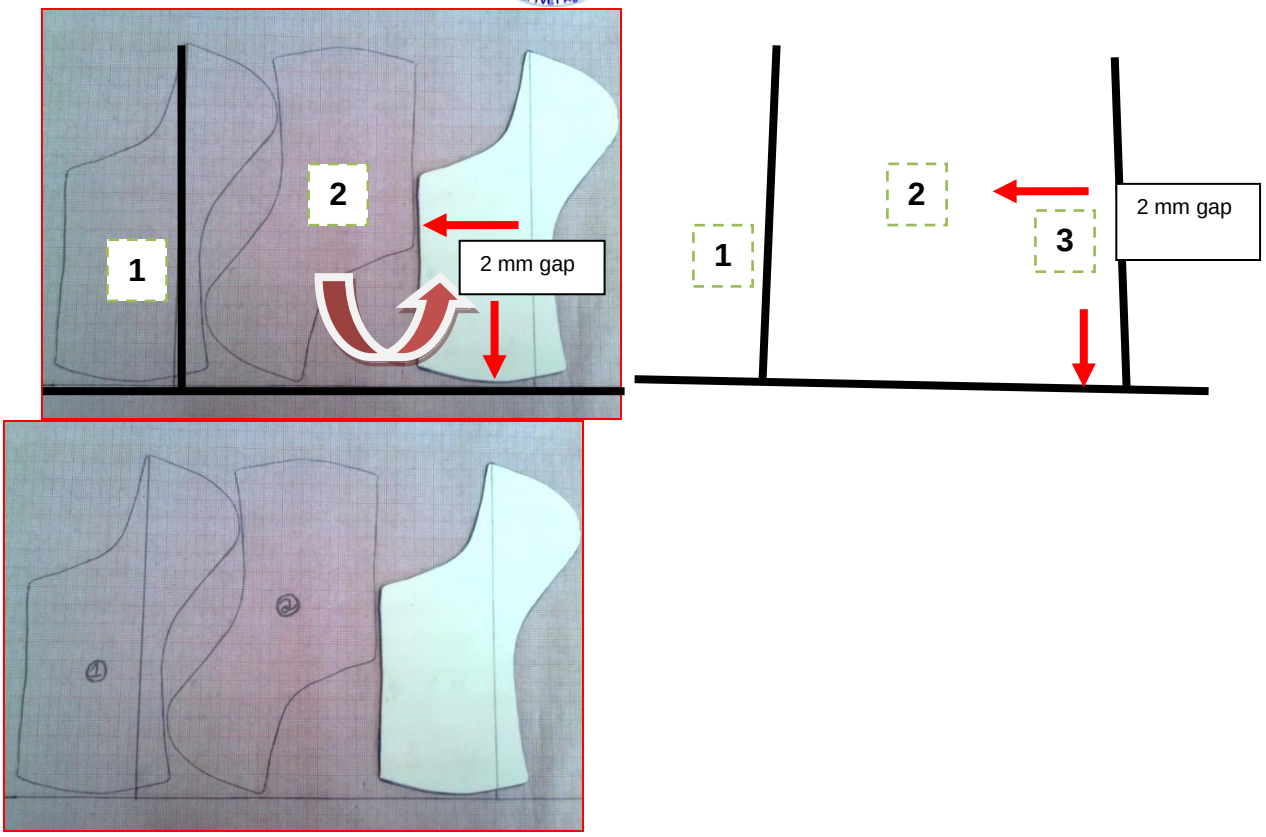
3) Trace first pattern on the graph paper matching the reference line pattern with any line of the graph paper and keeping 2mm space from the vertical and the horizontal lines. The gap of 2 mm is given because the synthetic materials are cut in layers. When the calculation is carried out for foam materials are cut in layers. When the calculation is carried out for foam materials, coated fabric laminated material etc., the gap should be given as 4-10mm (as per the thickness of the material). Mark the end points (reference points) of the reference line on the graph paper.



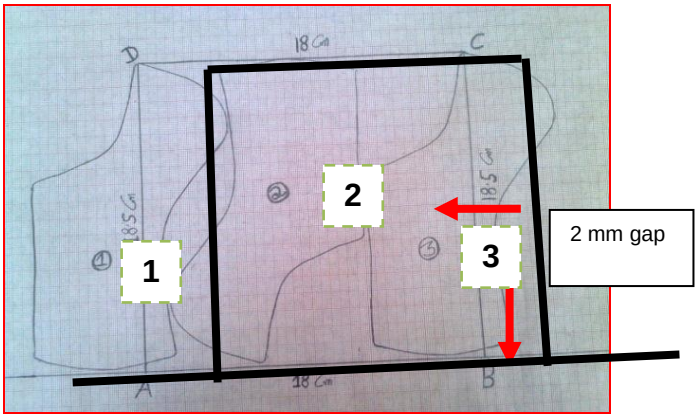
4) Trace second pattern (horizontally) the similar pattern interlocking (best possible) with the previous tracing by 180 degree. The space between the two tracings and from the base line should be 2 mm.



5) The third tracing (horizontally) should be done same first tracing as above and the space between the two tracings and also from the base line should be 2mm. mark the end points (reference points) of the reference line on the graph paper.

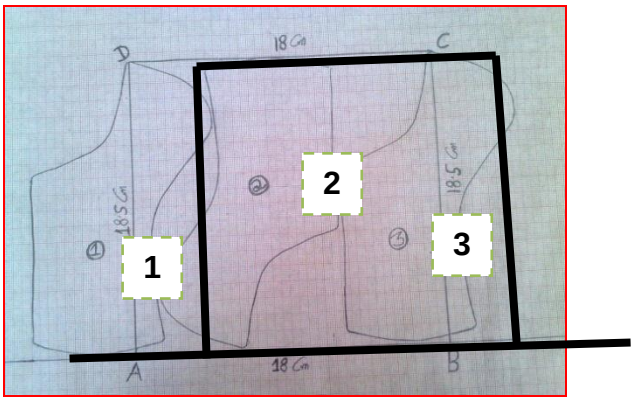


6) Join the reference point of first and third patterns to make the rectangle ABCD, where the base of the rectangle AB lines on the Base line of the graph paper.

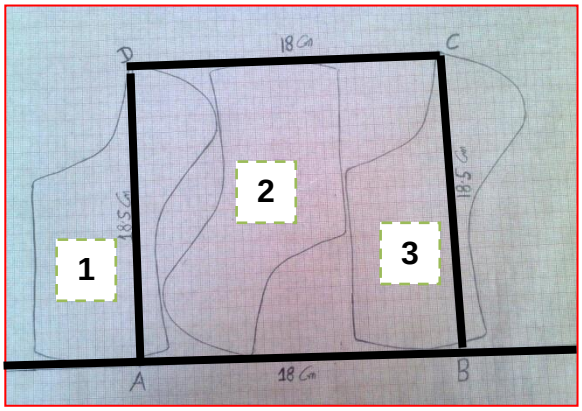


7) This rectangle ABCD should cover the area of two components (one pair) of the pattern. In exceptional cases, if the rectangle is not including area of two

components, project the reference line up to the highest points of the pattern to cover area of two components.



8) Measure the base AB and height BC in centimeter.



9) Calculate the area of rectangle ABCD by multiplying AB and BC. They are comes in sq.cm. Convert the value into sq.mtr. By dividing it by 10000.

Area of rectangle ABCD = AB * BC

= 18 cm * 18.5 cm

= 333 cm2

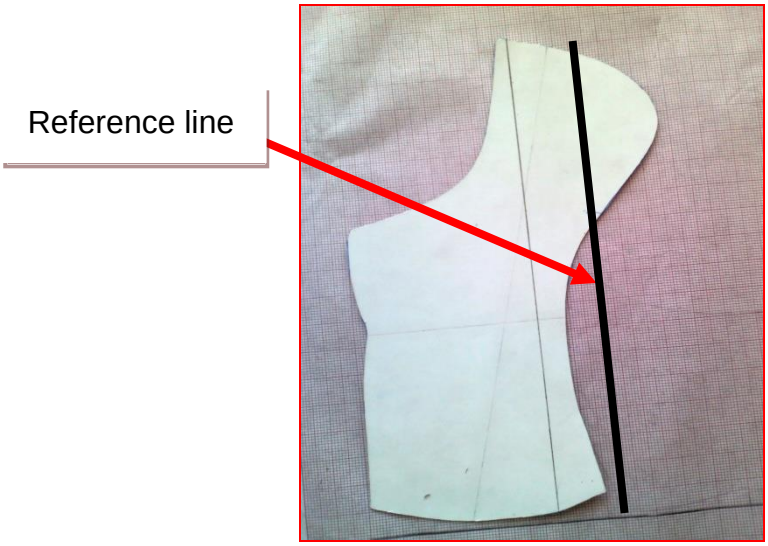
= .0333 m2

10) Thus, the area of two components (one pair) of the given pattern is calculated.

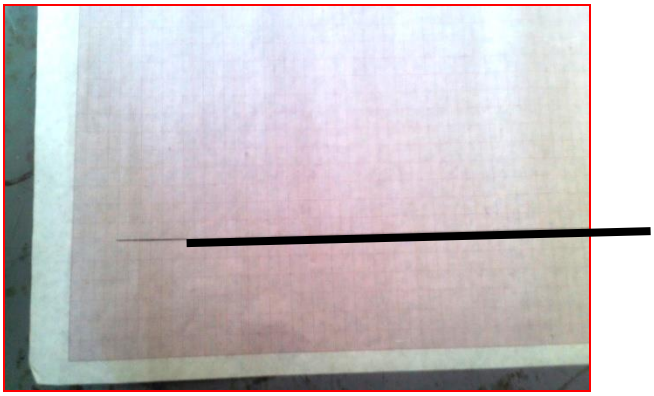
- From calculation no. 9 the area of two cut component of vamp is 0.0333 m2.

III. Outside quarter cut component

1) Mark the reference line (to be longest line) on the pattern.

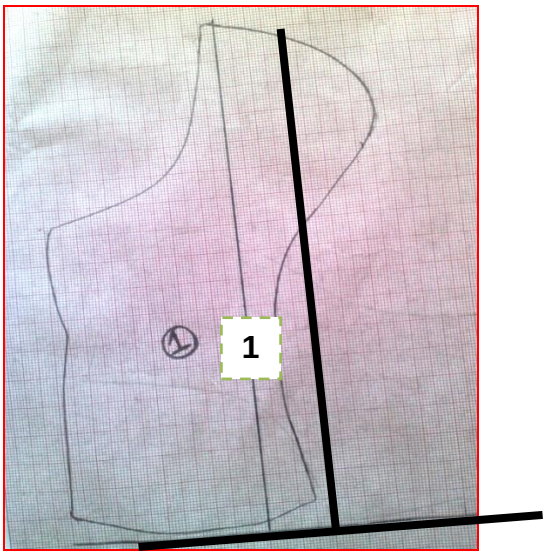


2) Mark the Base line on the graph paper.

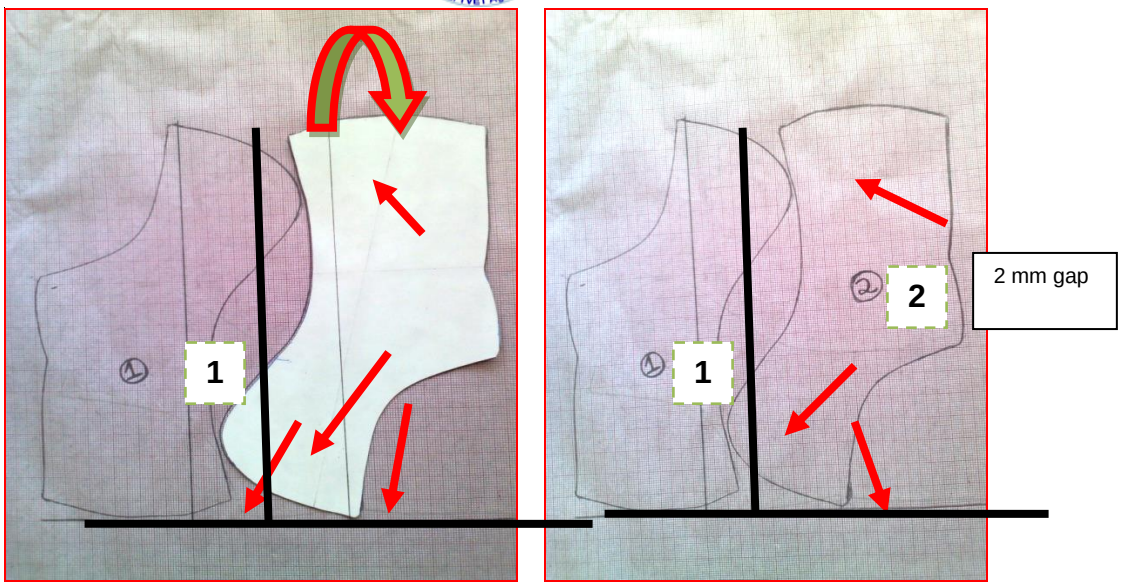


3) Trace first pattern on the graph paper matching the reference line pattern with any line of the graph paper and keeping 2mm space from the vertical and the

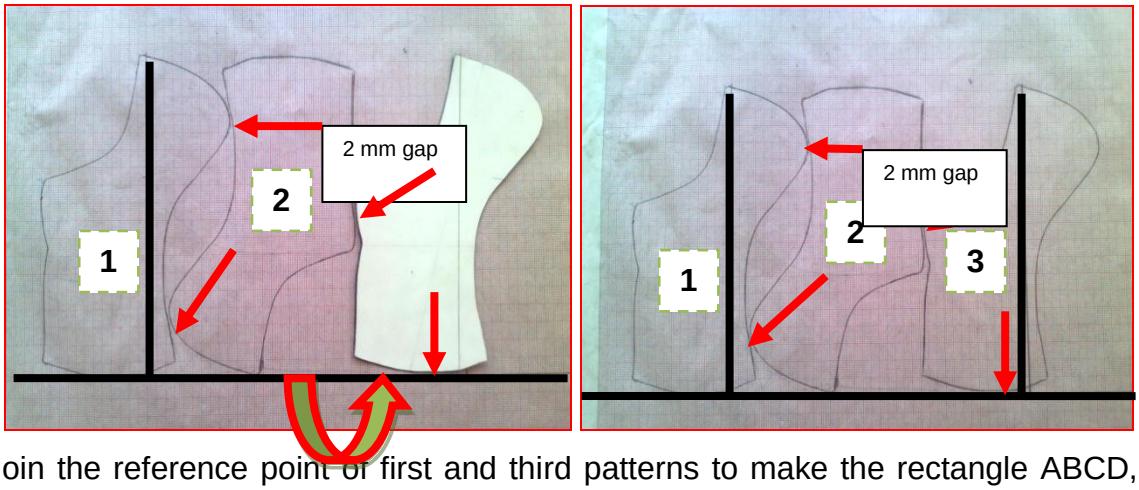
horizontal lines. The gap of 2 mm is given because the synthetic materials are cut in layers. When the calculation is carried out for foam materials are cut in layers. When the calculation is carried out for foam materials, coated fabric laminated material etc., the gap should be given as 4-10mm (as per the thickness of the material). Mark the end points (reference points) of the reference line on the graph paper.



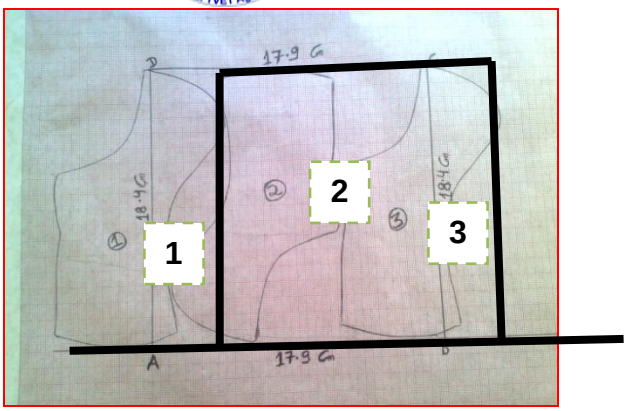
4) Trace second pattern (horizontally) the similar pattern interlocking (best possible) with the previous tracing by 180 degree. The space between the two tracings and from the base line should be 2 mm.



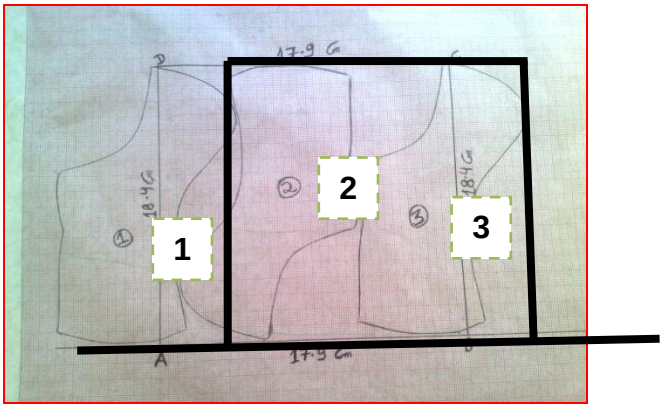
5) The third tracing (horizontally) should be done same first tracing as above and the space between the two tracings and also from the base line should be 2mm. mark the end points (reference points) of the reference line on the graph paper.



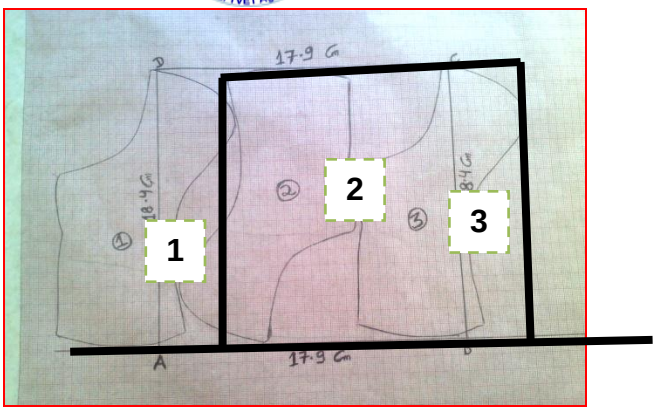
6) Join the reference point of first and third patterns to make the rectangle ABCD, where the base of the rectangle AB lines on the Base line of the graph paper.



7) This rectangle ABCD should cover the area of two components (one pair) of the pattern. In exceptional cases, if the rectangle is not including area of two components, project the reference line up to the highest points of the pattern to cover area of two components.



8) Measure the base AB and height BC in centimeter.



9) Calculate the area of rectangle ABCD by multiplying AB and BC. They are comes in sq.cm. Convert the value into sq.mtr. By dividing it by 10000.

Area of rectangle ABCD = AB * BC

= 17.9 cm * 18.4 cm

= 329.36 cm2

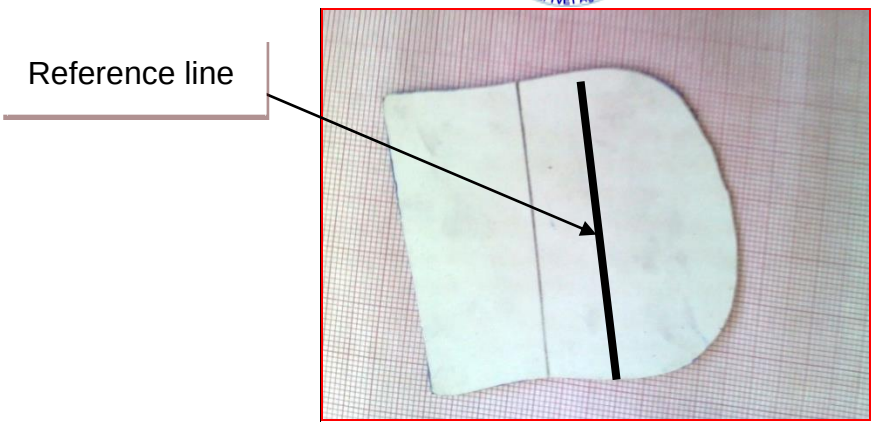
= .0329 m2

10) Thus, the area of two components (one pair) of the given pattern is calculated.

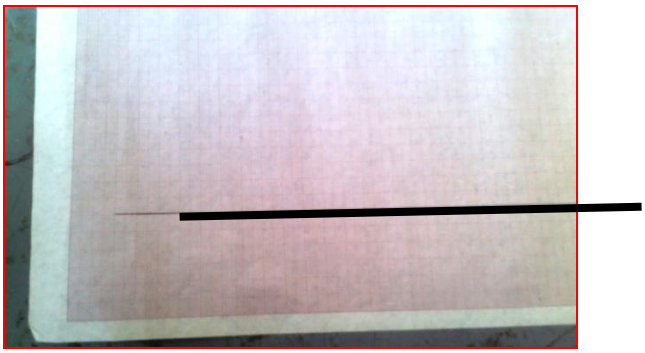
From calculation no. 9 the area of two cut component of vamp is 0.0329 m2

IV. Tongue cut component

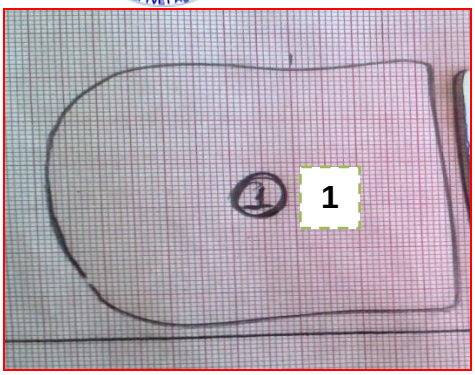
1) Mark the reference line (to be longest line) on the pattern.



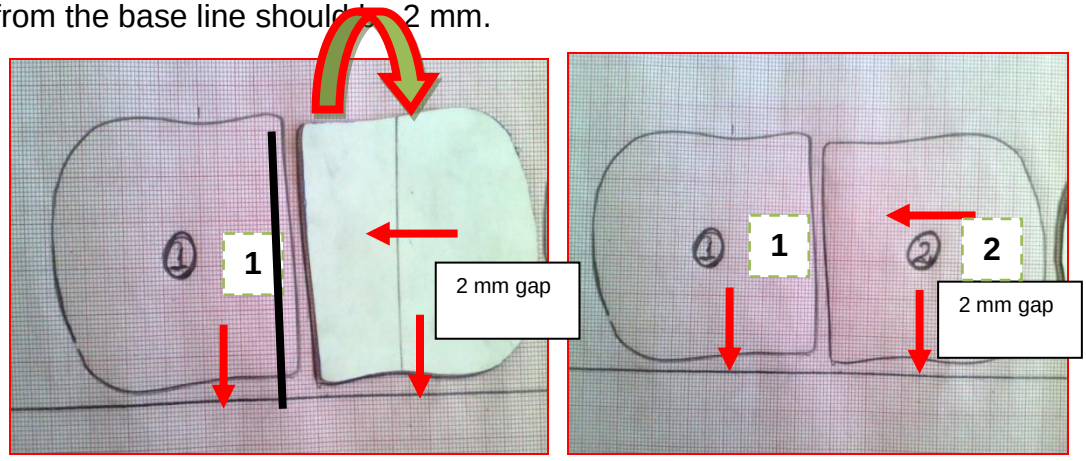
2) Mark the Base line on the graph paper.



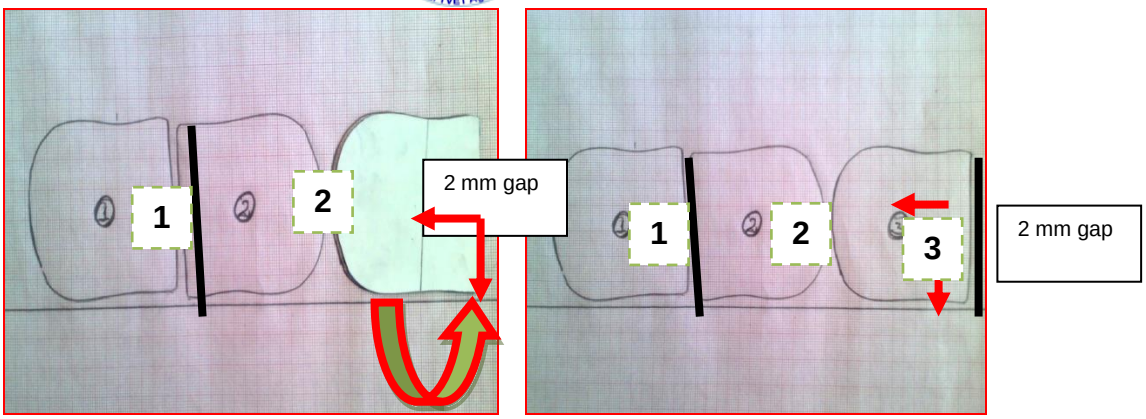
3) Trace first pattern on the graph paper matching the reference line pattern with any line of the graph paper and keeping 2mm space from the vertical and the horizontal lines. The gap of 2 mm is given because the synthetic materials are cut in layers. When the calculation is carried out for foam materials are cut in layers. When the calculation is carried out for foam materials, coated fabric laminated material etc., the gap should be given as 4-10mm (as per the thickness of the material). Mark the end points (reference points) of the reference line on the graph paper.



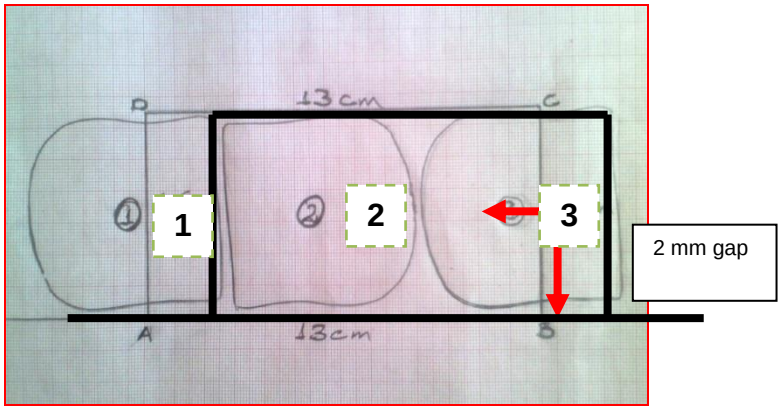
4) Trace second pattern (horizontally) the similar pattern interlocking (best possible) with the previous tracing by 180 degree. The space between the two tracings and from the base line should be 2 mm.



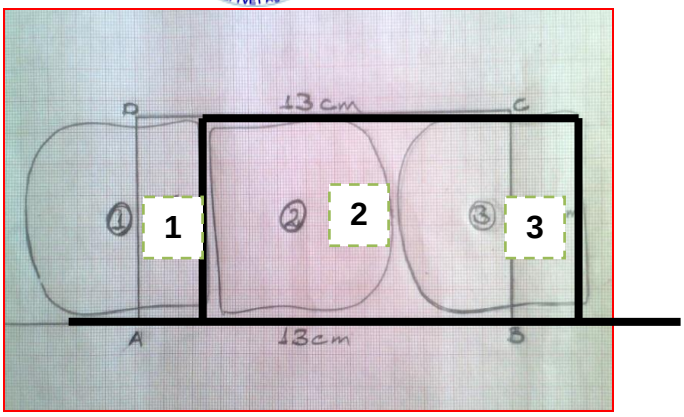
5) The third tracing (horizontally) should be done same first tracing as above and the space between the two tracings and also from the base line should be 2mm. mark the end points (reference points) of the reference line on the graph paper.



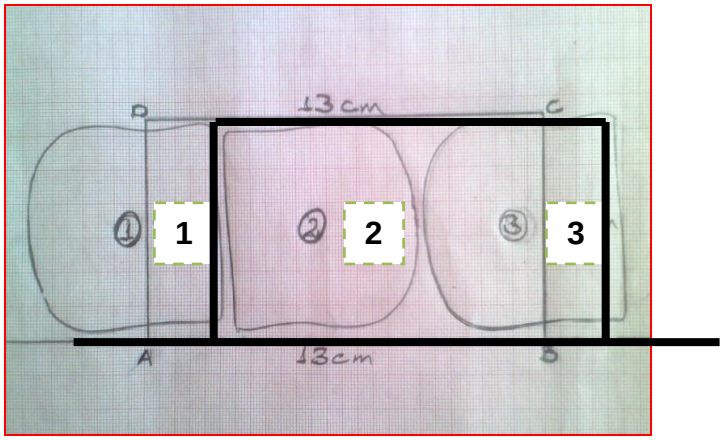
6) Join the reference point of first and third patterns to make the rectangle ABCD, where the base of the rectangle AB lines on the Base line of the graph paper.



7) This rectangle ABCD should cover the area of two components (one pair) of the pattern. In exceptional cases, if the rectangle is not including area of two components, project the reference line up to the highest points of the pattern to cover area of two components.



8) Measure the base AB and height BC in centimeter.



9) Calculate the area of rectangle ABCD by multiplying AB and BC. They are comes in sq.cm. Convert the value into sq.mtr. By dividing it by 10000.

Area of rectangle ABCD = AB * BC

= 13 cm * 6.5 cm

= 84.5 cm2

= .00845 m2

10) Thus, the area of two components (one pair) of the given pattern is calculated.

From calculation no. 9 the area of two cut component of vamp is 0. 00845 m2

NOTICE:-

The total area of one pair of derby shoe synthetic materials consumption for component below is:-

Total area of one pair = Vamp + inside quarter + outside quarter + tongue

= 0.0647 + .0333 + .0329 + .00845

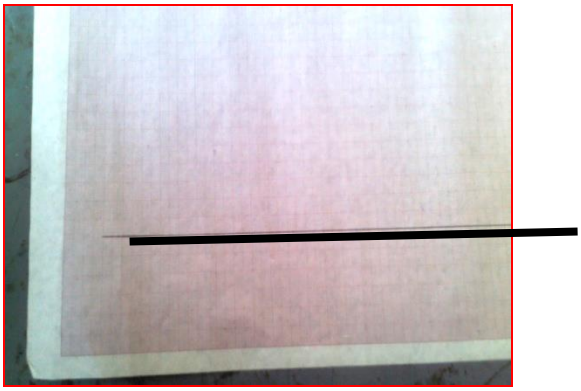
= 0.13935 m2

B. TRACING METHOD PROCEDURES:

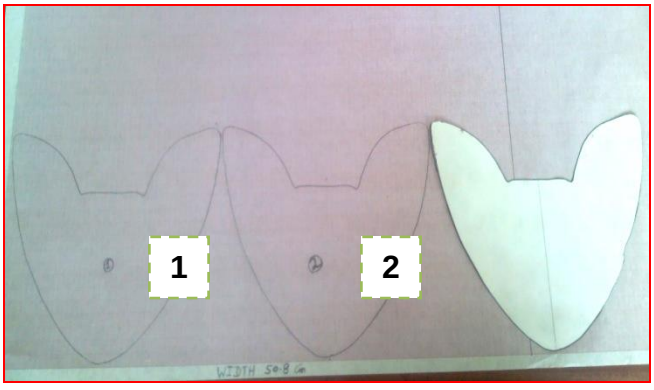
I. vamp cut component tracing

Tracing method is done in calculating the consumption of synthetic material for footwear by following the sequences of operations discussed below.

1. Mark the base lines (vertical and horizontal) on the plain/brown paper.

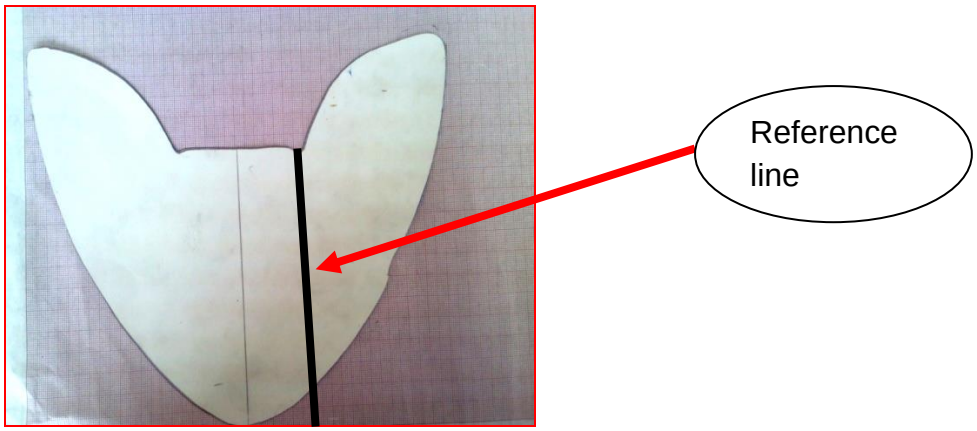


2. The horizontal line is traced as per the width of the material to be used for cutting and the vertical line should be up to 3-4 rows of the tracing (maximum one meter)

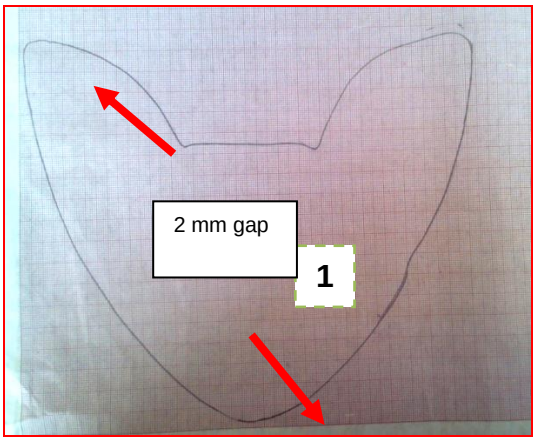


50.8 cm

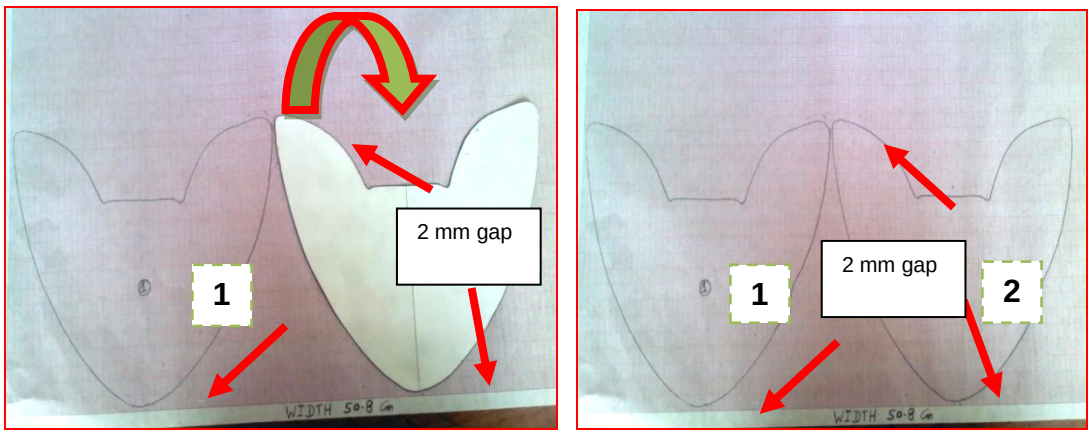
3. Mark the reference line on the pattern parallel to the direction of tightness.



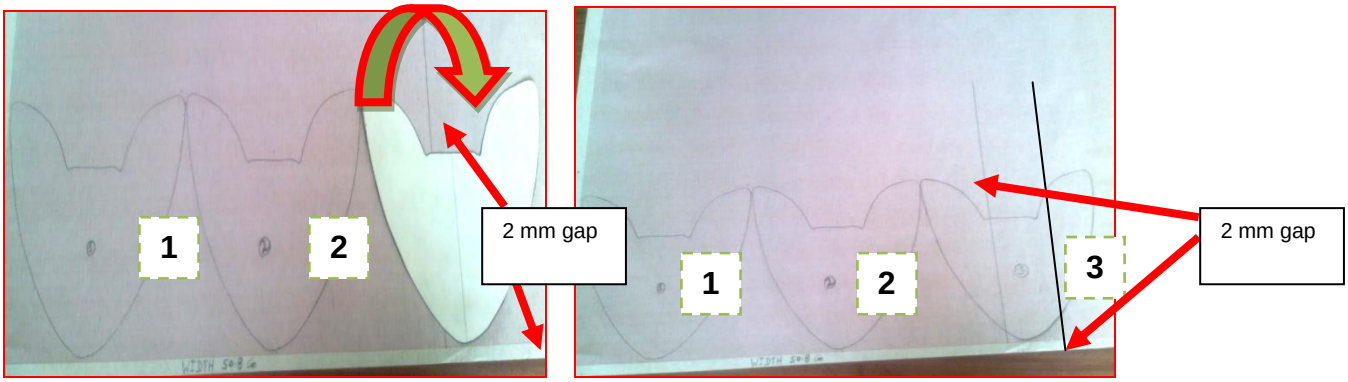
4. Trace first pattern on the plain/brown paper keeping the reference line of the pattern parallel to the vertical base line of the plain/brown paper and keeping 2mm space from the vertical and horizontal lines. The gap of 2mm is given because synthetic materials are cut in layers. When the calculation is carried out for foam material, coated fabric laminated material etc., the gap should be given as 4-10 mm (as per the thickness of the material).



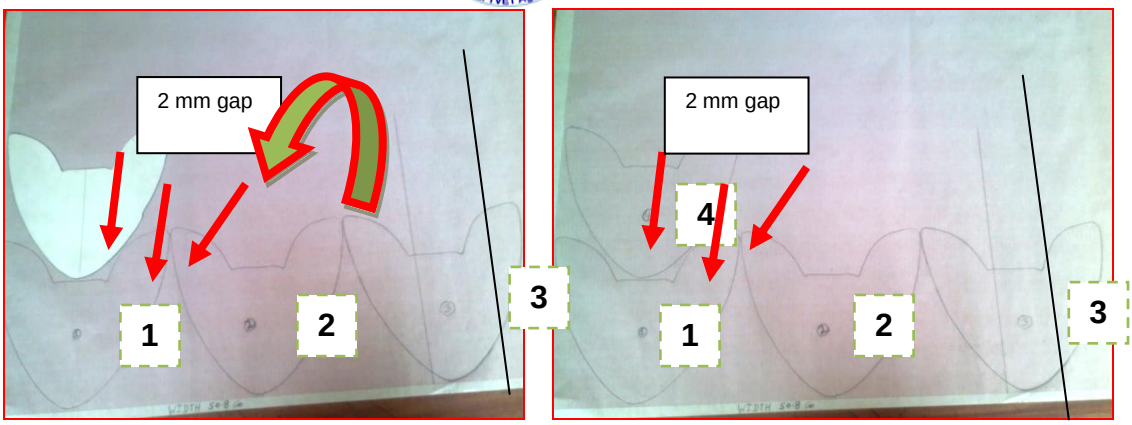
5. Trace 2nd pattern (horizontally) the similar pattern interlocking with the first tracing either by 0 degrees for best possible interlocking. The space between the two tracings and also from the baseline should be minimum 2mm.



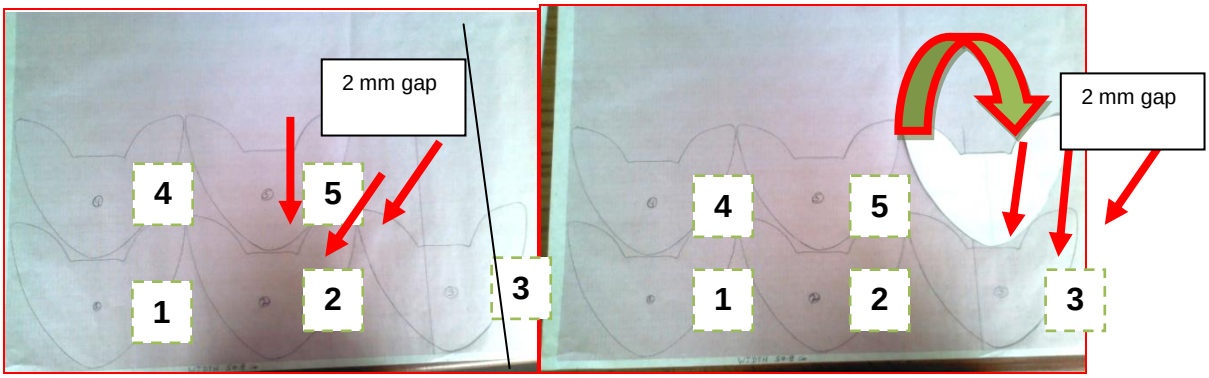
6. The third tracing (horizontally) should be done as above and the tracing is continued up to full or half of the width of the material.



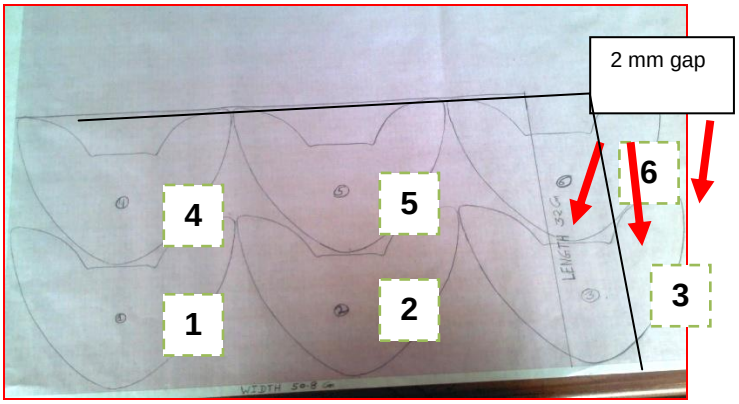
7. Trace 4th the same pattern vertically interlocking with the first tracing either by 0 degrees or 180 degrees keeping the space in between as 2 mm (minimum).



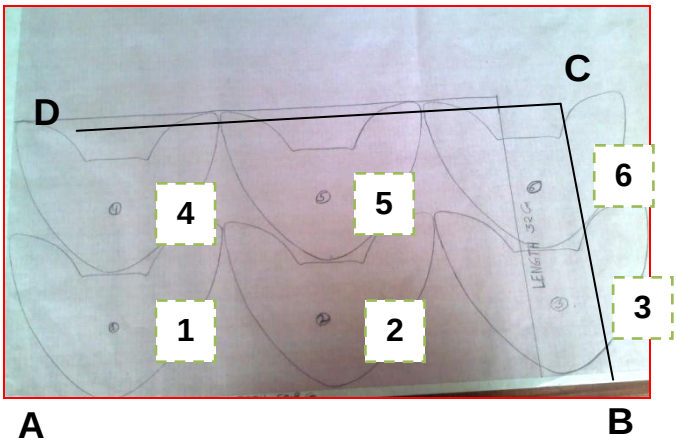
8. Similarly the tracing is done until end interlocking with the previous tracings (first row) and is carried out for 3-4 rows (maximum one meter). Sometimes only 2 rows are traced when the pattern is symmetrically interlocking.



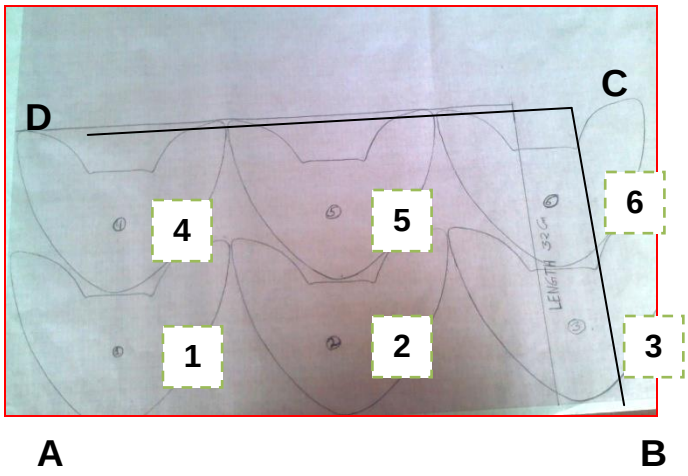
9. Trace the horizontal and vertical lines touching and blocking the outer most points of the tracings, thus making the rectangle.



10. Mark the rectangle as ABCD where AB is base and BC is the height of the rectangle ABCD.



11. Measure the base AB and the height BC in centimeter.



Base AB = 50.8 cm and height BC = 32 cm

12. Calculate the areas of the rectangle ABCD by multiplying BC and CD. They are comes in sq.cm. Convert the value in to sq.mtr. By dividing it by 10000.

Area of rectangle ABCD = base * height

= AB * BC

= 50.8 cm * 32 cm

= 1625.6 cm2 / 10000

= 0.16256 m2

13. Now the number of patterns is counted. By dividing the area traced by number of patterns traced the area of one pattern is estimated. Now, area per pair is calculated as per the number of components per pair.

$$\text{Area per pair} = \frac{\text{Total area for no. of component}}{\text{Total no. of components}}$$

$$= \frac{0.16256\text{m2}}{2}$$

$$= 0.081\ \text{m2/Pair}$$

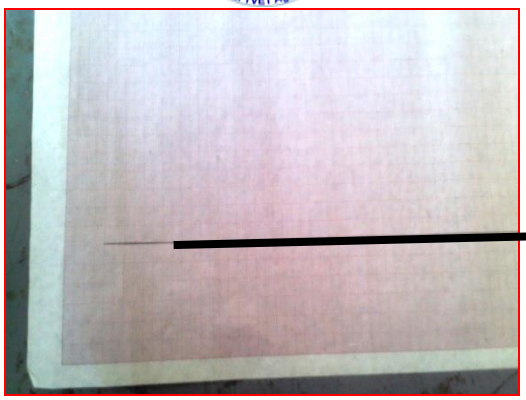
14. Repeat the same procedure for all the patterns and calculate the pair per pattern areas.
15. Add all the individual areas per pair to find out the cutting allowance of the given article.

B. TRACING METHOD PROCEDURES:

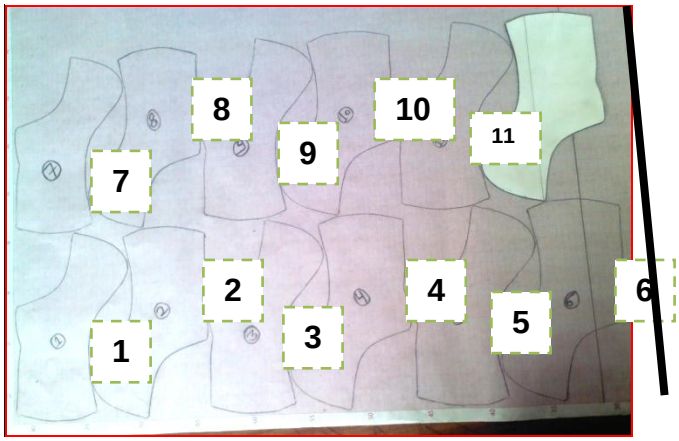
II. Outside quarter cut component tracing

Outside quarter tracing method is done in calculating the consumption of synthetic material for footwear by following the sequences of operations discussed below.

1. Mark the base lines (vertical and horizontal) on the plain/brown paper.

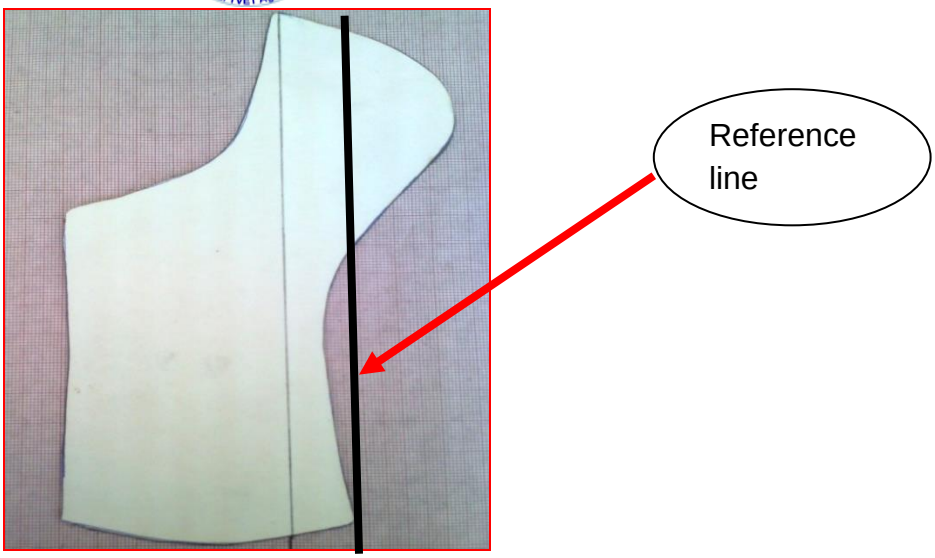


2. The horizontal line is traced as per the width of the material to be used for cutting (for simplification half of the material width are sometimes traced) and the vertical line should be up to 3-4 rows of the tracing (maximum one meter)

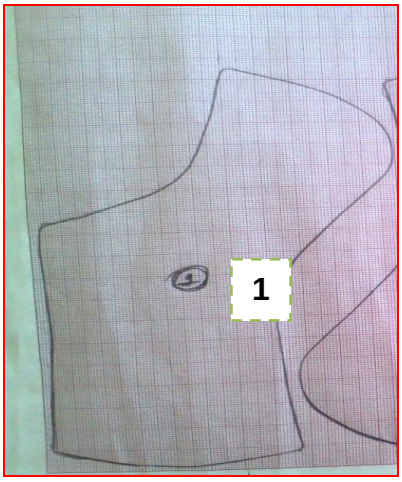


50.8 cm

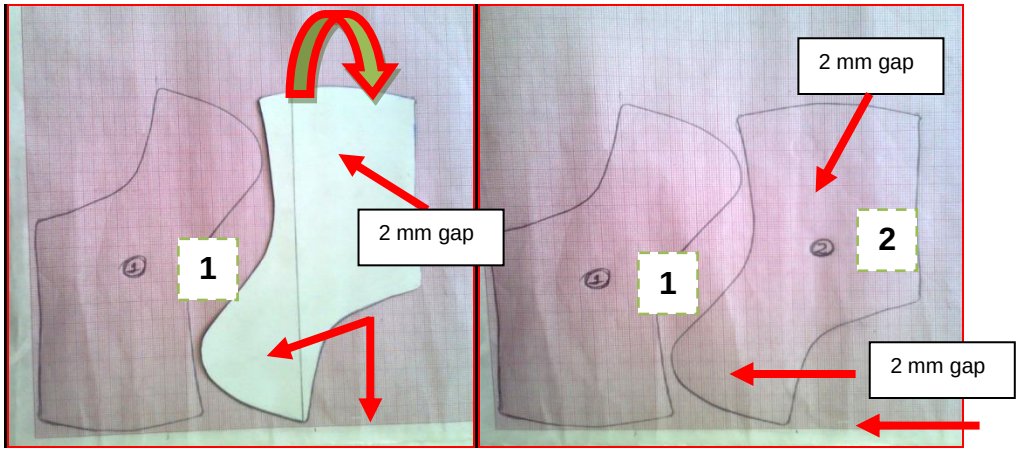
3. Mark the reference line on the pattern parallel to the direction of tightness.



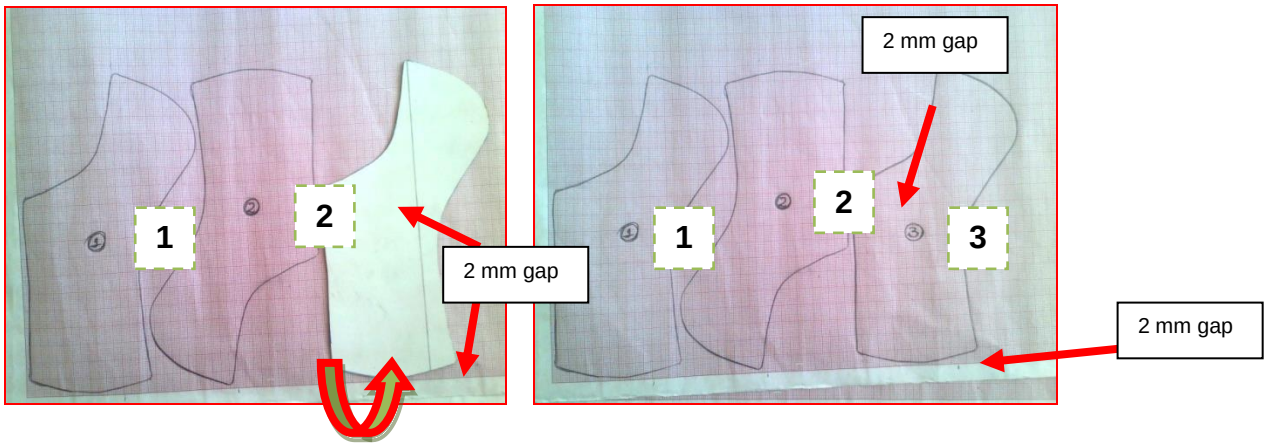
4. Trace first pattern on the plain/brown paper keeping the reference line of the pattern parallel to the vertical base line of the plain/brown paper and keeping 2mm space from the vertical and horizontal lines. The gap of 2mm is given because synthetic materials are cut in layers. When the calculation is carried out for foam material, coated fabric laminated material etc., the gap should be given as 4-10 mm (as per the thickness of the material).



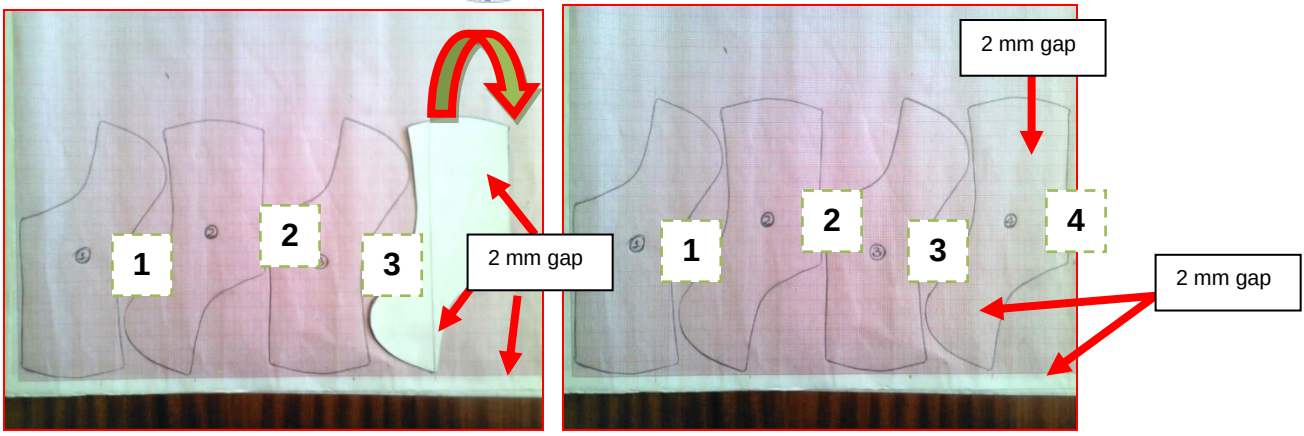
5. Trace 2nd pattern (horizontally) the similar pattern interlocking with the first tracing either by 0 degrees for best possible interlocking. The space between the two tracings and also from the baseline should be minimum 2mm.



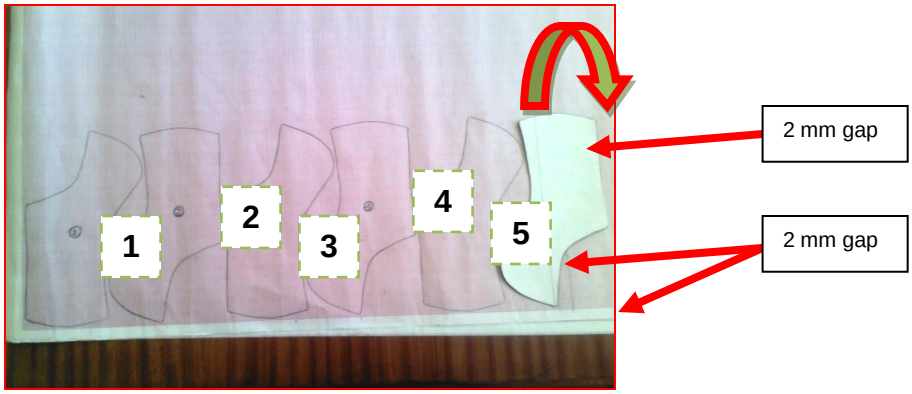
6. The third tracing (horizontally) should be done as above and the tracing is continued up to full or half of the width of the material.



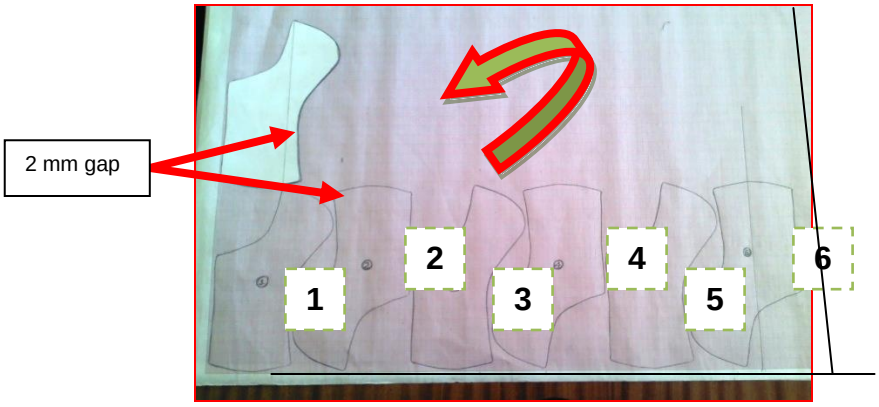
7. Trace 4th the same pattern vertically interlocking with the first tracing either by 0 degrees or 180 degrees keeping the space in between as 2 mm (minimum).



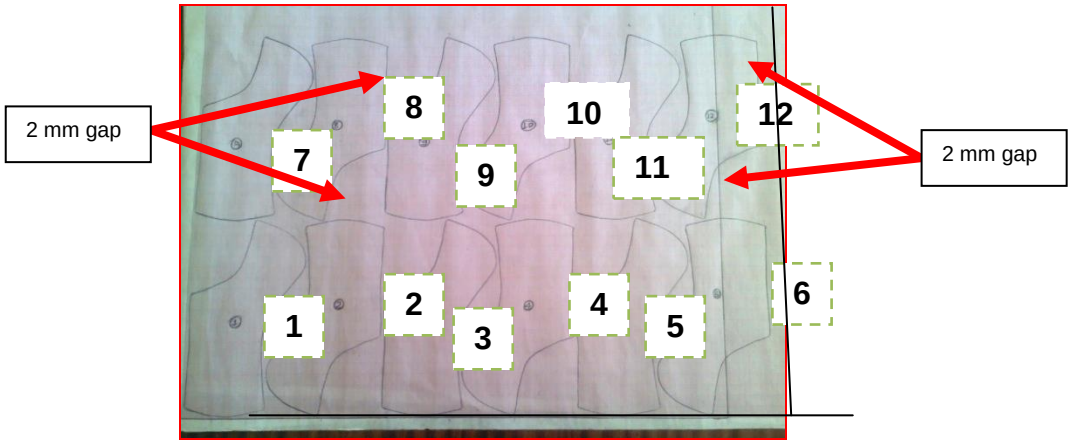
8. First raw Tracing will continue until the end of reference height.



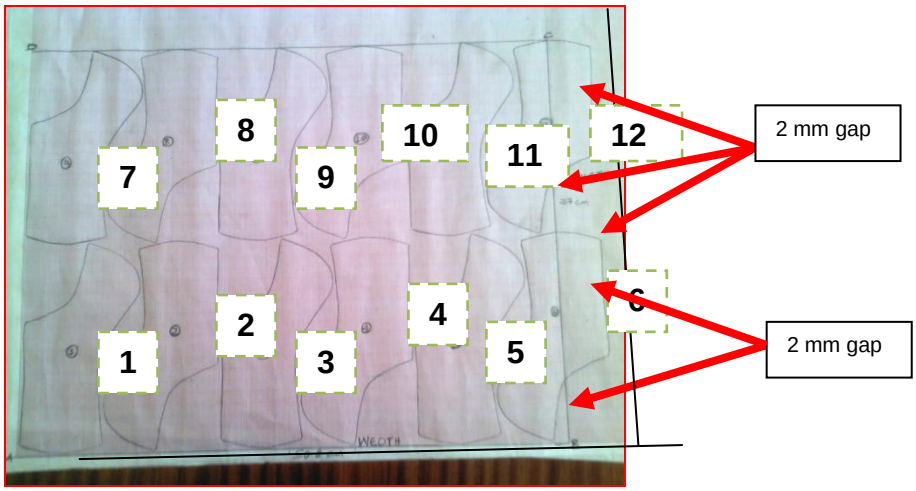
9. Similarly the tracing is done until end interlocking with the previous tracings (first row) and is carried out for 3-4 rows. Sometimes only 2 rows are traced when the pattern is symmetrically interlocked.



10. Full second raw tracing

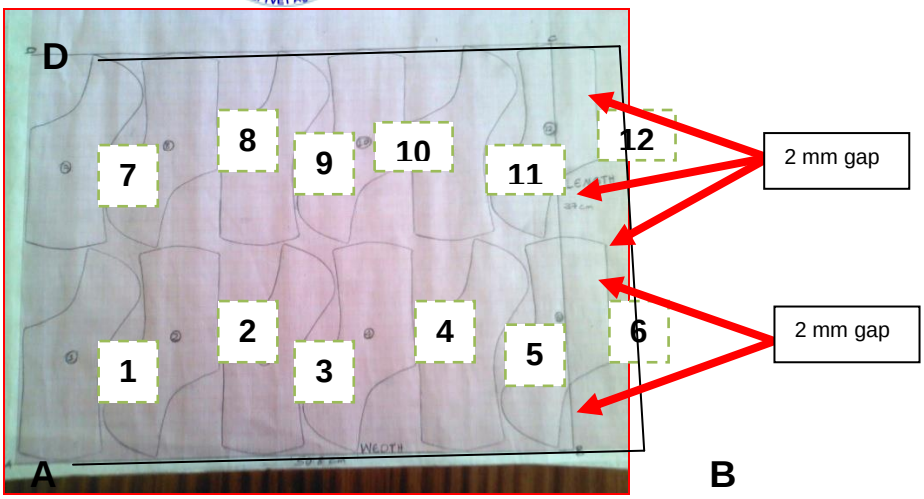


11. Trace the horizontal and vertical lines touching and blocking the outer most points of the tracings, thus making the rectangle.

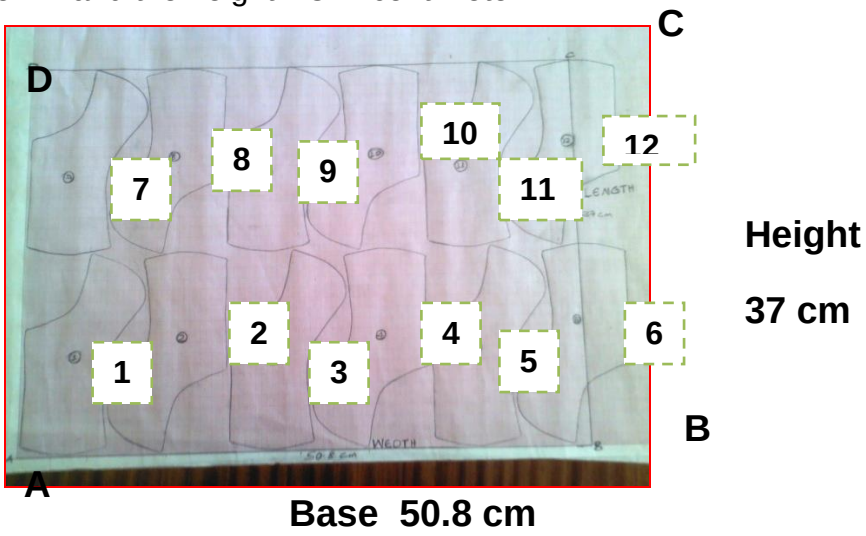


12. Mark the rectangle as ABCD where AB is base and BC is the height of the rectangle ABCD.

C



13. Measure the base AB and the height BC in centimeter.



Base AB = 50.8 cm and height BC = 37 cm

14. Calculate the areas of the rectangle ABCD by multiplying BC and CD. They are comes in sq.cm. Convert the value in to sq.mtr. By dividing it by 10000.

Area of rectangle ABCD = base * height

= AB * BC

= 50.8 cm * 37 cm

= 1879.6 cm2 dividing by 10000

= 0.18796 m2

15. Now the number of patterns is counted. By dividing the area traced by number of patterns traced the area of one pattern is estimated. Now, area per pair is calculated as per the number of components per pair.

Area per pair = total area for no. of component

Total no. of components per pair

= 0.18796m2

5.5

= 0.034 m2 / Pair

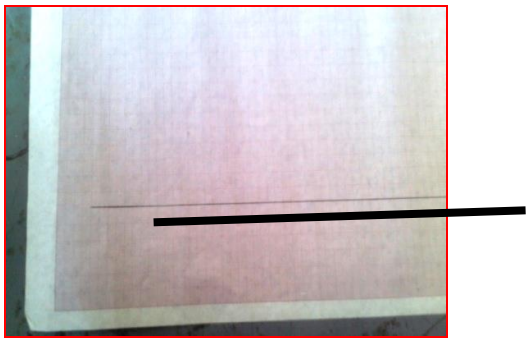
16. Repeat the same procedure for all the patterns and calculate the pair per pattern areas.
17. Add all the individual areas per pair to find out the cutting allowance of the given article.

B. TRACING METHOD PROCEDURES:

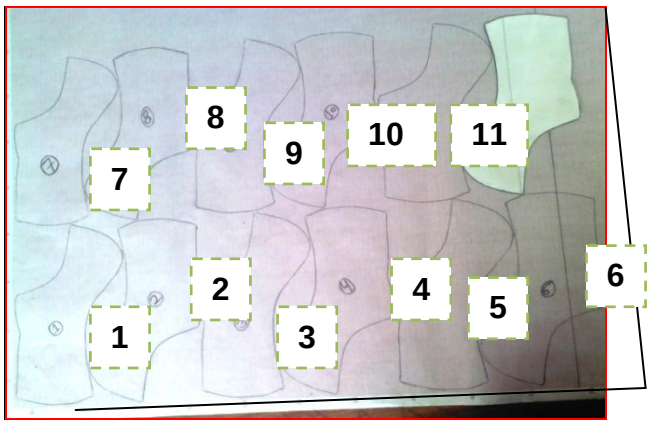
III. Inside quarter cut component tracing

Outside quarter tracing method is done in calculating the consumption of synthetic material for footwear by following the sequences of operations discussed below.

1. Mark the base lines (vertical and horizontal) on the plain/brown paper.

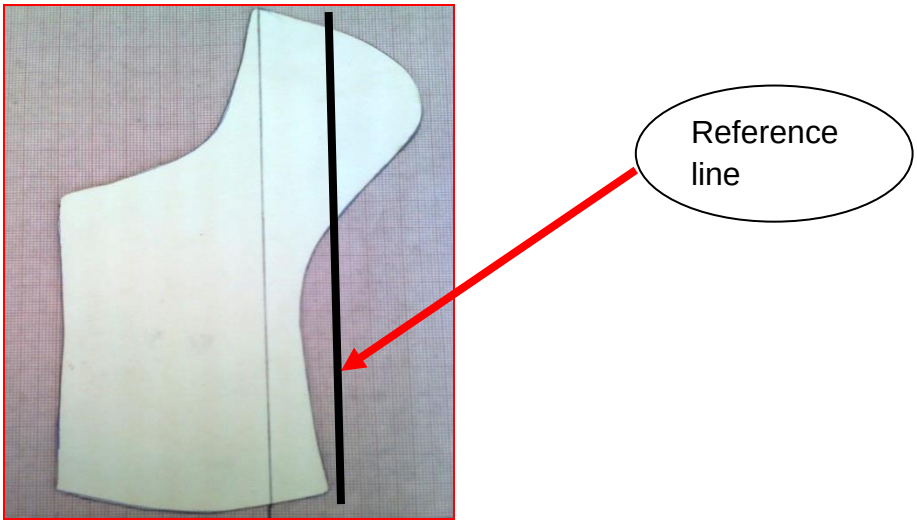


2. The horizontal line is traced as per the width of the material to be used for cutting (for simplification half of the material width are sometimes traced) and the vertical line should be up to 3-4 rows of the tracing (maximum one meter)



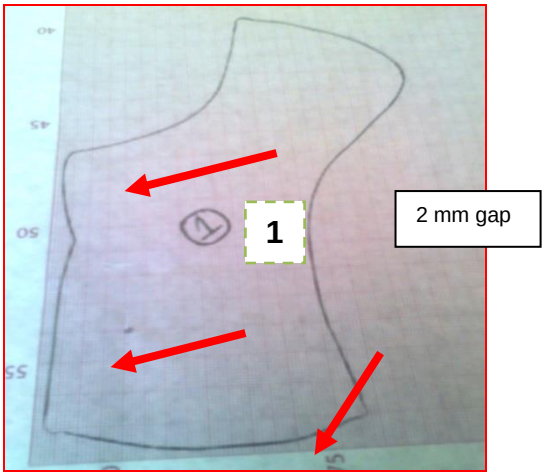
50.8 cm

3. Mark the reference line on the pattern parallel to the direction of tightness.

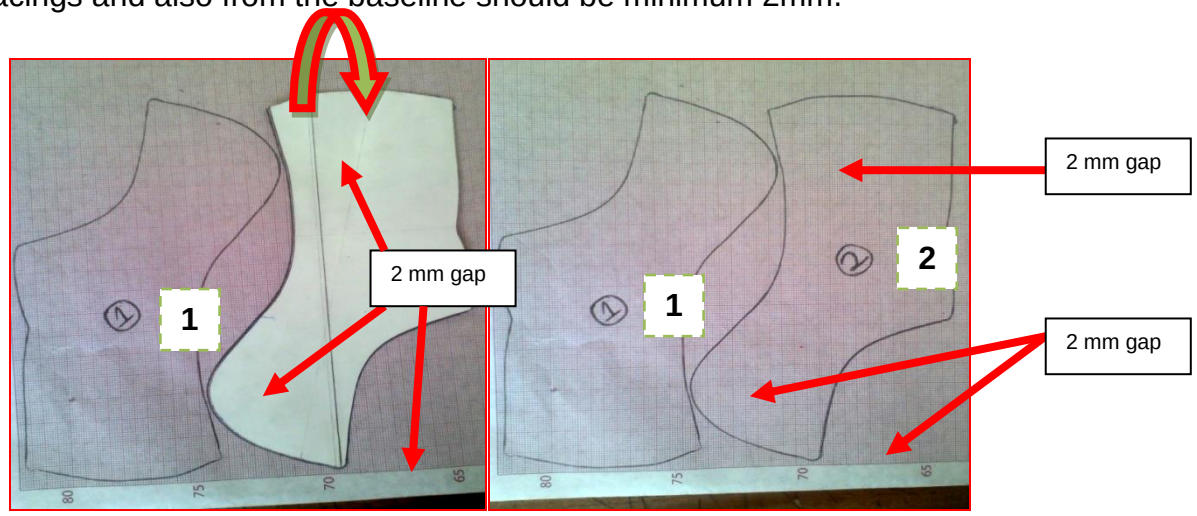


4. Trace first pattern on the plain/brown paper keeping the reference line of the pattern parallel to the vertical base line of the plain/brown paper and keeping 2mm space from the vertical and horizontal lines. The gap of 2mm is given

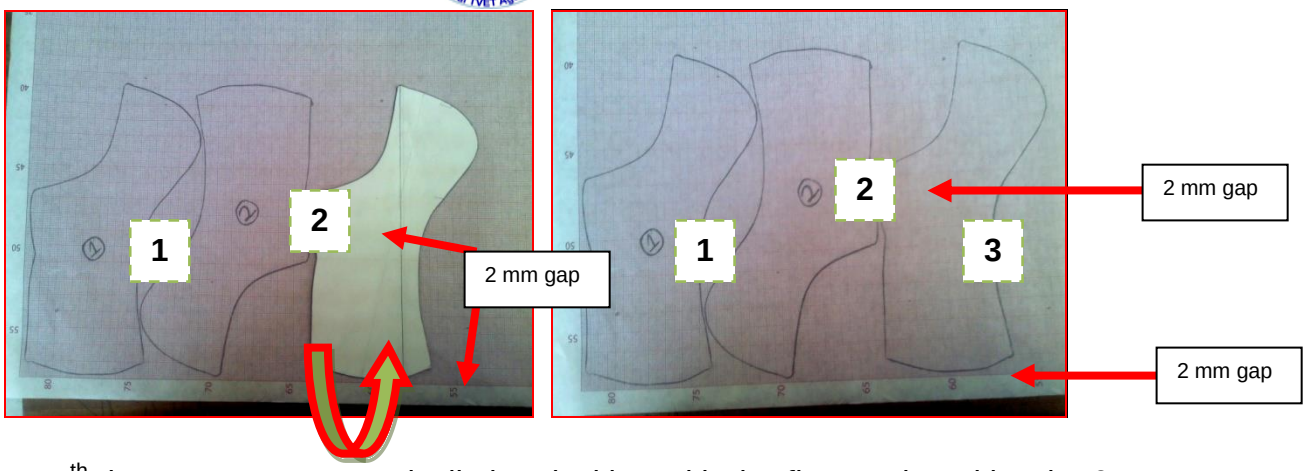
because synthetic materials are cut in layers. When the calculation is carried out for foam material, coated fabric laminated material etc., the gap should be given as 4-10 mm (as per the thickness of the material).



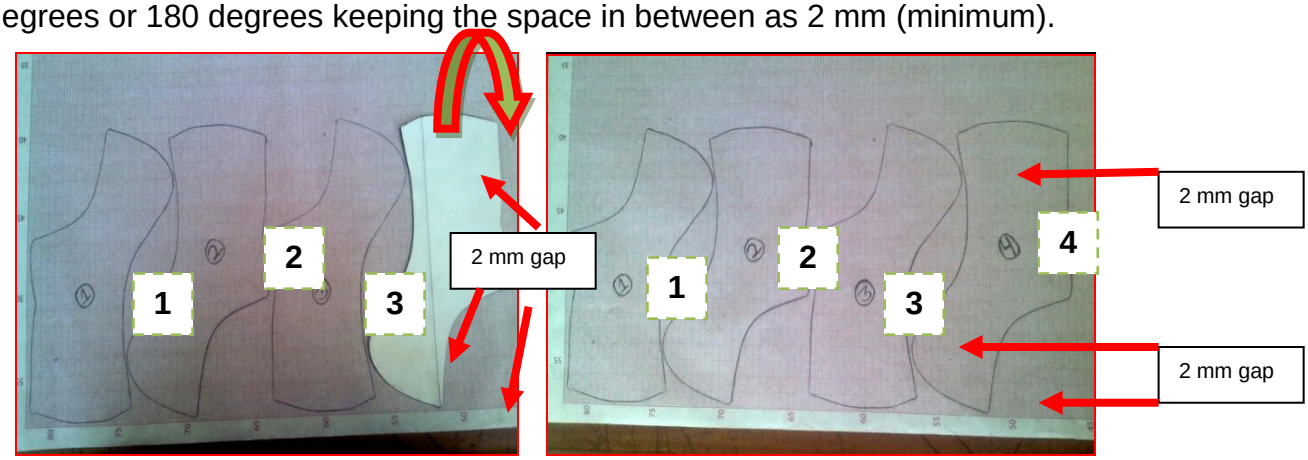
5. Trace 2nd pattern (horizontally) the similar pattern interlocking with the first tracing either by 0 degrees for best possible interlocking. The space between the two tracings and also from the baseline should be minimum 2mm.



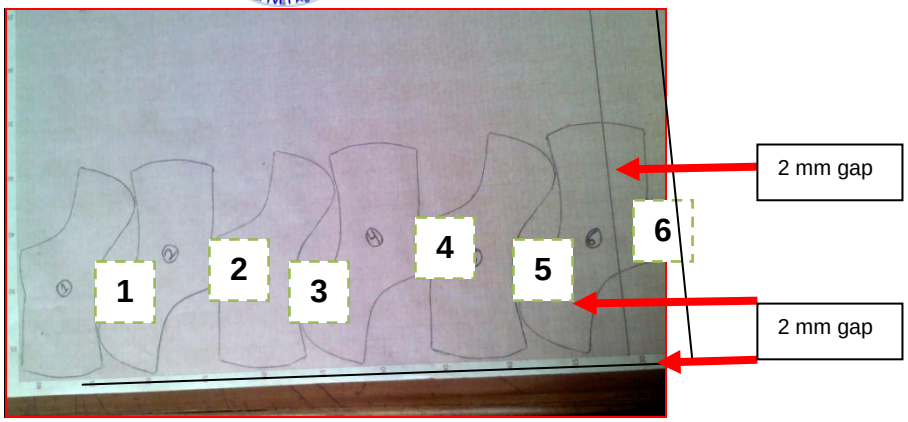
6. The third tracing (horizontally) should be done as above and the tracing is continued up to full or half of the width of the material.



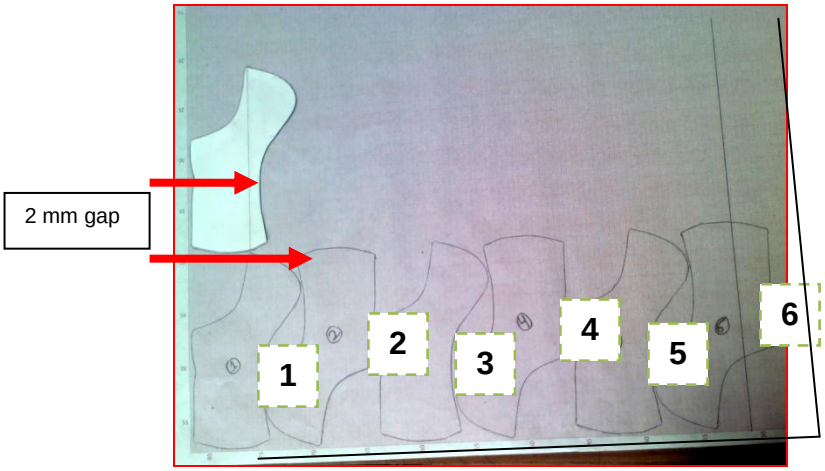
7. Trace 4th the same pattern vertically interlocking with the first tracing either by 0 degrees or 180 degrees keeping the space in between as 2 mm (minimum).



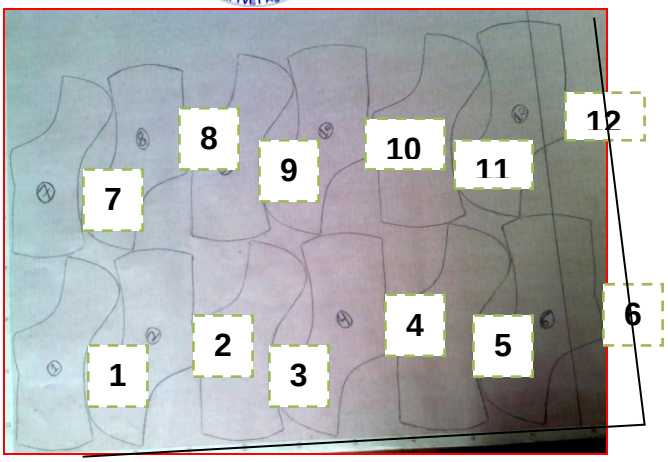
8. First raw Tracing will continue until the end of reference height or length.



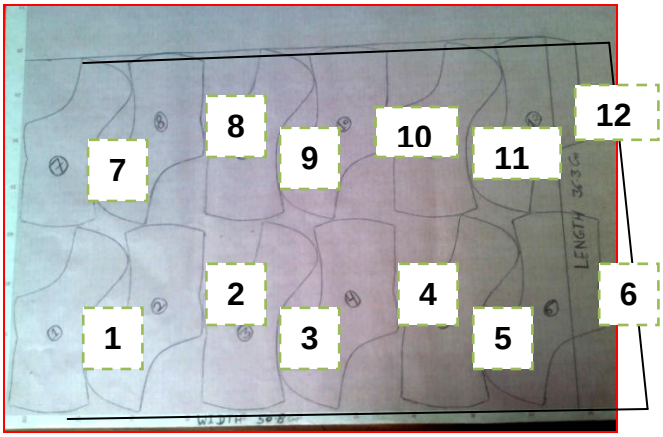
9. Similarly the tracing is done until end interlocking with the previous tracings (first row) and is carried out for 3-4 rows. Sometimes only 2 rows are traced when the pattern is symmetrically interlocked.



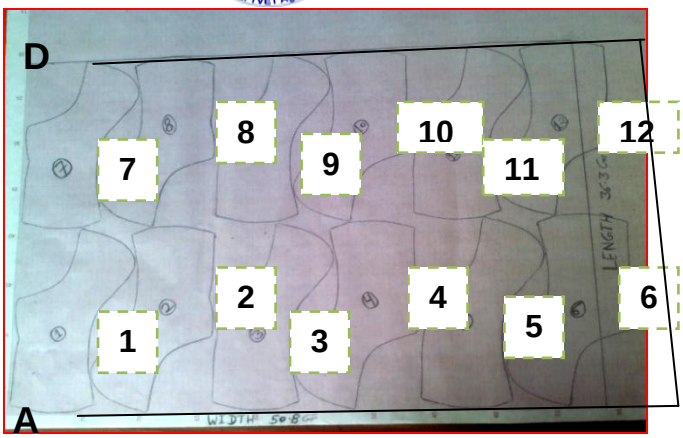
10. Full second raw tracing



11. Trace the horizontal and vertical lines touching and blocking the outer most points of the tracings, thus making the rectangle.



12. Mark the rectangle as ABCD where AB is base and BC is the height or length of the rectangle ABCD.



13. Measure the base AB and the height BC in centimeter.

Base AB = 50.8 cm and height BC = 36.3 cm

14. Calculate the areas of the rectangle ABCD by multiplying BC and CD. They are comes in sq.cm. Convert the value in to sq.mtr. By dividing it by 10000.

Area of rectangle ABCD = base * height

= AB * BC

= 50.8 cm * 36.3 cm

= 1844.4cm2 / 10000

= 0.1844 m2

15. Now the number of patterns is counted. By dividing the area traced by number of patterns traced the area of one pattern is estimated. Now, area per pair is calculated as per the number of components per pair.

Area per pair = Total area for no. of component

Total no. of components per pair

= 0.1844m2

5.5

= 0.0335 m2 / Pair

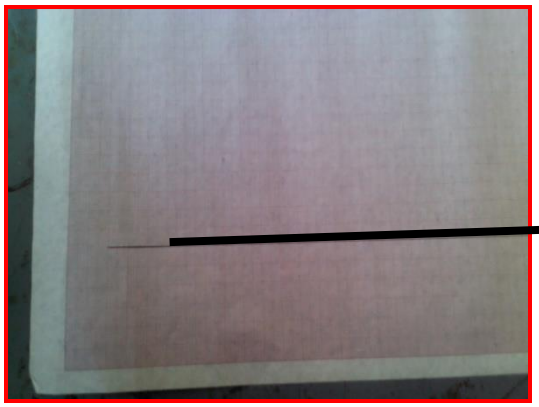
16. Repeat the same procedure for all the patterns and calculate the pair per pattern areas.
17. Add all the individual areas per pair to find out the cutting allowance of the given article.

B. TRACING METHOD PROCEDURES:

IV. Tongue cut component tracing

Outside quarter tracing method is done in calculating the consumption of synthetic material for footwear by following the sequences of operations discussed below.

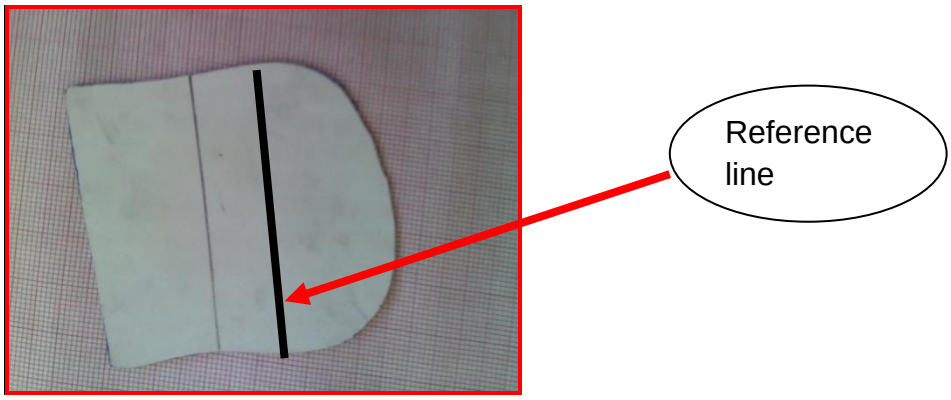
1. Mark the base lines (vertical and horizontal) on the plain/brown paper.



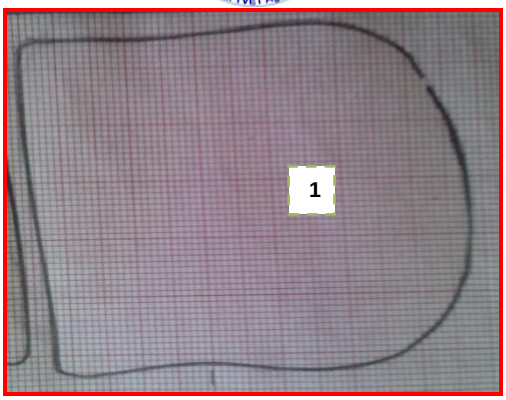
2. The horizontal line is traced as per the width of the material to be used for cutting and the vertical line should be up to 3-4 rows of the tracing.

50.8 cm

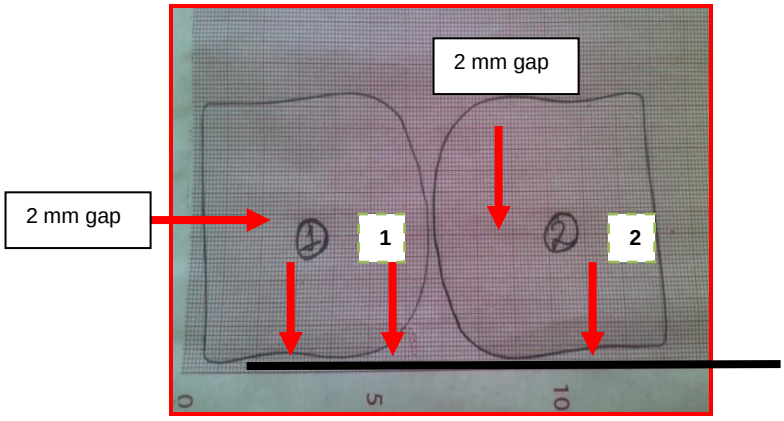
3. Mark the reference line on the pattern parallel to the direction of tightness.



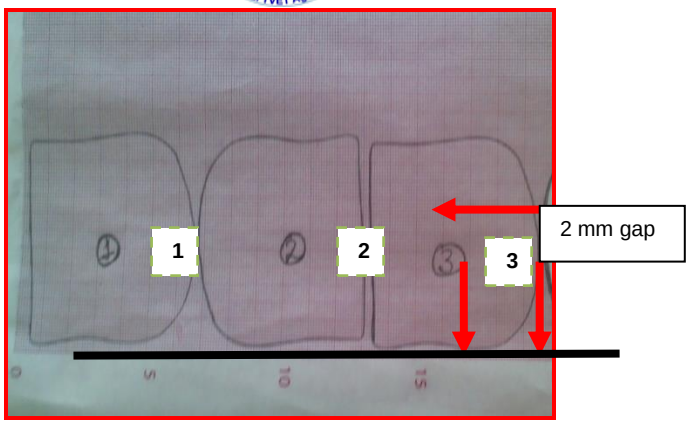
4. Trace first pattern on the plain/brown paper keeping the reference line of the pattern parallel to the vertical base line of the plain/brown paper and keeping 2mm space from the vertical and horizontal lines. The gap of 2mm is given because synthetic materials are cut in layers. When the calculation is carried out for foam material, coated fabric laminated material etc., the gap should be given as 4-10 mm (as per the thickness of the material).



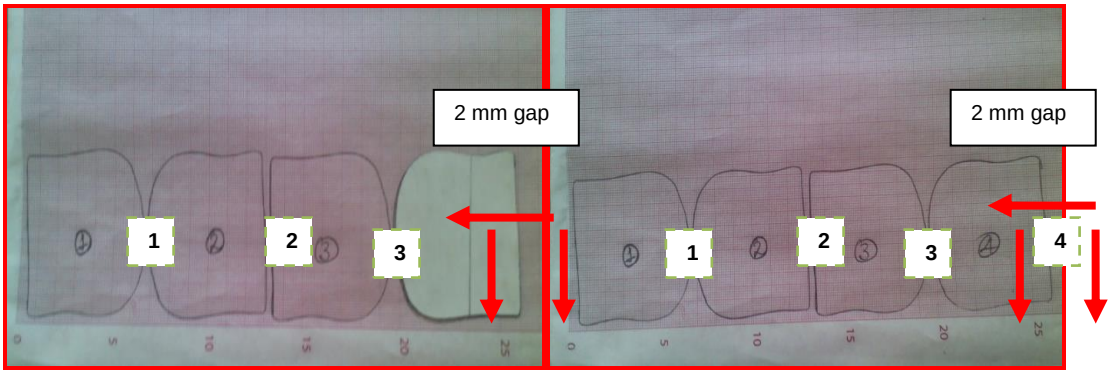
5. Trace 2nd pattern (horizontally) the similar pattern interlocking with the first tracing either by 0 degrees for best possible interlocking. The space between the two tracings and also from the baseline should be minimum 2mm.



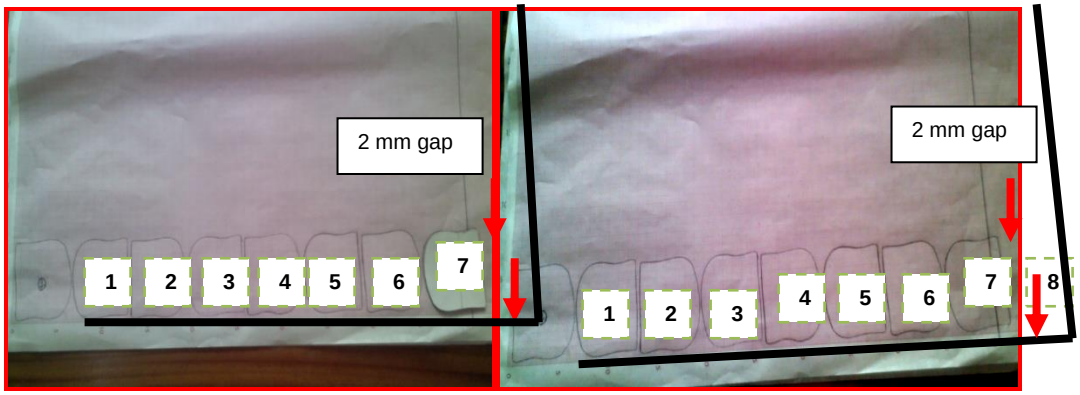
6. The third tracing (horizontally) should be done as above and the tracing is continued up to full or half of the width of the material.



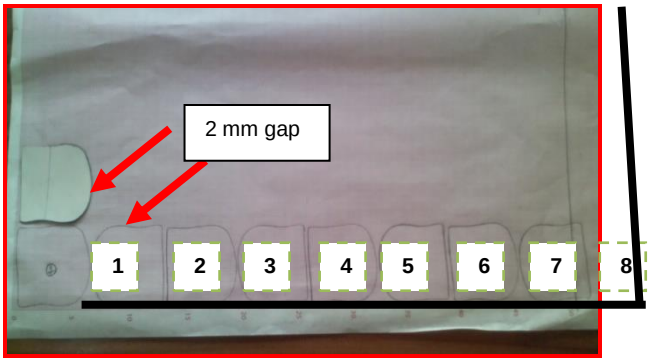
7. Trace 4th the same pattern vertically interlocking with the first tracing either by 0 degrees or 180 degrees keeping the space in between as 2 mm (minimum).



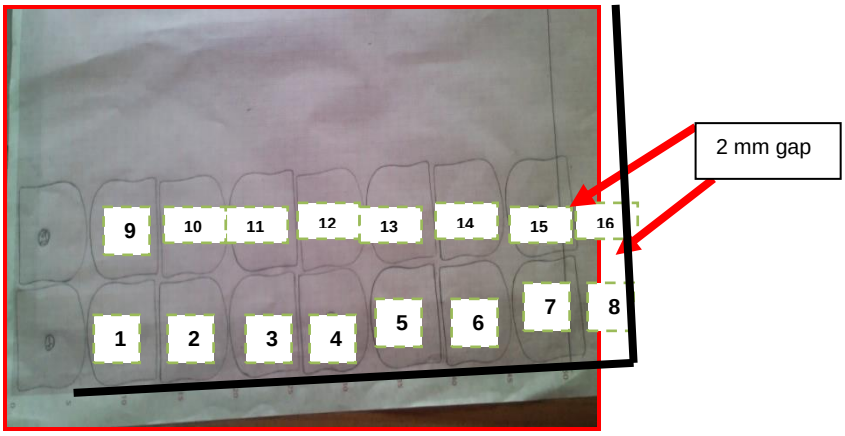
8. First raw Tracing will continue until the end of reference height or length.



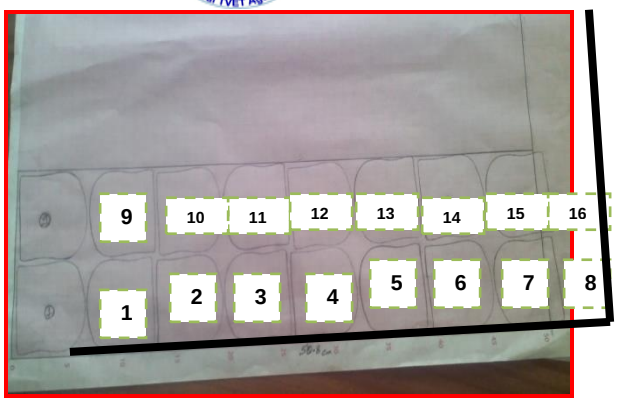
9. Similarly the tracing is done until end interlocking with the previous tracings (first row) and is carried out for 3-4 rows. Sometimes only 2 rows are traced when the pattern is symmetrically interlocked.



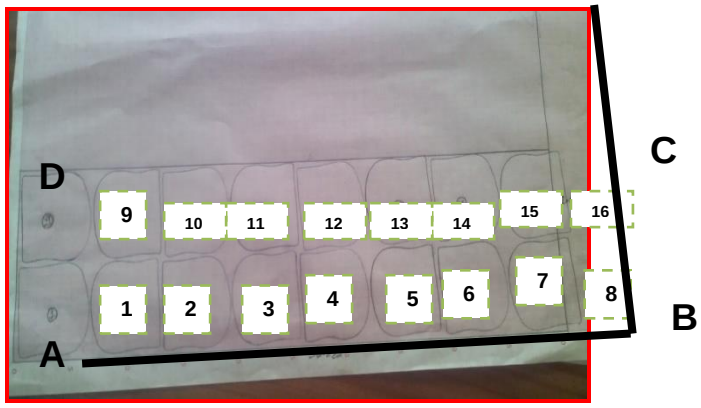
10. Full second raw tracing



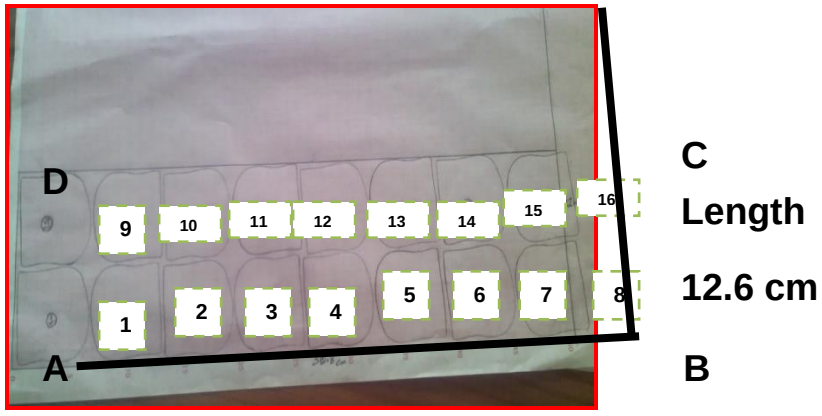
11. Trace the horizontal and vertical lines touching and blocking the outer most points of the tracings, thus making the rectangle.



12. Mark the rectangle as ABCD where AB is base and BC is the height or length of the rectangle ABCD.



13. Measure the base AB and the height BC in centimeter.



Base AB = 50.8 cm and height BC = 12.6 cm

14. Calculate the areas of the rectangle ABCD by multiplying BC and CD. They are comes in sq.cm. Convert the value in to sq.mtr. By dividing it by 10000.

Area of rectangle ABCD = base * height

= AB * BC

= 50.8 cm * 12.6 cm

= 640.08 cm2 / 10000

= 0.064 m2

15. Now the number of patterns is counted. By dividing the area traced by number of patterns traced the area of one pattern is estimated. Now, area per pair is calculated as per the number of components per pair.

$$\text{Area per pair} = \frac{\text{Total area for no. of component}}{\text{Total no. of components per pair}}$$

$$= \frac{0.064m2}{7.5}$$

= 0.0085m2 / Pair

NOTICE:-The total area of one pair of derby shoe synthetic materials consumption for component below using tracing methods is:-

Add all the individual areas per pair to find out the cutting allowance of the given article.

Total area of derby shoe by tracing methods equals to the total area of all patterns

Total area per Pair = vamp area + o/s quarter + i/s quarter + tongue

= 0.081+ 0.034 + 0.0335 + 0.0085

= 0.157 m2 per pair

Synthetic materials consumption calculation using graphical and tracing methods result is as follows:-

1. Using graphical method:

Total area of one pair = vamp cons. + outside quarter + inside quarter + tongue

= 0.0647 + .0333 + .0329 + .00845

= 0.13935 m2

2. Using tracing method:

Total area of one pair = vamp cons. + outside quarter + inside quarter + tongue

= 0.081+ 0.034 + 0.0335 + 0.0085

= 0.157 m2 per pair

Information Sheet 4 Recording the grade of material

Customers would contact one of the staff at the PDC Centre and fill the Request Form for Designing/Grading & other available services.

The charges for the work are determined on the basis of the request and an approved price list. The initial price list was prepared on the basis of activity based costing with the help of consultants. Further amendments are done annually if required by the Directorate (footwear) in consultation with the HOD, PDC. The price list is authorised by the Directorate (footwear).

A sample price list for PDC, LIDI is given below:

Services to be provided by PDC (Footwear design studio), LIDI

Service head	Description	Time limit	Price
Designing & pattern Development	Stuck on construction	03 days	……Birr
	Boots on stuck on construction	05 days	……Birr
	Moccasins	05 days	……Birr
	Stroble	05 days	……Birr
	Stitchdown	05 days	……Birr
	(one trial upper will be provided with paper patterns, Last & sole is to be provided by customer)	(per design)	
	(can use LIDI last & sole also & if need they have to pay actual costs of last & sole)		

Sketching	Shoes Soles Layout (3-D)	02 days 03 days 01 week (per sketch)	……Birr ……Birr ……Birr
Digital Services	Theme wise poster development Logo development Mood board making (using auto cad, corel draw &photoshopsoftwares)	01 week 01 week 01 week	……Birr ……Birr ……Birr
Sampling	Only upper Complete shoe	02 days 04 days (per sample)	……..Birr ……..Birr (all materials will be provided by customer)
Costing	Consumption norms Complete material costing sheet Technical book	02 days 03 days 05 days (per design)	……..Birr ……..Birr ……..Birr
Consultanc	Onsite designer services for collection and range	01 day	……..Birr

y	development, pattern engineering, benchmarking & other design related work	02 days 03 days One week 15 days One month (Per Designer)	……..Birr ……..Birr ……..Birr ……..Birr ……..Birr
CAD- CAM	Pattern Grading (paper only) Pattern Grading (paper + Tin Sheet) Tin Patterns (customer patterns)	02 days 04 days 03 days (per graded set)	……..Birr ……..Birr ……..Birr (prices are per pattern)
Knife development	Cutting die making* (Specification basis)	01 week (per set of max 30 pieces)	……..Birr (prices on area basis)

Whenever a new price list is issued it is mailed to all the customers. An approved price list is displayed in the PDC notice board for reference. On specific inquiries from customers the price list is faxed or mailed to the customers.

Normally, each grading/designing should be completed within 3 to 5 days of receipt of such orders. The following details are entered from the Customer Order Form into the Order Register serially:

- Serial number
- Date
- Name of company
- Type of work (Designing/Grading/tin pattern/samples)
- Number of styles/article number
- Charges

The Order Number is entered on the form and the form is kept in the Pending Order File.

A sample order form for designing and gradingservices are on next pages:

REQUEST FORM FOR DESIGNING

Order.No._____ **Date:**_____

1. Name of the Company:_____

2. Address: _____

3. Contact Person:_____**Tel :**_____

4. Services Required:

a) Designing one Shoe Patterns/Bottom pattern on last No. _____ **Size:** ____

b) Costing

c) Pattern engineering

5. Charges per style Rs.

6. Delivery Schedule (on priority basis):

1. **Date**
2. **Date**
3. **Date**
4. **Date**
5. **Date**
6. **Date**

7. Material Provided by Customer: Photos/Patterns/Lasts/Sample shoe/upper (Mention specifically).....

.....

8. Detail of bill: No. / dated Rs.

Signature of Customer: Received by:

(Signature of representative)

Received a designing job from Mr. ..... to be delivered as per delivery schedule at para 6 above after successful execution against the payment as indicated in Bill No. / / /dated

PDC representative

REQUEST FORM FOR GRADING

Order. No.:_____ **Date :**_____

1. Name of the Company:_____

2. Address :_____

3. Contact Person :_____**Tel:**_____

4. Services Required: a). Grading b). Pattern Copying

Art.No.	Size	Components in Model Size	Required Size	Total Graded components	Rate/piece	Total Amount

5.Grading restrictions if any :_____

6. Delivery Schedule (on priority basis):

1. **Date**
2. **Date**

7. Material Provided by Customer: Patterns/Lasts/Samples Shoe/Upper/Sketch (Mention specifically)

Checked By

Counter checked by

_____

8. Detail of bill : No. /_____dated_____Rs._____

Signature of Customer:_____ Received by:

(Signature of representative)

Received a grading job from Mr. _____to be delivered as per delivery schedule at para 6 above after successful execution against the payment as indicated in Bill NO. /_____dated:_____

PDC representative

The customer can avail of all the services, designing, grading and sample making, either individually or as a combined service.

Designing: The customer has to provide one odd Last in mean size and a picture (photograph or sketch) of shoe or sample in case of customised order.

Grading: The customer provides the standard model size patterns.

If the job is for Design customer's approval should be sought after completion of design. If it is not possible to get the approval (in case customer is at a different location), then his approval for performing grading without reviewing the design with the customer should be taken at the time of the order and recorded on the form.

The order number is marked on the last provided by the customer. If the last used is provided by LIDI, then the last number is written on the order form. A list of LIDI lasts should be displayed in the PDC section.

All the sketches provided by the customer are enclosed in an envelope duly numbered. If a photo is selected from a magazine, page number and full reference of the magazine e.g. ARS Sutoria volume VII page 63 is entered on the customer order form. If there are more than one photograph on the page the selected picture is identified by a tick mark. After the work is completed this mark is crossed.

All the inputs associated with one job (except last) are put in an envelope and the order form is stapled to it. This is kept in the Pending racks.

Self-Check 4	Written Test

Name: _____ **Date:** _____

(Total marks:-10)

Instructions: Write all your answers in the provided answer sheet on page 10. All questions carry 02 marks each.

Directions: Answer all the questions listed below. Examples may be necessary to aid some explanations/answers.

1. What are the 04 main services can a design centre (PDC) provides to their customers?
2. How we should keep customer order request?
3. What are the 04 information we should ask in an order form of designing services?
4. What are the 04 information we should ask in an order form of grading services?
5. Why record keeping of customer request is necessary?

Operation title 1: -Performing estimation of material consumption based upon the grade of material

Purpose	To know calculating the appropriate square feet of leather to use produce shoe
Equipment ,tools and materials	Pencil Eraser Ruler Graphic paper Pattern shoe Calculator Paper
Conditions or situations for the operations	• . All tools, equipment's and materials should be available on time when required. Appropriate table, working area/ workshop to assemble cream separator practice.
Procedures	1.Lay the pattern to be trace down on the graphic paper 2.Trace round 1st pattern with a sharp pencil. 3.The 2nd pattern is then rotated through exactly 180^ and interlock within the 1st pattern 4.Look two interlocking types both are 180^ methods in the first case wastage 5.3rd again rotated through 180^ and a 3rd pattern is drawn so that it touches both 1st and 2nd at least two point 6.Interlock the 4th tracing 7.The fifth trace must face the same direction no.1 8.The 6th trace face the same way as no. 5 should touch 2nd and 5th or 4th and 5th
Precautions	. Preparing materials, tools and equipment are according to inseminator command.
Quality criteria	• Did trainees interlock 180^ methods properly • Did trainees interlock 0^ methods properly

LAP Test -1	Practical Demonstration

Name: _____ Date: _____

Time started: _____ Time finished: _____

Instructions:

1. You are required to determine the upper leather consumption of oxford shoe using o degree pattern scaling methods and combination of 180 and 0 degree.
2. Determine the consumption of upper leather of derby 41 size.
3. Propose which method is good 0, 180 degree or combination of both?
4. You are given one (3) hours to complete the above mentioned task.
5. Request your teacher for evaluation and feedback of your work.

Operation title 2: -Performing 0* Methods of the parallelogram

Purpose	To minimise the first wastage
Equipment ,tools and materials	Pattern paper Pencil Pattern
Conditions or situations for the operations	• . All tools, equipment's and materials should be available on time when required. Appropriate table, working area/ workshop to assemble cream separator practice.
Procedures	• Trace pattern 1on graph sheet aligning the center line. Mark the location point • Trace the second pattern aligning at o degree with the first. Mark the location point • Trace the third pattern rotating at 180 degree and mark the location point. The third pattern must touch the first and second pattern at minimum two points • Trace the fourth pattern in the same direction as pattern three touching pattern 3 and 2 at minimum two points. Mark the location point • Trace the fifth pattern rotating at 180 degree method touching pattern 2 and 4 at minimum two points. Mark the location point • Trace the sixth pattern in the same direction as pattern five touching pattern 4 and 5 at minimum two points. Mark the location point • Note pattern 1,2 ,5 and 6 are in the same direction
Precautions	. Preparing materials, tools and equipment are according to inseminator command.
Quality criteria	• Did personal protective equipment worn while fitting and adjusting cream separator machine • Did trainees fitting and adjusting the component of the machine proper without leakage

	• Did the trainees interlock patterns 0^ methods

Lap test 2	**Practical Demonstration**

Name: _____ Date: _____

Time started: _____ Time finished: _____

Instructions:

1. You are required to construct parallelogram using 0 degree methods by derby quarter pattern
2. You are given one (1) hours to complete the above mentioned task.
3. Request your teacher for evaluation and feedback of your work.

Score = _____

Rating: _____

Note: **Satisfactory rating – 100%**

You can ask you teacher for the copy of the correct answer

Operation title 3: -Performing 180* Methods of the parallelogram

Purpose	To minimise the second wastage
Equipment ,tools and materials	Pattern paper Pencil Pattern
Conditions or situations for the operations	• . All tools, equipment's and materials should be available on time when required. Appropriate table, working area/ workshop to assemble cream separator practice.
Procedures	• Trace pattern 1 on graph sheet aligning the center line. Mark the location point • Trace the second pattern aligning at 180 degree with the first. Mark the location point • Trace the third pattern rotating at 180 degree and mark the location point. The third pattern must touch the first and second pattern at minimum two points • Trace the fourth pattern rotating at 180 degree touching pattern 3 and 2 or pattern 1 and 3 at minimum two points. Mark the location point • Trace the fifth pattern rotating at 180 degree touching pattern 2 and 4 at minimum two points. Mark the location point • Trace the sixth pattern in the same direction as pattern five touching pattern 4 and 5 or 2 and 5 at minimum two points. Mark the location point • Note pattern 1,3 ,5 and 6 are in the same direction
Precautions	. Preparing materials, tools and equipment are according to inseminator command.
Quality criteria	• Did personal protective equipment worn while fitting and adjusting cream separator machine • Did trainees fitting and adjusting the component of the machine proper without leakage

	• Did the trainees interlock patterns 180^ methods

LAP Test -3	**Practical Demonstration**

Name: _____ Date: _____

Time started: _____ Time finished: _____

Instructions:

6. You are required to construct parallelogram using 180 degree methods by derby quarter pattern.
7. Compare the result with the result of LAP test 1 on page 11
8. You are given one (1) hours to complete the above mentioned task.
   Request your teacher for evaluation and feedback of your work

Score = _____

Rating: _____

Operation title 4: - Describing relationship between pattern area and leather size

Purpose	To distinguish the relation between pattern area and leather size
Equipment ,tools and materials	Pattern paper Pencil Pattern
Conditions or situations for the operations	• . All tools, equipment's and materials should be available on time when required. Appropriate table, working area/ workshop to assemble cream separator practice.
Procedures	• Calculate the gross area of vamp • Calculate the gross area of quarter • Calculate the gross area of tongue
Precautions	. Preparing materials, tools and equipment are according to inseminator command.
Quality criteria	• Did trainees calculate the gross area of vamp, quarter & tongue

Lap test -4	**Written test**

Instructions: Write all your answers in the provided answer sheet on pages 14.

Test I: Short Answer Questions

Directions: Answer all the questions listed below.

8. Show the relation of the pattern scale area and leather area for derby shoe upper if:

    1. If the pattern scale area for Vamp is 5.18 SDM

Skin area is : 125 SDM

90 SDM

40 SDM

2. If the skin size is 90 SDM

Pattern scale area for Vamp is: 5.18 SDM

Quarter: 2.69 SDM

Tongue: 0.34 SDM

Operation title 5: - Performing consumption of synthetic material

Purpose	To distinguish the consumption of synthetic material for one pair shoe
Equipment ,tools and materials	Pattern paper Pencil Pattern
Conditions or situations for the operations	• . All tools, equipment's and materials should be available on time when required. Appropriate table, working area/ workshop to assemble cream separator practice.
Procedures	• Vamp cut component • Outside quarter cut component • Tongue cut component tracing
Precautions	. Preparing materials, tools and equipment are according to inseminator command.
Quality criteria	• Did trainees calculate consumption of synthetic material of vamp, quarter & tongue

LAP Test -5	**Practical Demonstration**

Name: _____ Date: _____

Time started: _____ Time finished: _____

Instructions:

1. You are required to determine the synthetic consumption of oxford shoe using graphical method.
2. You are required to determine the synthetic consumption of oxford shoe using tracing method.

3. Propose which method is good tracing methods or graphical?
4. You are given one (3) hours to complete the above mentioned task.
5. Request your teacher for evaluation and feedback of your work.

Reference Materials

Book:

TTLM of footwear level one on os Version 4January 2012 **IND BFP1 TTLM 0212v1**

Galenleather.com/bog

TTLM of footwear level two on (OS) Version 4January 2012 **IND FP2 TTLM 0212v1**

www.geine leather , hhh.leather

AKNOWLEDGEMENT

We wish to extend thanks and appreciation to the many representatives of TVET instructors and respective industry who revision new OS on footwear and Teaching, Training and Learning Materials (TTLM) proposed in LIDI (LEATHER INDUSTY DEVELOPMENT INSTITUTE) .

experts of Oromia Regional TVET bureau and Federal TVET bureau in Bishofitu city BIN INTERNATIONAL HOTEL

This Teaching, Training and Learning Materials (TTLM) was developed on December, 2020 Bishoftu

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