CHAPTER - 01

1.1. Leather Garments Beginning

Cro. Magnon man, the first prehistonichuman, lived about 50,000 years ago in co-operative societies called tribes. Tribe members sometimes traveled for weeks, many miles each day, looking for food out often retuning with nothing. They could not service in colder climates due to the lack of appropriate clothing. The only way our ancestors could survive winter was to store enough food each fall. This meant learning how to preserve food by preserving their food, they could survive winter.
Once over earliest relatives learned to preserve food more survived as a result they could multiply more quickly and began to migrate.
Moving north created a problem. However, how could the men & women in these tribes keep themselves worm in the cold, often frigid, climates of the north? They could have worm furs or animal skins, but dried out animal skins are very hard. The key to making animal skins into clothing was learning to make them soft.

The tribe that first invented worm clothing and also tanning, might have accidentally invented it. Tribe members might have been trying to use pieces of dried, hard – as – board animal skin as primitive food plates. Dried skin made a suitable plate, as long as it did not come into contact with large amounts of oil or fat but the tribe might have noticed that after using its new plates to serve a few greasy meet dinners, the plates started to soften.
This early tanner eventually discovered that since water and fat do not mix, the soft slightly greasy skin was also water proof.

No one knows how tanning was first discovered, but it could be argued that, along with the preservation of food, the science of tanning, that is

preserving and softening animal skins, was one of the most important inventions in human history.
Putrescible hides and skins transforms into imputrescible products by the incorporation of tanning agents.
HIDE + TANNIN = LEATHER
Cro – Magnon man first moved into Europe about 40,000 years ago, Archaeologists have evidence that these ancient peoples wore carefully designed, tailored clothing.
A loincloth of gazelle skin, worn by a woman in ancient Egypt during the Eighteenth Dynasty, 1580 – 1350 B.C. is almost perfectly preserved today.
To facilitate the development of leather production and to manufacture large quantities at low cost, work organization (beginning USTA, smil 1976) and mechanization were introduced in factories hand operated sewing machines had been on the market since the 1830, industrial machines were non existent at that time. It did not take long, however for the machine manufactures to produce study, Pedal driven sewing machines which could sew 20 stitches a minute. By the end of the nineteenth century there were electrically powered machines capable of more than 200 stitches a minute.
Two revolutionary inventions by Pr. Alexis Largine helped the clothing and leather garments industries to flourish.

- Invention of Tape for measure 1947
- Invention of Tailors Dummy (1849)

This technical success coincided with the opening of Department stores in the early part of the 19th Century selling Mass – produced articles.
This booming evolution continued to thrive into the 1950 with the arrival of the read – to wear from the U.S.A. which enabled further manufacturing distribution technique to develop.

1.2. History of clothing

Ancient Egypt (3000 to 300BC):

The Ancient Egypt had a well developed culture. Their architecture, in particular was technically highly advanced.

Ancient Greece (1600 to 100BC):

The ancient Greeks had a high level of culture. They made significant achievements in the areas of architecture, art, and craft.

Ancient Rome (500 to 400 AD):

The Romans made significant advances in the organization of government and in town planning.

Romanesque (700 to 1250):

The cultural of the Romanesque Middle Ages was characterized by a strong display of power by the nobility and a struggle for power between Church and States.

Gothic (1250 to 1500):

Culture in the late Middle age was determined not only by the church and the nobility but also the rising bourgeoisie and the city states.

Renaissance (1500 to 1640):

The begging of the modern age marked a turning point in all areas of life and culture. A Humanistic philosophy of life promoted individual personality and sought a freer spirit remember of Greek and Roman culture.

Baroque (1640 to 1720):

A struggle for European supremacy developed during the Thirty Year war fuelled by differences in religious doctrines.

Rococo (1720 to 1785):

The Rococo period concluded the styles of Baroque in the 18th century. Life styles became more refined. Composure and gesture revealed a serene, gallant and rather affected character.

The Twenties (1900 to 2005):

After the First World War (1914 to 1918) women's clothing in particular under went revolutionary changes. One of the most important influences was the movement towards equal status for women; in the work places, in privates and political life and inceasingly, in spot.

1.3 Why do people wear clothes?

Students of primitive societies still argue about whether there are or ever have been, any truly naked savages, or where the wearing of some form of clothing as part of all human behavior.

Human beings have created definite patterns in their appearance and dress, they learn how to modify their appearance, how to make it acceptable to others. They are able to construct the items they need. They share a particular mode of dress and decoration with other people.

Most people would respond to such a question by pointing out that we need clothes to keep us warm, to protect us from the elements. Some might suggest that we wear them because we would feel indecent without them and others would say that we fewer them to make ourselves look attractive,

In other words they would explain the wearing of clothes in terms of practical function morality or aesthetic qualities.
So people wear clothes the following reasons:

- Protection
- Modesty
- Attraction
- Communication

Protection:

Many writers have argued that clothing was born out of necessity. For example, MLINOWSKI, an anthropologist, suggested that clothing was created by people in response to a physical need for shelter and protection. Like other mammals we fare warm-blooded and we possess a number of physiological mechanisms for regulating our body temperature such as sweating and shivering.

Modesty:

It is quite commonly believed that we wear clothes because certain parts of our bodies are shameful and need to be covered. Attitudes of this kind have their origins in the religious mythology of Judea-Christian traditions, in particular in the story of Adam and Eve.

And they were both naked, the man and his wife and they were not ashamed. And when the woman saw the tree was good for food, and that it wad pleasant to the eyes, and a tree to be desired to make one wise, s he took of the fruit thereof, and did eat, and also gave unto her husband with her; and he did eat. And the eyes of both of them were opened, and they knew that they were naked; and they sewed fig leaves together, and made themselves

aprons…. Unto Adam also and to his wife did the Lord ''god make coats of skins and clothed them.

It seems then that our sense of embarrassment and modesty comes not from shame of particular parts of the body but the loss of what we are accustomed to wearing or feel is required in a particular situation. A Muslim woman would be embarrassed without her veil, the Victorian lady without her long skirts, and the conventional English holidaymaker without her bikini top.

Attraction:

The modesty theory has been attacked from another point of view. Clothing, it has been suggested, does not draw attention away from the body, or reduce an awareness of it as is implied in the term "Modesty". Rather, the converse is true. Clothing actually serves to display the body and exhibit it in order to gain admiration. One writer, Rudofsky, compares the wearing of clothes to the sexual displays of birds and animals.

James Laver makes a similar point:

"It would seem, in fact, that our clothes are dictated to us by the deepest unconscious desires of the opposite sex, throughout the greater part of history and prehistory, men have chosen their partners in life by their attractiveness as women. Therefore, women, clothes are intended to make their wearers as attractive, as women, as possible.Women, on the other hand, have, for the greater part of human history, instinctively chosen their husbands for their capacities to maintain and protect a family".

Even in our own society, it just does not make sense to explain all the clothing worn by women in these terms. Women do wear clothes which are designed to be not sexually attractive; their purpose may be entirely different.

Communication:

The clothing of the traffic warden introduces another demonstrates very explicitly a principle which could be very fruitfully applied to all forms of clothing …that of the expressive or communicative function of dress.
The traffic warden s uniform acts as a signal or sign to the observer. It informs him or her that the wearer is doing a particular job, performing a particular role.

1.4. Clothing culture and communication

One of the distinctive features of human clothing is that groups of people share particular patterns of dress. Clothing in not a ransom or totally individual affair; it is a social activity. The overall pattern of our dress, be it grasses skirts or tailored clothes, is a consequence of the society in which we live-in much the same way as the language we speak, the food we eat and the god or gods we believe in. The way we decorate four bodies, what we wear and how we wear it is part of our culture, our socially learned way of life.

Human behavior is not based to any great extent on instinct; we are the least biologically determined of all the species. Unlike animals for which behavior is largely, though not entirely, instinctual, the human child is virtually helpless. The human child depends on others for its survival for a comparatively long period while the long process of socialization takes place.

Leach argues that three aspects can be distinguished in human behavior:

Biological activities of the body such as breathing and heartbeat;
Technical actions, which affect the material world outside one self such as digging a hole or boiling an egg.

Expressive actions, which say something about the world.

In our society not all aspects of our social identity are communicated by clothing signs:

- Group.
- Role and status.

1.5. Garments Leather

The origin of the garment leather manufacture dates far back in the pre-historic ages and probably one of the earliest arts practiced by mankind. However the present day garment leather is a far cry from the prehistoric man.

Garment leather is a general form referred to the leathers meant for apparel and are classified into three categories viz.They are:-

- Grain garment leathers
- Suede garment leathers
- Fur garment leathers.

Characteristics of garment leather:

The basic characteristics and properties required for garment leathers are as follows:

Drape:

This is the most important characteristic of garment leather. It contributes to wear comfort.

Softness:

The clothing leathers should be soft without any bony feel. This property can be achieved by modifying the processing techniques.

Nap:

This is the most important characteristic by which the suede garment leathers are judged. These leathers should have a short, tight and velvety nap which is achieved by proper retaining techniques.

Surface smoothness:

This is an important property for grain garment leathers and a variety of chemicals under the tough modifiers and slip agents category are available to impart this property to the leathers.

Lightness in weight:

This property also relates to the wear comfort and it depends on the type of raw materials selected, thickness maintained and process followed.

Light fastness:

The garment is exposed to different weather condition when worn. The color of the garment should not change when exposed to the vagaries of the weather.

Wet and dry rub fastness:

In this case of grain garment leather. The finish should have good protective top coat to prevent the color coming off from the leather when rubbed with a dry cloth.

Fastness to washing:

This property depends upon the type of tonnages and dyestuff employed for production of garment leather.

Fastness to dry cleaning:

The garment leather should stand the treatment with solvents to remove greasy stains.

Perspiration resistance:

The leather should be capable of absorbing and transmitting the perspiration without staining/soiling the leather.

Uniformity in shade:

This property depends on tannin and post tinning operations and as essential for garment leathers wherein the different panels of the garment should have uniformity in shade even when cut from different leathers.

Shower proof ness:

This is very much essential for suede garment leather.

Stitch tear resistance:

Generally the stitch tear resistance should be good in the garment leathers. Garment leathers made from Indian origin sheep skins have better stitch tear resistance compared to sheep skins like merinos cross breeds.

Tongue tears resistance:

This is also an important property of garment leather.

1.6. Classification of leather garment

In modern civilization leather garments are being used as outer wear purpose and they are very excusive and predominantly fashion oriented. The Scandinavian people wear leather garments to protect them from cold. The people of Tropical countries also wear leather garments at winter season but fashion is more concerned than protection of cold. Now a days advanced countries like USA. UK Canada, Germany etc., use leather garments for industrial works due to safety purpose, So, Leather garments can be classified as follows:

1.6.a. Jacket

- Blouson
- Bolero
- Parka on ¾ Jacket
- Waist Coat
- Spencer
- Tyrolean
- Anorak
- Short Jacket
- Donkey Jacket

1.6.b. Trouser

- Tapered
- Straight
- Jeans
- Pleated

1.6.C. Skirt for Ladies only

- Gored
- Straight paneled
- Wrap
- Godet
- Jeans
- Pleated
- Jupe

- Flared

1.6.d. Hoods and Caps

1.6.e. Industrial of Safety Leather Garments

- Jacket
- ¾ Coat
- Waist coat
- Trouser
- Apron
- Knee or leg guard
- Knee or leg guard

1.6.f. Innerwear Leather Garments

- Bra
- Lingerie
- Leather Shorts

1.7. Classification of waist coat

Basically there are three types of Waist coat. They are

- Gilet
- Short knitted waist coat
- Long knitted waist coat

Definition of Gilet:

The garment which reaches to just bellow the waist and is fitted and sleeveless is called Gilet. The back panel is often of lining fabric.

1.8. Lining

Lining is an inner coverage of leather Garment linings have functional and consumer appeal objectives. Making a lining pattern for leather garments is like making a lining for a cloth garment. Leather garments are more often lines than cloth garments, since most people do not like the feel of animal skin against their skin. However, many designers will add only a half lining to a shirt by lining the upper portion of the shirt only.

Some skins, such as lamb suede, feel rough or look unsightly on the inside. Designers usually will add a lining to conceal the imperfections.

To make an unlined leather garment, purchase specially processed leathers with insides as nice as outsides.

Objective

The Purposes of Lining are

- To cover the flesh side of garment
- To conceal seam and folding allowances
- To give wear comport
- To enrich esthetic appeal
- To increase the thermal conductivity i.e. for more warmness i.e. quilting
- To increase the strength of garment.
- To elegance the garment.

Varity

- Cotton
- Printed cotton
- Brushed cotton
- Polyester
- Printed polyester

- Satin
- Poly satin
- Taffeta
- Polyonosic
- MM Dabu (viscous polyester)
- Twilted (Polyester, Sattin, Cotton)
- Wool and fur. (Natural and synthetic)
- Crepe
- Canvas

Viscose

Viscose is made from cellulose which is derived from wood pulp, and like most other synthetic fibers, it goes through a number of chemical and mechanical processes until the filaments are ready for spinning into yarns. Linings constructed from viscose fibres have strength, luster, softness and an affinity for dyes.

Rayon

Originally rayon was produced as a cheap substitute for silk and the fibers were known as "artificial silk". Rayon linings have similar properties to those of viscose linings but are somewhat weaker.

Polyamide

Derived from nylon, polyamide produces linings with excellent tensile strength and a relatively high degree of elasticity, and it takes dye stuffs very well. A drawback with polyamide linings is that some solvents used fro dry cleaning can have a detrimental effect on the fabric.

Polyester

Polyester fibres are closely related to polyamides and linings made from polyester fibres have many similar properties. The first polyester linings had a tendency to soften when pressed with a hot iron, but fibres with a high melting point have since been developed and these withstand regular pressing temperatures.

Consumer appeal

An important factor of consumer appeal is to present a garment whose inside has an attractive appearance. The surface and luster properties of the lining have a considerable influence on this, and those properties for linings most widely used are:

Taffeta

A Crisp fabric woven with a faint warp pattern which produces a shiny surface. These linings are generally piece – dyed which helps to soften them and make them able to withstand normal washing and dry cleaning process.

Crepe Made from specially processed years, mostly viscose acetate, the finished surface of this lining has a minute and uniformly crinkled appearance.

Satin (sateen)

This lining is characterized by a smooth and highly lustrous surface and a dull back. Satin is the name of a weave pattern and all – cotton fabrics that were once constructed with this weave pattern were called sateen.

Color also plays an important role and linings with a woven, printed or embossed pattern can give an extra fillip to a garment. Some large companies incorporate their logo in the weave pattern of their linings.

1.9. Needles

Needle is an important tool of the sewing machine which pierces the material to be stitched and facilitates to stitch during stitching the selection of correct needle depends upon the needle size needle system as well as the needle point.

The main functions of the sewing machine needle are:
The needle has to be able to penetrate the material being sewn, without damaging it by pushing the years a side.
The needle thread can wholly or partially pass and form a loop which can be picked up by the looper or hook mechanisms
Needle point plays a crucial role in aesthetic finish of the seam. Further, the point is important for penetrating the Leather / material with case. In leather, the seam style is determined by the point.

Needles are specified by:

- Needle system
- Needle size/thickness
- Needle point

NEEDLES SYSTEM

The needle system refers to the fitting measurements. The consideration of needle system is –

The shank diameter
The needle length
The shank length
The blade length
The thread groove
The clearance cut

The needle system is five types:

- 134 system
- 134-35 system
- 34 system
- 134 kk sys
- 438 system

    - The basic needle system is 134 system

System	Shank diameter(mm)	Needle length(mm)	Uses
134	2	38.5	Normal F.B,P.B
134-35	2	42	Cylinder bed.
34	1.6	38.5	Bartacker
134 kk	2	38.5	Normal F.B,P.B
438	2	38.5	Zigzag sewing machine

Needle system refers to the diameter of the needle blade just above the clearance cut of the needle. The needle sizes are expressed in number metric (NM) system or Simon co (singer) system.

Comparison Table:

Number metrics (NM)	60	65	70	75	80	85	90	100
Simon co.	8	9	10	11	12	13	14	16

Needle Points:

The purpose of needle point is to penetrate the needle into the material either by pushing aside the fibres or by cutting through the

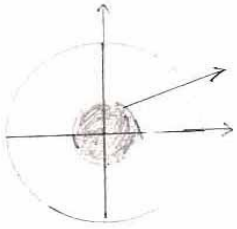
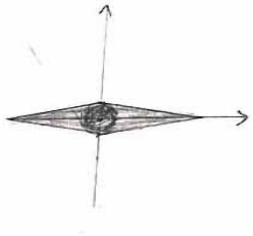
material in order to make way for the top thread to be passed down and being taken up by hook in the process of stitch formation.
In case of fabrics needle should perforate the material by pushing aside the fibres, so that fibres are not cut and damaged.

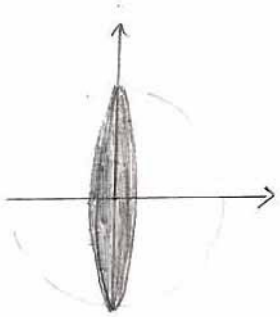
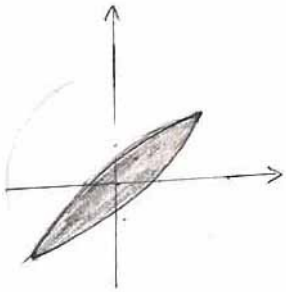
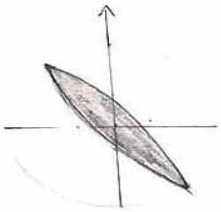
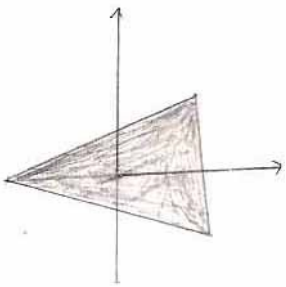
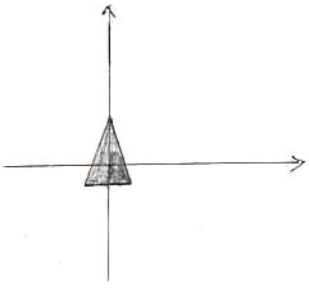
Needles points are two types, they are

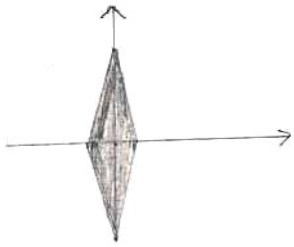
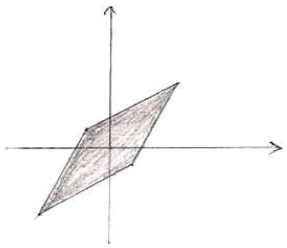
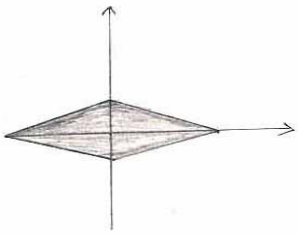
- Round point
- Cutting point

Cutting are Three types, they are

- Two cutting point/edge (P,S,LR,LL)
- Three cutting point/edge (D/TRI,SPI)
- Four cutting point/edge(DI,spear,VR,VL)

Round point: This is known as cloth point and is mainly used for fabrics. Penetration is achieved by pushing fibre apart rather than cutting.	
Cutting point: *a. Wedge point (P):* The point is 0°with less shaped cross section .This cut is vertically to the seam direction. Needle heating 95%. *b. PCL (Cut to Left) and PCR (Cut to Right) point:* Cutting point is 0° with less shape cross section with left or right twist groove bellow eye.	

c. S/cross point: Cutting point is 90° with less shaped cross section (narrow cross point). Needle heating is 85%.	
d. LR/Riverse twist point: Cutting point is 45°with less shaped cross section. Needle heating is 90%.	
e. LL/Twist point: Cutting point 135° with less shaped cross section(narrow point)	
Three cutting point: *a. TRI/D:* Cutting point with triangular cross section. It has three cutting edges. Needle heating is 80%.	
b. SDI: It has a round point with a triangular tip.	

Four cutting edge: *a. DI (Diamond shaped):* Cutting point is 90°with rhombic cross section.	
b. VR: Cutting point 45°with rhombic cross section (Narrow reverse twist point).	
C. Spear point: Cutting point 0° with rhombic cross section.	

Points to be watch for needle handle:

- Don't use "S" point needle where stitch density very high.
- Never use 'SPI'on leather than 1.8 mm.
- Always check the system.
- Use phosphate treated or chromium plate needle.
- Use LRor LL point for butted seam on zigzag m/c.
- Always use z twist thread to the needle and bobbin for clock wise rotation.

Parts of a Needle:

Butt:

The head of the needle.

Heel/Shank:

The brand mark number indicting.

Shoulder:

Part of the needle which is connecting shank and needle bar.

Needle bar:

Consists of two slots in two sides.

Eye:

It is the hole for putting the thread.

1.10. Threads

Almost all garments produced have one component in common: the sewing thread. Whilst sewing threads are usually a relatively small percentage of the cost of a garment, they have an extremely significant influence on the appearance and durability of the finished product. The production of sewing threads is an extensive and complex subject.

Type of thread

The following types have been offered for leather garments.

Mercerised Cotton	:	Approximately 10% stronger than normal cotton and probably the most widely used for leather garments.
Nylon	:	Its main advantage is greater tensile strength permitting a finer thread and finer needle for a seam of the same strength.

Nylon / Cotton	:	Smooth running and soft.
Polyester / Cotton	:	Superior in strength to cotton. The cotton covering provides improved flow through the needle, reduced cutting of the leather by the polyester and also protects the stretches during heat treatments.
Linen thread, double twist	:	This is traditionally used for protective clothing made from chrome tanned splits.

Threads are makes from Fibers/Filaments.

Fibres are two types.

- Natural Fibers
- Synthetic/ Man made Fibers

Natural Fibers	Man made Fibers
Cotton wool, Flax, Hair, Jute, Silk, Hemp , Kepak,	Poly amide, Polyesters

Qualities of Thread:

- Natural Fibers:

  Resistant to heat

  Easy to dye

  Less durable

  Shrinkage

  No elasticity

  Mildew formation when wet.

- Man made Fibers:

High strength

Excellent elasticity

Resistant to bacteria

Controlled elongation

Low moisture absorption

General properties of thread:

- High strength without being too thick i.e. Tenacity-wet and dry.
- Stretchable enough to withstand all garments making operations without breaking.
- It must also have elasticity.
- No shrinkage/expansion when exposed to heat or wet.
- High flexibility.
- Uniform thickness to avoid snagging during to heat or wet.
- Non slip property to prevent run back.
- Good loop formation property.
- Good abrasion resistance.
- Resistance to needle heat.
- Resistance to bacteria and mildew.
- Resistance to damage from sun light.
- Able to take dyes.
- Retain a good appearance in finished seams.

I use the polyester thread in my Waist Coat. So special properties of polyester threads are:

- Shrinkage temperature is high.
- It is not affected by mildew and bacteria.
- High tenacity and abrasion resistance.
- Excellent loop forming properly.
- Good sewing performance.
- More flexible.

- Partially translucent.
- Good abrasion resistance.
- Stitching tends to run back.

Thread consumption:

Lock stitch:

2(Material thickness+Stitch length) x Stitch/cm +15-20% wastage.

Chain stitch:

(2 Material thickness+3 stitch length) x stitch/cm + 15-20%wastage.

Identification of fiber:

Fibre	Burning Test
Cotton	Burns rapidly odor of burnt paper. Ash as residue.
Viscose (Rayon)	Burns rapidly odor of burnt paper. Ash as residue.
Cuprammonium	Burns rapidly odor of burnt paper. Ash as residue.
Acetate	Burns and forms black irregular bead. Pungent acetic acid smell.
wool	Burns steadily forming a crushable bead. Odor of burning hair.
Silk	Burns steadily forming a crushable bead. Odor of burning hair.
Polyester	Melts and forms a hard forming a round bead.
Polyamide (Nylon)	Melts and forms a hard round bead. No characteristic smell.
Polyacrylonitrile(Acrylic)	Melts and forms a hard round bead.

Relation between needle, thread & material

Thread Thickness TKT No.	Light Material		Medium to heavy material	
	Needle Size		Needle Size	
	NM	SIZE	NM	SIZE

80	65-70	9-10	70-80	10-12
60	80-90	12-14	90-100	14-16
40	90-100	14-16	100-110	16-18
30	110-120	18-19	120-130	19-21
35	110-120	18-19	120-130	19-21
20	120-130	19-21	130-140	21-22
25	130-140	21-22	140-160	22-23
15	130-140	22-22	140-160	22-23
10	140-160	22-23	160-180	23-24
8	160-170	23-24	180-200	24-25

1.11. Sewing

History of sewing:

The use of clothing dates back to the beginning of the history of mankind, its purpose being either protection or adornment.

Primitive sewing tools such as awls, and needles made from bones, fish bones, spines of plants and wood give evidence of sewing techniques of pre-historic times.

The first recorded attempts to sew with a machine were made by Wiesenthal in England around 1750.

The purpose of sewing:

Joining

Reinforcing

Decorating

Definition of sewing:

Sewing is the formation of stitches in a section of material using continuous thread for the purpose of join, reinforcing or decorating. The successive linear formation of such stitches is called a seam.

Types of seam:

There are mainly two types of seams. Such as

Lock stitch

Chain stitch

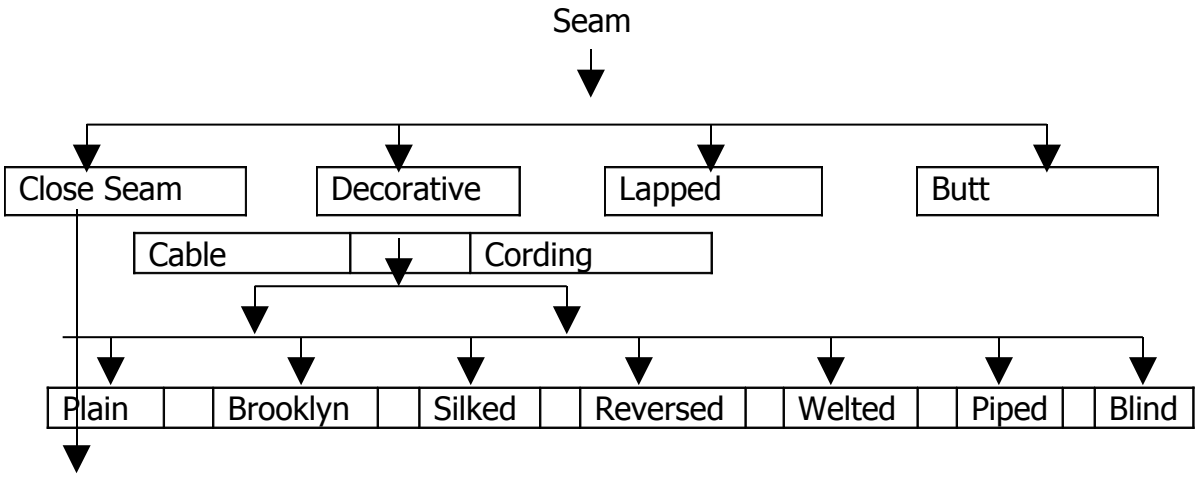
Lock stitch:

The lock stitches are formed with threads, needles and bobbin threads.

Chain stitches:

It is made by thread the chain formed bellow the leather. This thread twisted it self. This stitch is opened when we pull the thread from right side.

Other types of seams are (According to use):



Study of stitch formation:

Penetration of Needle:

This thread lifter goes down along with the thread to go easily with the needle the fabrics.

Dead centre down, formation of loop:

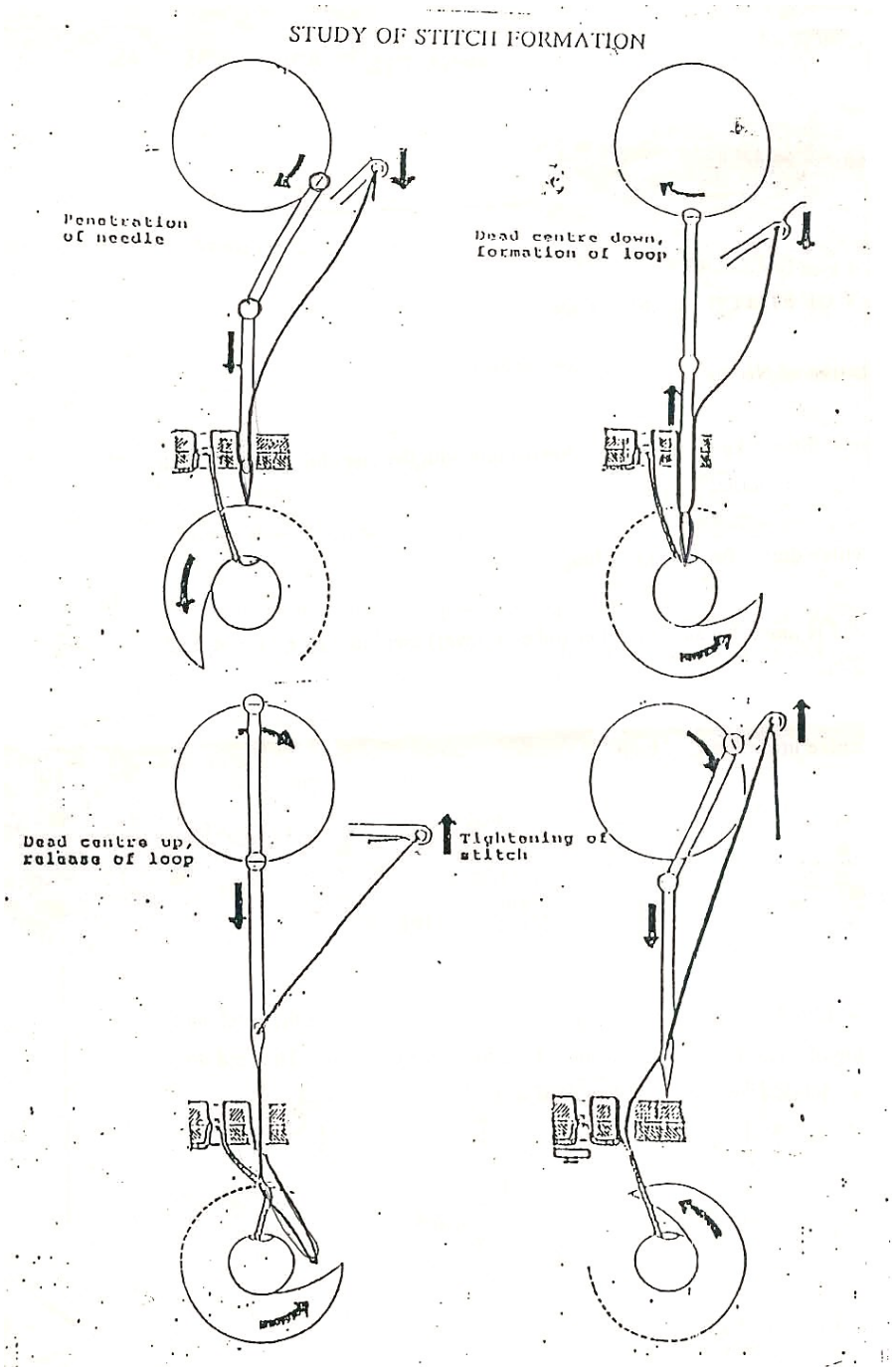
The thread is loose, because the lifter continues to go down and as the needle begins to come up, a loop is formed near the hook.

Dead centre up, release of loop:

The thread lifter which is coming up pulls the thread. The loop passing around the spool misses the hook and the stitch is formed.

Tightening of stitches:

The lifter by pulling the upper thread lightens the stitches and brings the crossing of towards the centre of the thickness of fabrics. The feed dog or wheel the fabrics forward by the length of a stitch.



Sewing machine types:

Generally three types sewing machine are used in leather products manufacturing. They are

- Flat bed machine
- Post bed machine
- Cylinder bed sewing machine

Flat bed sewing machine:

- This machine is used for construction Work and decoration work.
- We can use different sizes of threads and needles.
- Mainly it is in lock stitch type.
- It may be single or double needle machine.
- For cutting leather we can fix a trimmer also.
- Normally machine is running at 2800 rpm.

Post bed machine:

- Mainly used for construction work.
- We can use different sizes of threads and needles.
- Mainly stitches in lick stitch type.
- We can fix a trimmer also.
- We can use different guides in this machine.
- Normally machine is running at 2800 rpm.

Cylinder arm machine:

- This machine stitches in lock type.
- It may be single or double needle
- We can use this machine as u binder.

Sewing machine brands:

Here a list shows the common types of machine from different countries used in Bangladesh.

Serial No.	Machine Name	Country
1	PFAF ALDER	GERMANY
2	NECCHI	ITALY
3	JUKI SINGER	JAPAN
4	NITAKA	TAIWN
5	MINERVA	REP OF CHECK

The feed mechanism:

The feed dog is that portion of the machine which moves the work along.

The amount it moves is the stitch length:

- The fee rises through the needle plate sufficiently high to grip the work.
- The feed carries the work along the amount already set.
- The feed lowers into the machine.
- The feed returns to its original position.

Different types feed:

- Bottom feed
- Bottom and pressure foot feed
- Triple feed
- Driven roller feed.

Sequence of setting the Bobbin into the Bobbin case:

- Hold the bobbin in a way that the thread open end is directed to the left as observed from us.
- Set the bobbin into the bobbin case.
- Pull the thread in direction.
- Thread will pass under the tension spring and comes out from notch.
- Check that the bobbin rotates in the direction of the clock-wise when the thread is pulled.

Sequence of threading the machine head:

- Thread stand
- Thread stand hook
- Head brooch
- Free tension
- Tension block
- Disc with check spring
- Take up lever
- Thread guide
- Needle bar channel
- Needle eye.

Sequence of needle fixing in the needle bar:

- Switch-off the machine
- Set needle bar at up position
- Loosen needle set screw
- Remove damaged needle
- Insert a new needle and push it up as far as it will go.
- Make sure that the long groove is opposite to the bobbin, the short groove facing towards the hook point.
- Tighten needle set screw securely.

- Never use rusty needles.

Process control of sewing:

- Choose the right thread.
- Choose the right needle
- Set the needle gauge
- Set the pitch length
- Thread the needle properly
- Check for properly wound bobbin
- Set the pressure foot pressure
- Adjust the thread tension
- Ensure the proper lubrication

Instruction of sewing:

- Check the right thread size and color for both top and bobbin.
- Choose the right needle.
- Fix the needle in the needle holder in a proper position.
- Check the fly wheel rotation.
- Wind the bobbin with proper thread.
- Put the bobbin in the bobbin case properly and take out the thread through the proper slot.
- Thread the needle properly.
- Set the pitch length.
- Set the needle gauge.
- Set the roller pressure and pressure foot pressure.
- Set the edge guide if necessary.
- Press the knee press to the lift the pressure foot/roller.
- Locate the piece to be stitched in proper position.
- Press the pedal to start stitching and release it to stop stitching.
- The bobbin case must be checked for sufficient as well as right colored and sized thread.

- In some styles stitches go up to the edge in such case about 1inch of thread is left free at the end.
- Before actual stitching a waste piece of leather can be stitched.
- After stitching check the stitched piece match with the sample.
- Wound the additional bobbin at the time of stitching it self'

Acceptance criteria:

- The stitch width should be perfect and even as per sample.
- Ensure proper stitch length as per sample.
- No skipped stitches.
- No run off.
- No thread loops on materials.
- Stitches should follow the marking.
- No pressure foot impression.
- Match sample wherever necessary.

.

Sewing problems and solutions:

- Thread breakage
- Skipped stitches
- Seam puckering
- Needle heating
- Needle breakage.

Thread breakage:

Cause	Remedy
Thread tension too light, too loose	Readjust tension
Hook/looper not adjusted correctly	Readjust hook/looper setting
Burns on thread guiding elements	Polish thread guiding elements
Insufficient hook lubrication	Ensure sufficient oil supply by paper test
Wrong needle system	Change correct needle system
Check spring not properly adjusted	Readjust check spring

Skipped stitches:

Cause	Remedy
Check spring not properly adjusted.	Readjust check spring
Thread tension too tight	Readjust thread tension.
Wrong hook/looper timing.	Reset to standard setting, check loop formation
Wrong needle system	Change to correct needle system
Poor quality thread	Change to quality thread with correct finish.
Sewing thread elongation too high.	Change to thread with lower elongation.
Wrong needle size	Change needle size to match thread size.
Poor loop formation due to thread quality	Change to thread with lower elongation and better finish.

Seam puckering:

Cause	Remedy
Wrong tension of needle/bobbin thread.	Readjust tension of needle/bobbin thread.
Sewing thread not shrink-free.	Change to better quality thread.
Sewing thread with very high elongation.	Change to thread with lower elongation.
Poor quality of threads finish.	Use correctly finished thread.
Pressure foot pressure too high.	Reduce pressure foot pressure.

Needle heating:

Cause	Remedy
Damage of sewing goods.	Use smaller needle size, reduce needle temperature.

Melted residues on needle surface.	Change to needle with anti-clog surface.
Poor quality threads finish.	Change to quality thread with correct finish.
Poor finish of fabric.	Contact fabric supplier for better finish.

Needle breakage:

Cause	Remedy
Bent or damage needles	Replace bent or damage needles.
Wrong needle system	Faulty positioning of hook.
High needle temperature	Avoid extreme needle heating
High thread tension	Avoid too high thread tension
Bent bobbin	Change new bobbin
Too short needle fix screw	Change the lengthy needle fix screw.

1.12. Adhesives:

Adhesive are the substance that unit material creating a whole that is greater than the sum of its parts.

Adhesives are primarily used for two purposes. They can firstly be used as a temporary bond holding components for subsequent sewing and secondly for gluing hems or laminating components where the bond is excepted to the permanent.

Problems arise in wear if the adhesive degrades and migrates to the outer surface. In dry-cleaning the adhesive can be softened resulting in partial, temporary loss of adhesion followed by movement of the glued components sand finally re-adhesion, followed by movement of the glued components and finally re-adhesion in an undesired location.

Adhesives based on natural latex have given rise to a considerable number of individual complaints. They are very convenient to use in manufacture and have been used widely in the past because of their instant tack, ease of removal fro unwanted areas and wash ability or brushes. However, certain

leather dyes, heat and general oxidation have all resulted in break – down of this type of adhesive with consequent migration through the leather. Their use is not recommended.

Most problems have, however, been caused by the use of adhesive in closed seams. Partial solubility during dry-cleaning has resulted in the adhesive oozing out of stitch holes and being "Printed" on to other areas of the same garment or contaminating other garments with which the glue seams come into contact.

The general principle in gluing is to use the minimum quantity required for the purpose and to choose and adhesive which is resistant to constituents of the leather such as dyes and fat liquors and the maintenance treatment of the garment.

General properties of adhesive:

- High cohesive strength.
- High adhesive strength,
- High resistance to creep up to 60°at least.
- High resistance to ageing.
- High flexibility and resistance to flex cracking.
- Easily applied by hand or machine.
- High enough solids contents so that only one coat is needed.
- Controllable drying rate to suit work organization.
- Long tack for maximum versatility in work organization.
- Green strength should suit the process.
- Should be non inflammable and non toxic.
- Should be economic to use.
- Long shelf life.
- No shrinkage on
- drying or materials may wrinkable or bonds may shear.

- Excess or spilled adhesive should be easily removed from visible parts of the garments.

Two types of adhesive are found in leather garments industry. They are:
Water based adhesive.

Solvents based adhesive.

Note: Water based adhesive are non inflammable and non toxic.

The principles of adhesion:

The scientific study of adhesion is zymology and it is the science of joining things. But there are two types of adhesion. They are:

- Specific adhesion/ chemical adhesion.
- Mechanical/ physical adhesion.

Specific/chemical adhesion:

It gives a chemical bond between the adhesives and the surfaces being joined. The adhesives therefore, does not have to penetrate the material but is bonded to the material by chemical action. Here the molecular forces, either primary or secondary are brought into play rather than mechanical anchoring.

Mechanical/physical adhesion:

It gives a physical bond in which the adhesive keys into the fibers or structure of material to be bonded. It can be done only with porous material such as leather and fabric.

Some definitions of Adhesive:

Viscosity:

The ability of an adhesive to flow.

Shelf life:

Time it can be stored un opened.

Pot life:

The time it can e used after opening.

Drying time:

The period after adhesive application when it is unsuitable to make the bond.

Tack life:

The period after application in which it is possible to make a good bond either by pressure sensitive or heat reactivation.

Open time:

The time allowed between adhesive application and the assembling the bond:

Spotting tack:

Coalescence of upper bottom adhesive films on contact at low pressure.

Green strength:

The initial strength of the bond immediately after removal from the press.

Press time:

This is the minimum time for which components are under pressure in the bonding press. It is determined by the rate of set-up.

1.13. Front opening system

All leather garments require an opening. The type of opening and where it is sited depend on the design o the garment and of course its purpose.

There are there component are generally involved in front opening system of a leather garment.

- Button with button hole
- Snap button.

Buttons are measure by a standard called Ligne.

10 ligne	=	6 mm
20 Ligne	=	12.5 mm
30 Ligne	=	19 mm
40 Ligne	=	25 mm

To calculate the button size

- Measure its diameter
- Measure its thickness
- Assess its shape

So buttons, an essential point is the, place the button hole 5 mm over the center front line (CF)

1.14. FLOW CHART OF LEATHER GARMENTS MANUFACTURE

2 pata

CHAPTER - 02

2.1. Pattern engineering

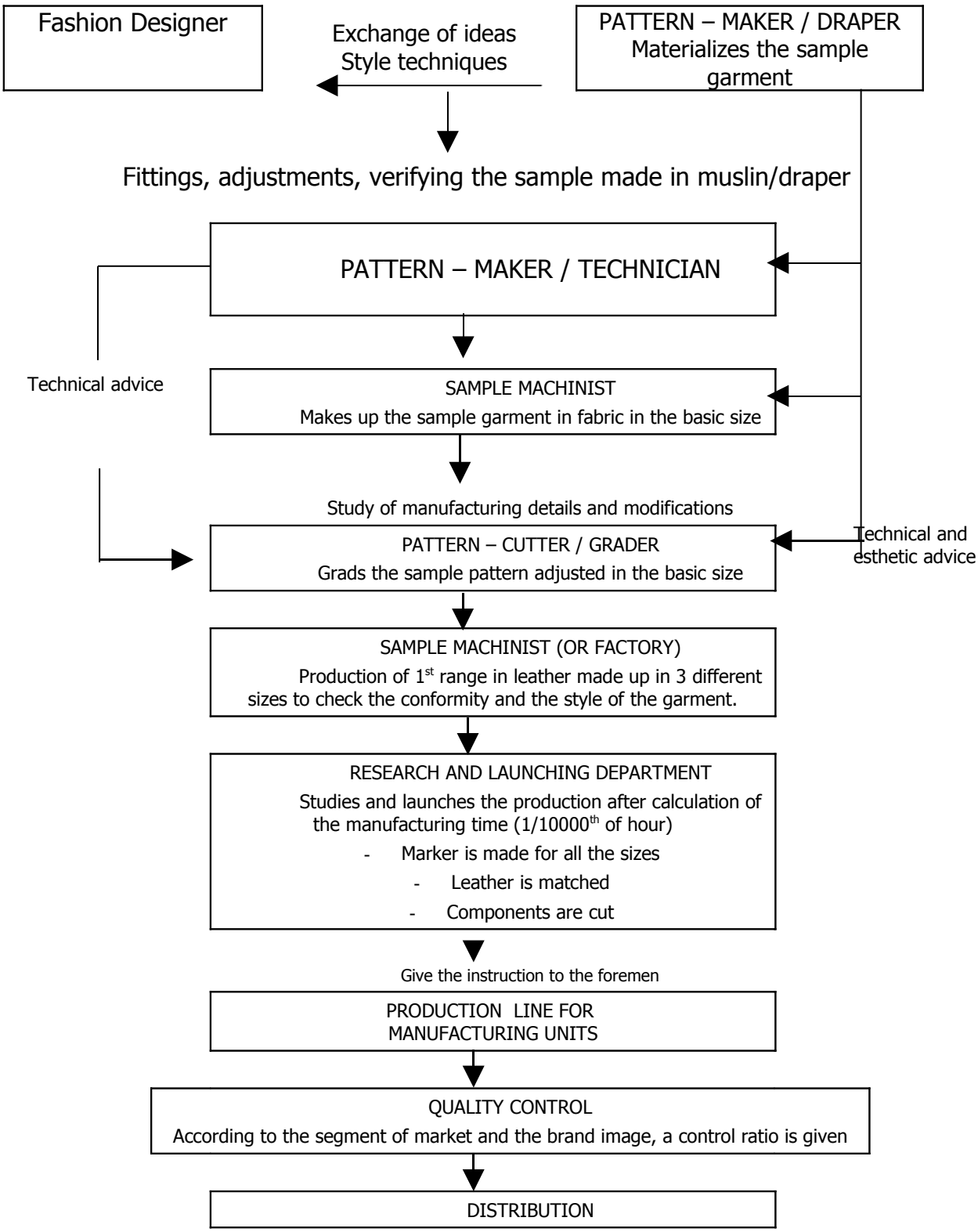
The pattern is the primary link between design and production and so must communicate accurately with all the function that has to use the pattern. The patterns have clearly and precisely convey the information necessary to perform each of the operation. This information is conveyed by numbers marks, nips and notches etc and not by written instruction.
New sample patterns always require some explanation but there should be no necessity for verbal or written working instruction when it comes to production.

The pattern should tell the complete story to all concerned.
Design is the duplication of art through technology. A designer must have a clear concept of art, motive style and fashion. He always thinks about the culture of a particular community. A garment design comes through several stages of collection. The flow diagram shows the different stages of leather garments design collection

Before starting to plan a pattern, one should always study the fashion sketch very carefully and try to understand it i.e., to visualize the construction of the style it shows as it often gives a useful hint
The question of darts and other technical details connected with shape and fit e.g., tightness of waist, ease or fullness and so on, are very largely left to the judgment of the pattern designer, who must make a decision on these points bearing in mind the shape of the figure, the style details as well as the material to be used. Thus if sketch does not show a dart, this does not mean that no dart can or should be used. It would be a very bad mistake indeed to ignore the contour shape of the figure simply because the sketch does not indicate how it should be dealt with the problem of fitting the principle curves of the figure i.e., the waist and hip must be considered in very case before planning the lines of a pattern.

The most practical way of pattern designing is to test patterns as much as possible on the figure or on the stand. It is useful to develop the habit of experimenting with various proportions such as depth of yokes, width of panels etc., by trying them out on oneself and learning to judge the effect in front of mirror while the work of planning the pattern is still proceeding.
A finished pattern with all the lines planned should be checked in the same way. After drawing the style lines very clearly preferably in colored pencil, so that they show up well even at a distance. The darts are pinned up and the pattern is placed on the stand or figure and then the whole effect in a mirror is to be surveyed standing some distance way from it. Badly planned lines and proportions soon become apparent and it needs but little practice to learn to see one's mistakes at an early stage when these can still be easily rectified. It is best way of developing an eye for good line and proportion and also the quickest way of improving test and judgment, both essential to good pattern designing.

2.2. STAGES OF COLLECTION



2.3. Pattern making / Designing Methodology

Pattern is the flat representation of a three dimensional figure into a view dimensional form. And pattern making is a science and engineering.
The pattern designing procedure has the following major steps.
Study of Anatomy of Human body – Gents, Ladies, Children, Infants.
Taking of measurement – Actual body measurement.
Preparation of Basic block – fitted garments pattern e.g., jacket, skirt, trouser, over coats.

- Perspective drawing of a specific style.
- Enlargement of block / draft / construction.
- Preparation of first pattern.
- Preparation of the production pattern.
- Grading
-

2.4. Grading

Pattern grading is a technique used to reproduce a pattern in other sizes, it must be done accurately, small errors unnoticed when one size is graded create problems when many sizes are required. An accurate method is to draft the smallest size and the largest size then stop off the sizes between lines drawn through the basic points. Although grading machines and computers are increasingly being used, it is still necessary to understand the principle of grading patterns in orders to program machines.

The object of grading

The idea is to obtain from a basic pattern in different sizes in order to fit different sizes respective the following parameters.
Morphology big, small obese
Garment use (work sportswear, city wear)

Techniques, darts, the cutting lines, collar. The difficulty lies in the fact that one must keep all sizes well adjusted and pay special attention to the attractiveness and the particular style of the garment as well as its fashion aspect.

General rules for grading

- The garment is accepted in the collection.
- The sample pattern must be perfectly adjusted and studied to avoid amplifying mistakes made during the grading.
- State the size on all pieces of the graded pattern.
- Mark straight grain, vertical and horizontal lines on all pattern blocks. (bust, cross – back, waist, hips etc)
- Know the measurements of the sizes needed in order to establish the growth chart.
- The grading axes will be usually parallel and perpendicular to the straight grain.
- Be very precise with the measurements and the drawing through to avoid off – standard sizes.
- Always keep front and back parallel to keep the value balanced.

2.5. Pattern Instructions

The following instructions should be marked on patterns. Those marked with an asterisk are sometimes marked on an accompanying technical sheet instead of the pattern.

Name of the Style / Product No.

The name of each piece.

Pattern size.

Centre back or center front (this is often marked by a notch)

Fold lines (these are often marked by a fold symbol)
Balance marks (these are matching points marked by a notch)
Grain lines (usually marked by arrow lines)
Construction marks (these include darts, buttonholes, pocket placing, pleats.

These lines are often marked by notches or punch holes)

- Seam allowances.
- The number of pieces to be cut (sate if it is a single piece, a mirrored piece or a paired piece)

Allowances

Allowances are added to the ready patterns so that they cab be joined together to make a finished product of given measurements. Normally an allowance of 1 cm is added on all sides of the pattern to permit jointing or folding. Folding allowances are given at the hem of a garment e.g. sleeve, front and back bottom etc., as per requirement. The study of the sketch is made and cam to a conclusion that the patterns have 1 cm seam allowances all round, 1 cm folding allowances at center front and collar except neck line.
Sleeve, front and back bottom have 4 cm hem folding allowances.
The ready patterns are pinned on to the thick pattern board using a compus, measure 1 cm onto the scale and move along the edge of the pattern so that allowance is marked easier and faster.

Notches

Notches are balance marks or identification marks. They are made along the edge of seam allowance in order to match seams when sewing. These identification marks also help to recognize the panels easily. Patterns are made one over the other notches made on them.

2.6. DESIGNING & PATTERN CUTTING

Designing

Designing is an important process in the manufacture of leather goods. In the principal of designing, a good design should be easy for fabrication & saleable.

The design should be simple when it is converted into production as much as possible, because production & productivity are the sky factors for successful commercial venture. Assembling of too many components for multi-purpose functions must be avoided as much as possible. It affects the important aspects of designing namely, size, shape, structure attraction & value appearance. In good designing, techniques & technical skills very important. A good design should not impart the functions of the products for which they are manufactured.

For example, a document case can hold documents & serve for its intended functions. Without intended function, any leather goods added decorations to enhance the rich appearance of the article will be of no use.

A good designer must have creative & hi-tech skills to product to international standards. He has to foresee the fashion trends & frequent change of styles & designs. He must be aware of the quality of the materials, color matching, texture, feel, etc…& the quality of other fittings such as accessories, decorations, fittings, etc…In fact, the designer stands between the market & the manufacturer.

Pattern Cutting:

In leather goods production the most important operation next to designing is pattern cutting.

The pattern market (pattern cutter) next to designer should have sound knowledge about the design chosen, various materials & tools that are to be used & different types of construction that are contemplated.

According to the type of construction the pattern & its size very, & allowances to be provided are different. In each pattern, allowances for seam & turnover to be provided. The pattern size varies for leather, lining, foam & other reinforcements. It is always the practice to have distinct marking in the patterns itself for fixing of accessories, attaching of reinforcements at the place of folding. Normally, the patterns are made of thick & strong hard boards, most of the time to make number of production, hard board patterns are fixed into aluminum or galvanized metal piping around the edge or completely made on them (Aluminum, Zinc, etc…) These are known as templates in technical parlance.

In leather goods making there are three kinds of pattern are used. Normally,

- Basic pattern
- Making pattern
- Cutting pattern

Basic pattern:

Basic pattern is plan, which is an ideal of designer demonstrated. Only from this pattern the making pattern is developed. The size & shape of & product are determined by basic pattern.

Making pattern:

The patterns which are cut to be correct size & shapes of components of leather goods product are called making patterns. Making pattern is some times called working pattern. The main purpose of these patterns are to help in the production of cutting patterns, & also in the production process to help the bench work operation for further makings of place of folding, place of button fixing, & any other making. These patterns are largely used for making cut edge construction types of product to cut leather components.

Cutting pattern:

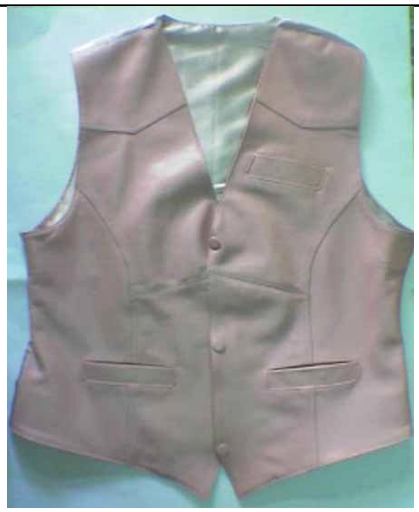
The patterns which are cut with allowance, for folding, over lapping (seam), stitching etc… of the components of the product are called cutting patterns. From the making pattern, a set of cutting pattern made generally. Each set includes patterns for cutting component, pattern for lining, pattern for reinforce materials or stiffening materials, & pattern for padding (foam). As mentioned above, in simple cut edge construction & some of binding edge construction product patterns, the making pattern & cutting pattern are one & the same.

A good pattern marker must be aware of different types of finished leather, & their suitability in making different types of leather goods; he must be well versed with the technology & technique of fabrication & types of constructions. He must have the essential knowledge in elementary mathematics, reading of measuring scales, & use of geometrical instruments for drawing geometrical shapes such as rectangle, triangle, square, circle, parallelogram & other odd shapes. He must have knowledge about different types of fittings & accessories, linings & reinforcement materials, which are used in leather goods making.

The pattern marker must give in each pattern the following information, which would help the cutter to cut materials easily & accurately.

- Model number/Code number of the product,
- Name of the pattern/Back, Front, Gusset, Pocket, Handle, etc…/,
- Number of components to be cut,
- Name of the raw material/Leather, Lining, Foam, etc…/,
- Center point for prefect joining of the components,
- Marks or slots for fixing fittings, accessories, decorations, zip, etc,
- Good components, defective components, partly good & partly defective component. (That is the visual part must have good surface, & invisible parts has defective surface).

2.7. DESIGN / SPEC SHEET: Gilet

Company	ARIF	
Leather	Sheep Nappa	
Thickness	0.8—0.9mm	
Style No.	001	
Date	17.09.2005	
Color	Pink	
Garment Description		Jilet.
Half Back		20cm
Chest		100 cm
Neck Size		40cm
Natural waist length		44.6 cm
Scye Depth		24.4cm
Thread		Polyester
Thread No		40
Thread ply		3
Stitch		Lock
Stitch Density		6/cm
Needle		19
Needle Point		LR
Lining		Light Pink
Adhesive		Water Based
Button		Four Parts Jacket Snap Button

2.8. The classic waist coat block

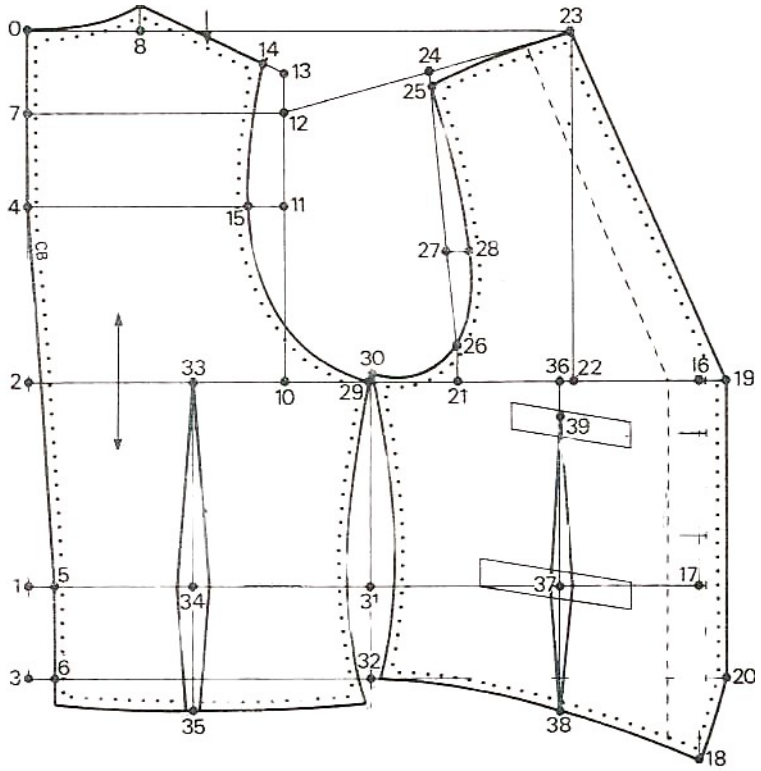


Fig: Classic waist coat block

Measurements required drafting the block.

Measurements:

Chest	100 cm
Natural waist length	44.6 cm
Scye depth	24.4 cm
Half back	20 cm
Neck size	40 cm

A 1 cm seam allowance is included in the block.

- Square both ways from 0.
- Nape to waist plus 1 cm; square across.
- Scye depth plus 4 cm; square across.

- 7.5cm; square across.
- 1/2measurement 0-2;squae across
- 2cm; square down to. Join 4-5.
- 1/4scye depth;
- 1/4neck minus 1cm.
- 8-9 2cm; draw in neck curve.
- 2-10 half back plus 1cm; square up to 11 and 12.
- 2.5 cm; join 9-13.
- 1/2chest plus 5cm; square down to 17 on waistline. 17-18 is 14cm.
- 2.5cm; square down to 20.
- 1/6 chest measurement minus 2.5cm.
- ½ measurement 16-21plus 0.5cm; square up to 23. Join 23-12.
- The measurement 9-14 plus 0.5cm
- 1cm; Join 23-25.
- 3cm; Join 25-26.
- 1/3 measurement 25-26; 27-28is 1.5cm.
- 1/2measurement 10-21; square up 0.5cm to 30, down to 31and 32.
- Draw in back armhole through points 14, 15, 29.
- Draw in front armhole through points 25,28,26,30.
- Draw in front edge 23,19,20,18.
- Draw in lower edge of back, draw with slight curve.
- ½ measurement 2-10plus 2.5cm; square down to 34and 35.
- Construct back dart from 33; shape 2.5cm at 34,1cm at 35.
- 1cm; square down to 37 and 38. 36-39 is 2.5cm.
- Construct from dart from 39; shape 1.5cm at 37.
- Shape side seam 4cm at 31, 1cm at 32.

2.9. JILET ON BODY

Pink color Sheep Napa Leather

Deep Brown color Goat Napa Leather

2.10. Standard Body Measurements

A size chart for over garments.

A	CHEST	88	92	96	100	104	108	112	116	120
B	SEAT	92	96	100	104	108	114	118	122	126
C	NATURAL WAIST	74	78	82	86	90	98	102	106	110
D	HALF BACK	18.5	19	19.5	20	20.5	21	21.5	22	22.5
E	Scye Depth	22	22.8	23.6	24.4	25.2	26	26.4	26.8	27.2
F	Neck size	37	38	39	40	41	42	43	44	45
G	Sleeve length, one piece	63.6	64.2	64.8	65.4	66	66	66	66	66
H	Sleeve length two piece	79	80	81	82	83	83.5	84	84.5	85
I	Natural waist length	43.4	43.8	44.2	44.6	45	45	45	45	45
J	Close wrist measurement	16.4	16.8	17.2	17.6	18	18.4	18.8	19.2	19.6

2.11. Material used in Gilet:

- Leather
- Lining(Satin)
- Thread 40/3 (Polyester)
- Needle
- Adhesive
- Snap Button

2.12. Consumption of Leather and Lining

Consumption of leather

Name of the component	Measurement	Area
Front Yoke	: 17x 15 x 2	= 510 cm2
Centre Front Top	: 27x 20 x 2	= 1080 cm2
Centre Front Bottom	: 31x 16 x 2	= 992cm2
Front Side	: 37x 19x 2	= 1406 cm2
Front Facing Top	: 39x 8 x 2	= 624cm2
Front Facing Bottom	: 39x 8 x 2	= 464cm2
Bottom Facing	: 25x 8x2	= 400cm2
Arm Hole Facing	: 36x 8 x2	= 576cm2
Bottom Pocket	: 16x 8x 2	= 256cm2
Upper Pocket	: 14 x 9 x1	= 126cm2
Bottom Pocket Facing	: 12x5x2	= 120 cm2
Upper Pocket Facing	: 12 x 5 x1	= 60cm2
Total pattern area		= 6614cm2
		= 66.14d cm2
20% pattern placement		= 13.228 d cm2
6% Shrinkage		= 3.968d cm2
5% Wastage		= 3.307d cm2
Actual Leather Area		= 86.643d cm2
The consumption of leather		= 9.326Sqft.

Consumption of Lining:

Name of the component	Measurement	Area
Back Part Lining	: 61x30x2	= 3360cm2
Front Inner Lining	: 59x27x2	= 3186cm2
Upper Pocket Lining	: 11x15x2	= 330cm2
Bottom Pocket Lining	: 16x15x4	= 960cm2

Total area of Lining	= 8136 cm2
10% Wastage	= 813.6 cm2
Consumption of Lining	= 8949.6cm2
	= 1.07Sq gauge.

CHAPTER - 03

3.1. Work Sketch

For Pink Color

Front View

Back View

For Deep Brown Color

Front View

Back View

3.2. Units of operation of a Gilet:

Leather Jilet production unit consists of-

- Cutting division
- Marking division
- Skiving division
- Cementing/Attaching division
- Folding
- Assembling division
- Finishing division
- Other important work sections are
- Inspection / Quality control.

3.2.a. CUTTING

Selection of leather

The raw material for leather goods production is obtained from processed or semi-processed hides & skins. These raw materials (finished Leather) are dependent on the ever-fluctuating price & demand of the meat industry. In addition, the raw material is highly heterogeneous in nature. Each hide or skin very in structure & chemical compositions, quality from another, species to species, & within the skin or hide. Hence it poses a greater challenge to the technologists in selection of good quality finished leather for particular type of leather god.

Important operation in the fabrication of leather goods is the cutting department. In a factory it should be mannered by experts & highly skilled personnel's as the very nature of finished article depends on the method of cutting room techniques. Awareness has to be created on

the sound principles of cutting room practice. It is always born in mind that the whole costing of leather goods depends on the way of cutting patterns in the cutting department, since saving leather (with least wastage) means saving in cost of production.

For successful cutting, the cutter must be aware of sections & quality variations of skin.

BUTT

Butt is the best part of the leather (Hide/skin). It has a uniform grain structure & usually of good color. Mostly the front panel (visible part of the articles) cut from butt.

SHOULDER

This portion of leather is the second best with the substance thinner than the butt. It may contain growth marks but it is firm & tight.

NECK

The nick is the third in quality. It may be thicker, but has a lose grain & is poor in strength & may large growth marks, particularly in the case of hides.

BELLY

Belly is thin has lose in fibrous structure. It is poor quality. Mostly this part of leather is used in the hidden part of the articles.

SHANK

Shank may vary according to the skin. They are usually the weak part. Since, they are stretchy with wrinkles; they may or may not be used according to its quality.

OFFALS

They are very pliable & stretching & hence they are 3not normally used.

The back- bone area may be quite pronounced, especially in the case of goat & cutter avoids it.

A cutter plays a vital role in leather goods making & he is considered to be an important person after designer & pattern maker.

Qualities of a Cutter:

- Part of the hide/skin & their suitability for cutting of components of the products.
- Types of leather & their suitability for making different types of leather goods.
- Identification of common defects & stretch of leather.
- Assortment of leather for various thicknesses & their suitability for various components of the product.

Before proceeding to cutting operation, the suitability of that particular leather for the available order of production has been determined. It has to been done on the table, which have sufficient light & space to see the entire area of each leather surface. The selection process is done by visual examination, mainly concerned with aesthetic value of leather. This includes examination of properties such as smoothness of grain matching through out the batch, color matching, softness, fullness, feel, dyeing & any other defects.

GRAIN MATCHING

Most of the time the panel pf leather goods is sectioned. In this case the gain of each component should be matched; otherwise the articles will appear odd & doesn't have good appearance.

Matching grain is an important factor, particularly for the high grade articles proper consideration of grain matching is necessary. Of course for minimization of wastage & cost reduction some times grain matching has been difficult, but in all articles the front panel of article is usually have well matched grain pattern.

COLOR MATCHING

In aniline dye batch, the leather should have to be matched for shade & the components of the article have to be cut from the matched grain of same shade.

In case of pigment finished leather the defects would have been covered due to a thick color coating. In this case, especially the backbone area is measured & any mark is visible, it is not advisable to use these portions in the front panel of the article.

COMMON DEFECTS

A cutter/selector must examine each hide or skin both on the grain side & flesh side for defects. Before cutting operation begins the following defects has to be marked.

- Deep Flesh Cut
- Bad Grain
- Uneven Grain
- Glazing Fold
- Color Variation
- Excessive stretch

Cutting is considered to be one of the most important operations in the manufacture of leather goods operation. Cutting is the term used for

cutting leather components, linings, foam & other reinforcement materials using for production of leather goods.

The essential operation involved in cutting room are done by the two methods

- By Manual
- By Machine

KEY POINRS TO BE REMEMBERED DURING CUTTING:

- Make sire that it is the correct pattern of the article you desired to cut,
- Examine for defects, size and shape of hides/ skins,
- Selective cutting must be practiced; the best part of the article demands the best part of hide/ skin.
- Visible parts should have good grain surface and section covered could contain grain defects,
- Good cutting begins with a sharp knife. Less sharpened knife or blunt knife cuts the leather with ragged edge,
- The angle between the edge of the knife and the cutting board depends up on the hardness of the materials being cut. A small angle for a very soft materials like fabric and a greater angle for hard material like leather and reinforcements, may be used,
- Over cutting and under cutting must be avoided.
- Patterns must be placed in such a way to ensure quality, economy and minimum wastage.
- Straight – line cuttings must be done first with steel scale/ruler /. Curved line cuttings or irregular shapes must be cut with templates, Cutting, must be done on a smooth surface of soft wood or plywood or galvanized iron plate or zinc plate for accurate cutting,

Pattern must be placed on the leather and initialize cutting from left to right, Start cutting from left top corner of the pattern and end at the right bottom corner,

CUTTING DIRECTION

Use the least number of cutting strokes,

Cut through the leather in one stroke

Tools and equipments for pattern making

Working surface:

A flat working surface required. However a tracing wheel will mark any polished or laminated top, therefore a protection must be given to this type of surface.

Paper :

Strong brown paper is preferred for patterns, thin card should be used for blocks that are sued frequently.

Pencil :

Use hard pencils for drafting patterns (2H, 4H), colored pencils are useful for outlining complicated areas.

Curved Rules :

These are used for drawing long curves.

Set Square:

A large set square with a 45° angle is very useful, metric grading squares can be obtained.

Fibre pens:

These are required for writing clear instructions on patterns.

Tracing wheel:

To trace out the pattern from brown sheet.

Shears (Scissors):

Use separate shears for cutting cloth and paper as cutting paper will blunt the blades.

Calculator:

The calculator is now a common tool in all areas of skill, it eliminates the hard work of calculating proportions and is accurate. If a calculator is not available use the table of aliquot parts

French Curves:

Plastic shapes and cures are available in a range of sizes, they are useful for drawing good curves. A flexi curve which allows a shape to be manipulated is also available.

Pattern Notcher:

This is a tool which marks balance points by snipping out a section of pattern paper.

Other Items :

Pins, holes punch, paper weight, bradawl, snips, proctor, pantograph, rubber, metric ruler, metric tape, metric stick.

3.2.b. Marking:

After receiving each component then I use marking process:

Tools:

- Silver marker
- Ball point pen
- White pencil
- Leather component
- Process control of marking:-
- Choose the right marking pen/pencil
- Ensure proper lighting

Procedure:

- Keep the cut components pair wise on the table.
- Check for color matching.
- Then write the job card number, size, pair no. on each and every piece by silver marker/pencil.
- The match marked pieces are grouped size wise as per required and tied with rubber and stored in plastic cover.

Acceptance criteria:

The pair should be according to the mark.

3.2.c. Skiving

The third unit operation inside cutting rooms skiving. The term skiving means decreasing or reducing the substance at the edge of the components of leather mostly at the flesh side.

Object of skiving:

- To improve the appearance of final product.
- To avoid discomfort in wear/use.

- To reduce the bulkiness.

Fig: Skiving Machine

Classification of skiving:

There are four types of skiving. They are

- Edge skiving
- Dart skiving
- Bevel skiving
- Groove skiving

Edge skiving:

This is thinning down on the double width of the required edge. By adjusting the pressure foot adjusting screw to required depth of skiving, fine edge skiving is obtained. Fine edge skiving is done in most of the articles.

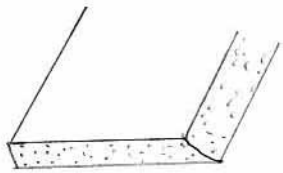


Fig: Edge skiving

Dart skiving:

It is also called the parallel skiving. Narrow thinning down some of the thickness of the edge. The substance is removed parallel with uniform thickness. The skiving is continued till the end of the component in reached. Parallel skiving is used in turn over works.

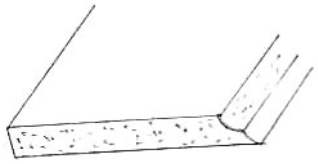


Fig: Dart skiving

Bevel skiving:

Thinning down of variable thickness. By adjusting the pressure foot and the feed roller at the suitable angle, bevel skiving is obtained. Third type of skiving is used in the fabrication of brief case, jewelry boxes, cosmetic boxes, suitcases, etc…

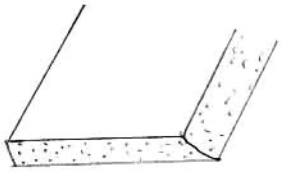


Fig: Bevel skiving

Groove skiving:

Groove on the middle of the component for folding without decreasing the substance of folded part. For this type of skiving special tracer foot is required.

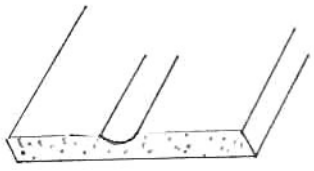


Fig: Groove skiving

How to skive:

- Push the lever to engage the pressure foot.
- Adjust the skiving thickness as required using the adjusting screw.
- Feed roller and knife:-The feed roller is to be arrange to be parallel to the inner surface at the bell knife at all times and the gap between them must be as little as possible. When adjusting screw is too turned to the right, the space between the feed roller and the knife becomes wider and as the screw is turned to the left the space becomes narrower.
- When the work piece is tick and hard: - The tension of the spring is made stronger by pulling the spring tension adjuster towards the operator and hanging it on the spring.
- When the work piece is soft: - The tension of the spring is made weaker by hanging the spring tension adjuster an appropriate level.
- Adjustment of bell knife:-The ell shaped knife is gradually depleted in thickness as it repeatedly grinds by the emery wheel and there fore the gap between the pressure foot and the edge of the knife becomes wider. In that case the bell knife is brought closer to the pressure foot by turning the knob.
- Adjustment of space between pressure foot and knife:-The space between the pressure foot and knife edge varies depending on the thickness and hardness of the work piece.

Materials to be skived	Difference
Soft and thin leather	0.2-0.3
Medium soft leather	0.3-0.5
Hard leather	0.5-0.8

Control before skiving

- Ensure the bell knife width is min 15 mm.
- Ensure the bell knife is proper position.
- Ensure that the bell knife is proper shape.
- Ensure that the bell knife rotation is away from operator.
- Ensure that feed roller rotation is clockwise direction.
- Set the feed roller angle and inclination.
- Set width guide.
- Set the pressure foot guide.
- Set the skiving width by adjusting width guide.
- Set the pressure foot guide for the required skiving type.

Techniques of skiving:

- Check the bell knife sharpens.
- For grinding the knife, the feed grinding roller grinding the knife.
- Set the feed roller alignment according to the skiving type and requirement.
- Feed the material to be skived from the left side of feed roller.
- Control the feeding speed by treadle.
- The feed roller feeds the material against the bell knife and the skived material comes out.

Maintenance of skiving machine:

- The machine is designed for self lubrication of all rubbing surface and no particular preventive maintains system is called for.
- Keep the machine clean and lubricates the points.

- Control the position of the edge of band knife using the optical unit.

- Do not adjust the alignment of reciprocating wheel.
- Before starting the machine check the grinding stones.

Acceptable criteria:

- Skiving should be even as per the sample.
- No under or over skived component.
- No components out of original cut shape.

3.2.d. Cementing/Attaching

Cementing is an important operation in the manufacture of leather garments. At this stage only, the different components of lining and reinforcement are joining together by means of application. Cement or adhesive used in the fabrication of leather garments is of two types i.e.-

- Temporary adhesive
- Permanent adhesive.

Process of cementing:

- Choose the right adhesive and brush.
- Apply the adhesive as a thin coat at the marked places of both components to be attached.
- In case of leather board, apply adhesive fully on both the leather board and the upper area to be attached.
- Leave it to dry for about 1 mm.
- Attach the components together by pressing both components adhesive applied point.
- Check for proper attaching.
- Hammer the attaching portion well.

Process control:

- The brush should be clean.
- Ensure that the bowl is clean without any contaminants.

Acceptance criteria:

- Apply the cement evenly.
- Components should be attached perfectly to the marking.

3.2.e. Folding

- It is the vital process of leather garment manufacturing.

Process control:

- Choose the right type of adhesive.
- Choose the right reinforcing tape if necessary.
- Check job card no, size, total number of pieces.

Instruction:

- Tape attaches the cut component if required.
- Apply adhesive over the folding area.
- Fold the leather and fix it over the glue.
- Hammer the component over the adhesive attached area.

Acceptance criteria:

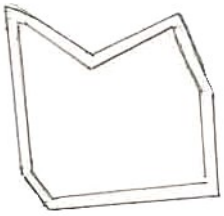
- Folded edge should be smooth.
- No excess flow of adhesive.
- Folding allowance should be even.
- No wrinkles on the folded area.
- Match with sample wherever necessary.

3.3. Pattern classification

3.3.a. Leather

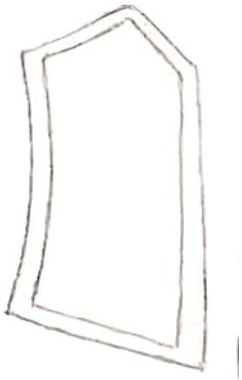
Front Yoke

- 1 cm allowances in all side.
- 2 pieces to be cut in opposite direction.
- Notches to be given.



Centre Front Top.

- 1 cm allowances in all sides.
- 2 pieces to be cut in opposite direction (Mirror).
- Notches to be given.

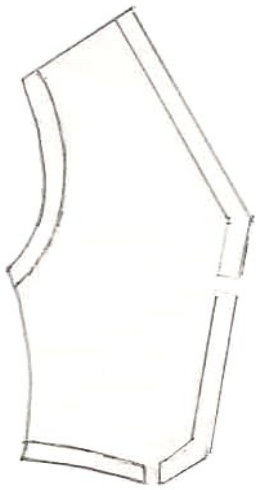


Centre Front Bottom.

- 1 cm allowance all sides
- 2 pieces to be cut in opposite direction (Mirror).
- Notch at bottom.
- Pocket mark to be given.

Front Side.

- 1 cm allowances in all sides
- Notches at waist line.
- 2 pieces to be cut in opposite direction (Mirror).
- Pockets marks to be given.



Facing Components.

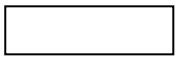
- Centre Front Facing Top.
- Centre Front Facing Bottom.
- Bottom Facing.
- Arm Hole Facing.
- 1 cm allowance all sides
- 2 Pieces to be cut in opposite direction (Mirror)

Bottom Pocket:

- 1 cm allowance in all sides.
- 2 pieces to be cut in opposite direction.

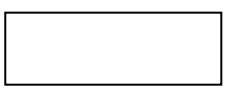
Top Pocket:

- 1 cm allowances in all side.
- 1 piece to be cut.



Pocket Top Strap:

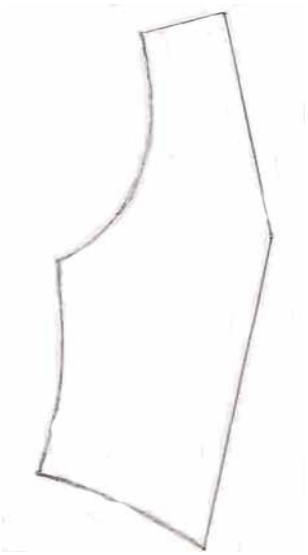
- 1 cm allowance in all sides
- 1 pieces to be cut



Pocket Bottom Strap:

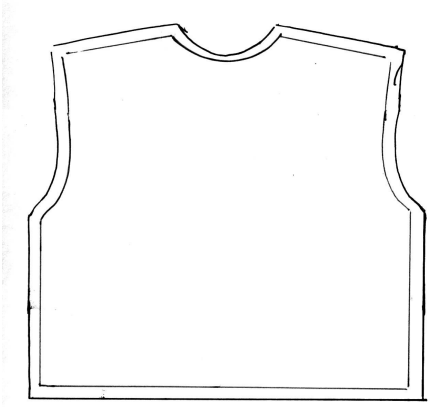
- 1 cm allowance in all sides
- 2 piece to be cut.

3.3.b. Lining



Front Lining :

- 1.5 cm allowance in all sides.
- 2 Pieces to be cut in opposite direction (Mirror).

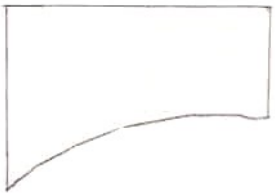


Back Lining:

- 1.5 cm allowance in all sides.
- 2 Pieces to be cut in opposite direction (Mirror).

Pocket Top Lining:

- 1 cm allowances in all sides.
- 2 pieces to be cut in opposite direction.

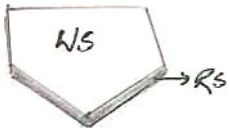


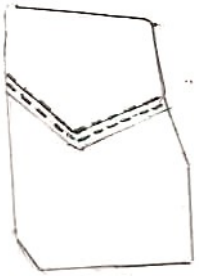
Pocket Bottom Lining:

- 1 cm allowances all sides.
- Length more not than waist line.
- 4 pieces to be cut in opposite direction.

3.4. Assembling

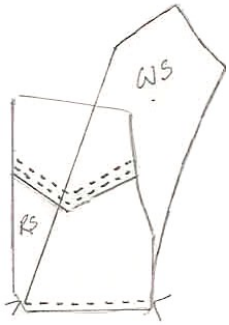
Yoke Joint with Centre Front Top:



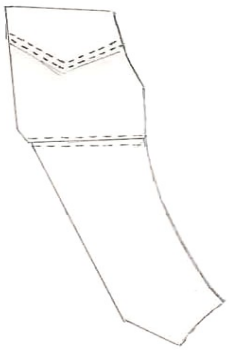


- First fold 1cm in yoke part
- Apply adhesive and carefully fold this part.
- Place yoke part on Centre Front Top.
- 2 and 5 mm top stitch on yoke part.
- Complete two set.

Centre Front Joint with Centre Front Bottom:



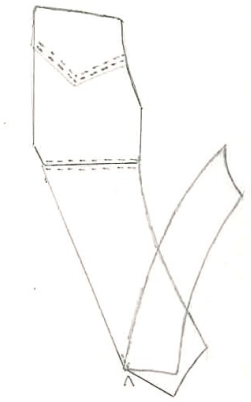
- Place top to top.
- 1cm stitch on Centre Front Bottom.
- Turn the components.
- Then scissoring.
- 2mm top stitch on to the side of

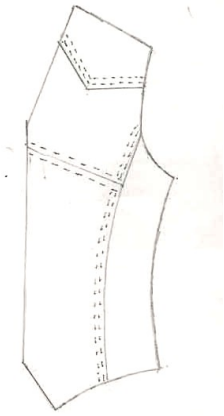


the seam

- Then complete two set.

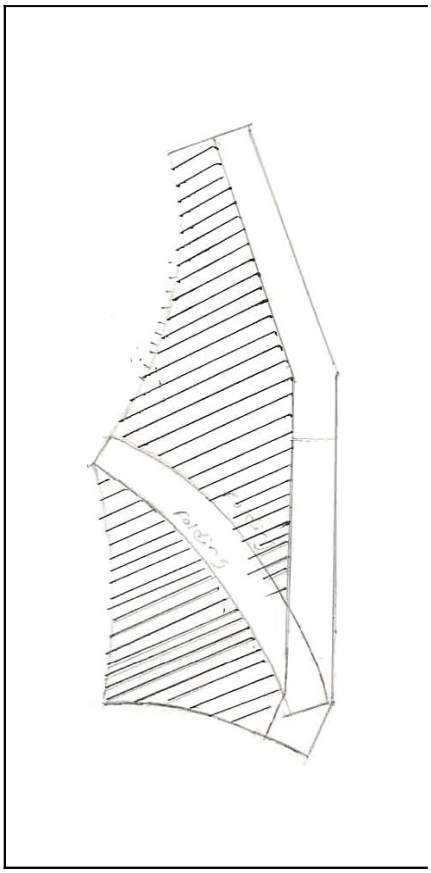
Centre Front Joint with Side seam.





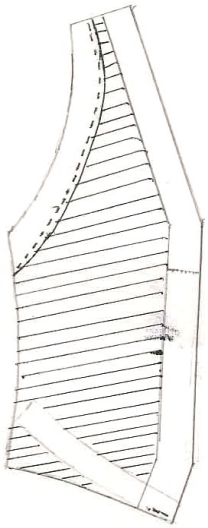
- Place Top to Top.
- Care matches the curve.
- Stitch 1cm seam.
- Turn and seam opening wrong side.
- Then scissoring.
- 2mm and 5mm top stitches on Centre Front.
- Then complete two set.
- Then prepare bottom pocket carefully left and right and prepare upper left pocket carefully.

Front facing and arm hole joint Lining:

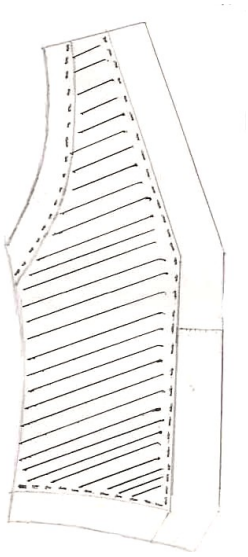


- Place top to top.
- 1cm stitch.
- Seam line open and corner cut.
- Apply adhesive and hammering.
- Stitch left and right component.
- Facing component inner side on the lining component.
- Prepare two components.
- Place top to top.
- Start from lower porti0n of Arm hole.
- Scissoring is done on the Lining.
- Stitching must be control.
- Edge matching carefully.
- Prepare two set component.

Bottom facing joint with Lining:



- At first close the dart by making a pleat in the bottom.
- Place top to top in corner making.
- Match the component carefully.
- Stitch 1cm.
- Edge should be matched.
- Cut corner in wrong side.



- Seam opening.
- Apply adhesive and hammering.
- Prepare two components.

Then Facing component with Front lining joint with Front part. Stitch and hammering should be done carefully. Complete two set.

Back part lining joint with Front left and right part of the component. At first joint wrong side and turning the component and hammering. Then stitch 2 and5mm around the components. Finally attach snap button very carefully.

Then Snap Button Attached with front left and right part care fully

3.5. Safety Precaution

- To be concentrated during drafting and drawing and assembling.
- To hold the knife properly.
- To pay proper concentration at whole work.
- Avoid loose and long sleeves.
- Hammering should do carefully.
- When work is finished switch off the machine.

CHAPTER - 04

4.0. FINISHING

4.1. IRONING

Ironing is an essential element in the production of a perfectly finished, garment. A little more time can be spent on pressing operations, where as in production, the time scale may be limited according to the cost and quality of the garment.

First it is important to differentiate between "Top pressings" and "under pressing" as the terms are used in the industry. Top pressing is the final pressing of the garment before it is dispatched to the customer. This is relatively speedy process particularly now that there is such a wide range of sophisticated equipment available to perform this function in the outer wear sector.

Under pressing on the other hand is the pressing of individual parts during the making up of the garment. Pressing each piece before joining to the next makes the subsequent tasks easier and usually more accurate, though it must be remembered that outerwear often needs to be pressed slowly and carefully. If the under pressing has been carried out with care throughout the garment assembly, top pressing becomes little more than toughing up the completed garment.

Before pressing a garment it is important that scraps of the sample leather are tested thoroughly to discover the ideal conditions under which the garment can be pressed. Only when the correct conditions have been established can the actual garment sections be allowed to come into contact with the iron.

It is advisable to use a cloth between the iron and the leather to prevent damage to the surface of the leather, such as shining.

4.2. Leather Garment Care

A Leather garment should be treated as any other fine garment, with a few exceptions.

- Do not store the garment on a wire hanger. Always use a wide hanger to maintain the garment's shape.
- Do not store leather garments in plastic bags or in a hot, bright, or damp room. Excess dryness may cause the leather to crack and moisture can cause mildew. Consider using cold storage during the summer months.
- If a leather garment gets wet, allow it to air dry naturally, since quick drying near a radiator will cause the leather to dry out and crack. A new leather garment can be pre-treated with a stain – repellent finish, will help prevent stains from occurring.
- Leather cleaners and conditioners are available in retail outlets to help restore leather garments to their original state after repeated wear. However, an excess buildup of these products can clog the pores in the leather, inhibiting, and the skin's ability to breathe
- Do not apply pins or adhesive tape to the surface of leather garments.
- Avoid spraying perfume and hairspray directly onto a leather garment. In general, do not allow a garment to become exceedingly soiled, as this may cause permanent damage.
- Do not attempt to remove difficult stains. Contact qualified professional leather cleaner. A herm can be fixed by applying a small amount of rubber cement to the area.
- Iron a leather or suede garment by placing a heavy brown paper bag on top of it; use a low setting, with no steam.

- Garments may shrink after professional dry cleaning but will stretch out again with wear.

- Wipe off dust and dirt on a leather garment with a soft dry sponge or cloth. Buy a special suede brush and buffing block to clean the surface of nu-buck and suede.

- Only trust a professional leather dry cleaner to clean a leather garment.

- Do not send leather garments to the neighborhood dry cleaner unless they can demonstrate that large volumes of these garments are cleaned on a regular basis. Most local dry cleaners know a lot more about textiles than leathers. Do not consider cleaning a leather garment at a "Coin op" dry cleaning location.

- Women should consider wearing scarves when wearing delicate, difficult – to clean leather garments, as scarves protect garments form cosmetics and body oils.

- To remove a small minor stain use a large pencil eraser, but only after this process has been tested on the inner, unexposed facing of the garment to ensure the easer does not damage the skin.

- If a garment becomes wrinkled, put it on hanger and gently pull the wrinkles out without significantly stretching the skin. If this fails, try to press the garment with san iron. First make sure the garment is totally dry. Place a heavy brown paper bag over the garment and keep the iron constantly moving over the paper. Set the iron on its lowest heat setting. Never use steam when ironing.

4.3. Packing

Leather garments items which can be damaged, molded or chapped, must therefore be packed carefully and securely.

CARTON

- Made of thick paper board
- For medium articles 26" x 24" x 8"
- For large articles 39" x 29" x 10"

PROCESS

- To flat the garment
- To place thin tracing paper on the garment
- To fold the sleeves on body
- Place bottom cover for preventing impression on other area.
- To place ten garments like this into one carton
- To keep 3 or 4 packs of silica gel on bottom and top of the carton for moisture absorbing purpose.
- To cover the carton with polyethylene paper for protection purpose.

Points to be considered when package:

- Do not fill the cardboard boxes just with the product, but pack a number of similar items in smaller box, or use cardboard layers.
- Clearly indicate which products and in which quality is packed in each box, so that won't be a mystery to the importer.
- Before packing, products should be protected by plastic bags in order to avoid damage from rain or moisture.
- Each box should have a packing list, which gives a specification of all products in terms of quality, Type, color, etc…

4.4. Test Report of Leather and Lining

Test	Pink Color	Deep Brown
Tensile strength (kg/cm2)	300	100
Stitch tears strength (kg/cm)	22.22	50
Tearing strength (kg/cm)	33.33	6.25
Lastometer test (Cracking) kg/cm	444.44	225
(Bursting) kg/cm	466.67	237.5
Softness test mm	1.775	2.676
Breaking	3	2
Water vapour permeability mg/cm2/hr	1.63	1.975

Grey scale Reading					
Rub Fastness (Dry)	Rotation	Pink color		Deep Brown color	
		LR	Felt	LR	Felt
	32	5	5	5	5
	64	5	5	5	5
	128	5	5	5	5
	256	5	5	5	5
	512	5	5	5	5
	1028	5	5	5	5
(Wet)	256	4	4	¾	¾
	512	¾	3	3	3
	1028	3/4	3	2/3	2/3
Perspiration Test - LR	Grain		Flesh	Grain	Flesh
	4/5		5	4/5	4/5
Fabric					
Cellulose				¾	4/5
Cotton				4/5	5
Nylon				2/3	4
Polyester				4/5	5
Acrylic				5	5
Wool				3/4	4/5
Cellulose				4/5	4/5
Others are no change					
Lining (Satin)	No Change				

4.5. Costing

4.5.a. Costing of Pink Color Waist Coat (Gilet)

Item	Description	Quantity	Price (Taka)	Unit Cost
Leather	Sheep Napa	9.326 sqft	81	755.41
Lining	Satin	1.07 sq	70	74.91
Snap	Four parts	Gauge 3	3	9
Button	Button			
Adhesive	Solvent Based			15
Thread	Polyester (Pink)			10

Total Material Cost	= 864.32
40% Production Cost	=345.72
20% Profit	= 172.86
5% Vat	=43.22
10% Others	= 86.43
Total Cost	=1512.5

4.5.b. Costing of Deep Brown Color Waist Coat (Gilet)

Item	Description	Quantity	Price(Taka)	Unit Cost
Leather	Goat Napa	9.326sqft	60	559.56
Lining	Satin	1.07 sq	70	74.91
Snap	Four parts	gauge 3	3	9
Button	Button			
Adhesive				15
Thread				10
Total Material Cost				668.47
40% Production Cost				267.38
20% Profit				133.69
5% Vat				= 33.42
10% Others				66.84
Total Cost				=1169.8

5.0. CONCLUSION

Leather has played in important role in day to day life of mankind from immemorial. From ancient civilization to modern times, leather has been used by the human race in one form on the other its daily life, and it is discovered and rediscovered every where and it seems that mankind can hardly do without this useful material.

Modernization and increasing value addition were the watch words for achieving accelerated export grown in the leather industry. The project report has covered in confined form from the very beginning operation of leather garments (Gilet) selection of leather to the finishing operation packing.

In my project work I use both sheep and Napa Leather. But better result showed in sheep Napa Leather. Pink color Lining shown better result.

Finally I express my opinion that I carefully heart and soul try finished my project work. If I would have enough time I will finish my project work more better. I am satisfied such type of the Project Work.

6.0. BIBLIOGRAPHY

- Clothing Technology By- Europa Lehrmittel
- Leather Appareal Design By- Francesea Sterlacci
- Making Leather Clothes By- Jongensen
- Home Needle Crafts By- Dora Seton
- Fashion Source
- Mens wear
- Leather Clothing - Its Manufacture and Maintenance
- Making Cloths in Leather By- Ben and Elizabeth Morris
- Leather work – Step By step Guide
- An Introduction to the Principles of Physical Testing of Leather By – Prof. S. S. Dutta
- SLP
- SLF
- SATRA
- Theory and Practice of Leather Manufacture By – K. T. Sarkar
- Principles of Leather Manufacture By – S. S. Dutta
- Possible Defects in Leather Production By – G. John
- Class lecture