# Abstract

CD Box plays an important part in leather goods industry. The global market for leather goods is very rich and increasing day by day on the basis of product supplement. Most of the leather products and goods industry manufacture a huge amount of CD box cover using box work procedure, as it has a great value in local and international market. So it is desirable for me to complete a project work on studies on the construction and development of CD box cover using box work procedure for the international market. In my project work I look after every section of CD box cover using box work procedure manufacturing process,, firstly pattern making, leather cutting, cementing, assembling, then quality checking and lastly approving.

This works help increase manufacturing knowledge of leather goods and products. To earn practical knowledge for reducing cost, wastage and time, to appraise how well resources are utilized, to improve the cutting, clicking, stitching and assembling process to reveal problem area. To be efficient and successful in my position in a reputed organization where it is possible to explore talent and potentials to the fullest and thus make a contribution of the organization's growth as well as personal growth and move to self-actualization.

# CHAPTER

# *ONE*

## *INTRODUCTION OF LEATHER GOODS*

***1.1 Introduction Of Leather Products***

***1.2 History Of Leather Products***

***1.3 Classification Of Leather Products***

***1.4 General Classification Of Leather Goods***

***1.5 CD BOX COVER As Leather Goods***

***1.6 Tools Used In Leather Products Manufacture***

***1.7 Global Leather Garments Industry***

***1.8 Overview Of The Bangladeshi Leather***

***1.9 Leather Industry In Bangladesh***

## *1.1 INTRODUCTION OF LEATHER PRODUCTS :*

**Leather is one of nature`s most exciting materials. No substance equals it for the construction of articles for personal use. Leather has played an important role in day-to-day life of mankind from immemorial. Man from the very beginning, has been using animal skins for covering his body & legs from climatic conditions, keeping his provisions of water in goat skins & making belts from various purpose. From ancient civilization to modern times, leather has been used by the human race one from on the other in its daily life & it is discovered every where & it seems that mankind can hardly do without these useful materials.**

**The products made out of leather land themselves to an enormous variety of both useful and essential items, which are a need and asset in modern living. An extensive range of colors & design widen the selection range which encourage the prospective consumers to put this products to use in a multitudes to ways be it fashionable or functional.**

**The term "Leather goods" is applied & confined generally to the articles or goods made mainly of leather & intended for carrying personal belongings, such as the smaller items, which can be carried in hand or shoulder. The variety of leather goods we come across everyday is countless. When there are a variety of articles that differs so much in size, design & method of construction, then it is absolutely necessary to classify them into separate convenient arts of similar kind. In this project report, classification of leather goods has been defined in confined items.**

**Now a day because of leather becomes a costly commodity, hence goods made of synthetics or man made fibers are also terms as leather goods, but this goods are definitely much lower in price compared to "genuine" leather. In this project report, the real is taken for construction.**

**This project report has covered in confined from the very beginning operation of "CD BOX COVER" production (selection of leather) to the finishing operation**

**packing.**

## *1.2 HISTORY OF LEATHER PRODUCTS :*

**The making of leather products is today a considerable subject, conducted in most of the principal cities of the world. It is an industry which had its beginning in the early civilization. Specimens of ancient work are preserved in the museums, many having been recovered from the tombs of the early kings of Egypt. The industry has progressed through the ages down to the present day, with an indication that it will continue for centuries to come. However, here we presented century wise a brief history of different leather products.**

**In Egypt, leather artifacts were found in tombs built as early as 3000B.C. evidence that the pharaohs wore leather sandals.**

**During 750B.C. the Romans made leather footwear, clothing & ornaments. At that time, Teutonic tribes in the cold north of Europe wore whole garments of leather. And the Roman soldiers came back to Rome wearing leather trousers called brace.**
**By the thirteen century, the Romans introduced moneybags. They also introduced coin purse.**
**By the fifteen century, many homes contained finely detailed Spanish leather, which was used in wall hanging, upholstery, book covers, vests & jackets.**

**In sixteen century, a special type of leather called Morocco leather was tanned from goat skin & it was used in many purposes. We also know that Englishmen dark their beer out of mugs that were made from leather.**

**<u>The 1990s</u>**

**In the early 1990s, upon the advent of the open automobile, rich man wore long motoring coats made of leather to protect them from the elements. They also wore leather trench coats fashioned after the British military officer's coat.**

**The 1920s**

**During the 1920s, women's leather & suede sports were began to appear, both in Europe & the United States. Also during the 1920s interior designers namely Corbusier & Marcel Breuer integrated cow hides with their polished steel furniture during the Bauhaus period.**

**The 1930s**

**In France, in 1930s, the designer Paquin created a suit using goat suede & wool.**

**The 1940s**

**During the 1940s & 1950s, shades of tan, rust & brown were predominant in suede for both man & woman. One the most popular jacket styles in 1949s was the aviator jacket. Even die-hard army commanders like general pattern wore then during the world war-II.**

**The 1950s**

**Bonnie Cashion was the first American designer to create off-white Cabretta leather coat. In early 1960s, designers began to provide new colors in leather.**

**The 1960s**

**In 1960s, designer's created leather & suede garments, in combination with fabric & knit as well as leather & suede ensembles. Ornament leather garments were fashionable in 1960 century probably the most popular coat during the late 1960 century was the embroidered goat skin jacket by Mallory.**

**The 1970s**

**The 1970 century saw a return to the more sophisticated leather garment. By 1978, Claude Montana was quickly establishing himself as the kings of women's leather apparel design.**

**The 1980s**

**By the 1980s, leather is a luxury item. Designer's used it to fashionable colors leather goods; pants, suit, leather coat dress, pouf dress etc are the gifts of the year likely 1980.**

### *The 1990s*

**Novelty skins were becoming popular in Italy & France in the early age of 1990. Different luxurious leather products were created, from the designer to budget category. The history of leather products, actually an unbelievable length of time, from the earliest time to today's sophisticated fashion. The art of leather products manufacturing will add a new dimensions to the world by the time 2010.**

## *1.3 CLASSIFICATION OF LEATHER PRODUCTS :*

**A leather product means any type of footwear, goods or leather apparel. However, the well known classifications of leather products are given below.**

**Leather products are:**

- **Leather footwear**
- **Garments – Children's wear, Women's wear, Gent's wear**
- **Gloves**

- **Leather Goods**
- **Sports Goods**
- **Divers.**

## *1.4 GENERAL CLASSIFICATION OF LEATHER GOODS :*

**Now we will study about leather goods. Leather goods refer to articles made mainly of leather & intended for the containing of personal belongings. Some leather goods are small in value & some special forms of leather goods are purely decorative. However, leather goods are classified according to the point consideration.**

a) **According to the value.**
b) **According to the degree of reinforcement.**

### a) According to the value:

**The different classes of leather goods are as follows-**

1) **Small leather goods**
2) **Medium leather goods**
3) **Heavy leather goods**

### 1) Small leather goods:

**The goods are made from leather having sometimes of (0.5-1.00) mm falls under this category. Sometimes these goods are called Fancy leather goods or Personal leather goods.**

### 2) Medium leather goods:

**Medium leather goods indicates the personal thickness of (0.8-1.2) mm. ladies bags,**

**side bags, shoulder bags etc are called medium bag.**

3) **Heavy leather goods**

**These are made generally from cow & butt hides which are strong & durable. The hide has distinct surface gain patterns & the size ranges from 20 to 30 sq ft. These types of goods are made from heavy bearing the thickness of (1-1.5) mm. Luggage etc are the example of the class.**

**According to the degree of reinforcements:**

**Leather goods are three types. Namely:**

a. **Limp leather goods.**
b. **Semi-Limp leather goods.**
c. **Stiffened leather goods.**

**1) Limp leather goods:**

**The leather are made without applying any internal stiffener or reinforcement, are simply known as the limp leather goods. Most pocket goods are made in this way**

**2) Semi-Limp leather goods:**

**The articles for various reasons have a paper or stiff fabric material as a foundation between the leather & lining, so imparting a degree of reinforcement or firmness. These goods belong to the class of semi limp leather goods.**
**4) Stiffened leather goods:**

**Others are built up on a foundation of stout pulp board, so making the completed article quite coming under the heading of stiffened leather goods.**

**Stiffened leather goods are sub-divided into the groups, such as:**

- **Moulded leather goods.**
- **Box or Built up leather goods.**

**Moulded leather goods:**

**Moulded work is the class of goods of the container type, in which the foundation is made by gluing successive layers of paper around a block of the required shape & size; the "Moulding" thus formed being covered. Moulded work is with in the province of both small & large goods.**

**Box or Built up leather goods:**

**The articles are made on a foundation of sheet pulp board, the pieces being cut to define sizes & "Built-up" to form a box, then strengthened with fabrics & afterwards covered with leather & lined. These classes of goods are said to box or built up leather goods. They are subjected to fancy leather goods.**

## *1.5 CD BOX COVER AS LEATHER GOODS:*

**According to the above classification of leather goods, CD box cover is in category of small leather goods/ fancy leather goods.**

## *1.6 TOOLS USED IN LEATHER PRODUCTS MANUFACTURE:*

**a) Knife: Knives are the most important tools. There are many types of knife like survel knife, xacto knife, and utility knife.**

**b) Skiving knife: For skiving edge of leather using these tools requires. Skills & Experience can be also done more easily with a skiving machine.**

**c) Creaser: It is steel tools for finishing the edge of the wrist watch belt. It compresses the leather, giving it a slightly darker and shiny line. It is in different sizes & design.**

**d) Oil stone: Oil stone is made by carbon or silicon carbon. It is used to remove the wire edge formed in the cutting knife. It is also two sides soft & rough. To get fine cutting edge rub the knife on the soft side of the oil stone.**

**e) Leather shears: These are used for cutting leather of any thickness.**

**f) Revolving punches: The revolving punch has a magazine of punches of different diameter. It is used to make holes to close the edge of the fabric or to decorate the belt.**

**g) Awl: It is used for sewing leather. They are known by different names diamond, harness or bucking awls. It is used to make hole in leather.**

**h) Hammer: It is used for hammering. There are many kinds of hammer such as heavy hammer, light hammer & medium hammer. In wrist watch belt manufacturing light hammer is used. Hammer for leather worker are of two types.**

**i) Square scale: For measuring a straight edge for trimming & for measuring & 90 degree angle. It may be used.**

**j) Stitch marker: It is an important tool for making wrist watch belts. Wheel number on the wheel means quantity of stitches per inch, the higher the number, the smaller**

**stitch length.**

**k) Folding hammer: These are used for hammering after cementing & stitching.**

**l) Bone folder: Made of wood or bone used where turning edges over. Also used when pattern making.**

**m) Spring divider: Used in designing departments for measuring various allowances of patterns.**

**[**

**n) Thickness gauge: Used for same purpose as thickness gauge.**

**o) Sharpening stone: Used for sharpening various kinds of knives.**

**p) Scissors: Used by the closing room workers for trimming threads ends, cutting slots & for other similar works.**

**q) Cutting knife: Generally used for cutting leather of heavy type.**

**r) Wooden mallet rubberized: Used for hammering the punches wherever hand punches are used.**

## *1.7 GLOBAL LEATHER GARMENTS INDUSTRY:*

**The global import of leather garments remained almost stagnant during 1992 - 2001 but for a marginal movement from US$ 4321 million to US$ 4737 million. In terms of its share in the total global import of leather and leather products during this period, it represents a negative movement from 8% to 6%**

**India's export of leather garments increased from US$ 326 million in 1992 to US$ 379 million in 2001, accounting for a share of 20% in India's total leather and leather products export o US$ 1936 million.**

**India's share in global leather garments import increased marginally from 7.53% in 1992 to 8.00% in 2001.**

**The statement showing global import of leather garments and India's export and its shares during 1998 to 2001 is given below—**

| Details | 1998 | 1999 | 2000 | I 2001 |
|---|---|---|---|---|
| World Import of Leather Garments | 3291 | 3162 | 4456 | 4737 |
| India's Export of Leather Garments | 376.66 | 347.28 | 460.45 | 378.75 |
| India's Share | 11.44% | 10.98% | 10.33% | 8% |

**Source: ITC, Geneva,**
**(Value in Million US$)**

**From the above statement, it can be seen that India holds a meager share of 4.89% in the USA's total import of leather garments, which along accounts for 39% of the global leather garments import trade. During 2002, there has been a decline in the USA's import to leather garments to US$ 1487 million as well as India's export of leather garments at US$ 47 million, further reducing India's market share to 3.13%.**

**Though the share of India in some major markets is quite significant, it is yet to improve the share in certain other markets like Japan. India's share in Japan is a meager 0.83% only.**

**The USA is the largest importer of leather garments. During 2001, the USA's import of leather garments stood at US$ 1851 million, accounting for a major share of 39% in the global leather garments import. This is followed by Germany holding a share of 11%, Japan 7% France 7%, the UK 6%, Hong Kong 4%, Italy, 4% Spain 4%, Canada 2% Netherlands 2% Switzerland 2%. Belgium 2% Austria 1.37% Denmark 1.22%, Sweden 1.08%, Russia 0.68% and Greece 0.63%.**

**These sixteen countries together holds a major share of about 95% in the global leather garments import. India's export of leather garments to these sixteen countries during 2001 - 2002 stood at US$ 355 million, out of their total import US$ 4461 million, accounting for a share of 8%.**

| *Importing Country* | *1998* | *1999* | *2000* | *2001* |
|---|---|---|---|---|
| USA | 969.85 | 1057.16 | 1810.09 | 1850.82 |
| GERMANY | 69.18 | 571.60 | 526.22 | 522.94 |
| JAPAN | 94.79 | 151.41 | 334.83 | 312.75 |
| FRANCE | 187.57 | 187.41 | 222.79 | 311.57 |
| UK | 178.72 | 173.26 | 255.06 | 264.65 |
| HONG KONG | 145.30 | 137.48 | 238.39 | 196.40 |

| | | | | |
|---|---|---|---|---|
| ITALY | 151.94 | 124.34 | 141.32 | 190.65 |
| SPAIN | 88.65 | 108.01 | 149.06 | 185.00 |
| CANADA | 63.15 | 64.69 | 102.29 | 106.49 |
| NETHERLANDS | 117.26 | 87.76 | 91.20 | 99.87 |

**Source: ITC, Geneva,**

**(Value in Million US$)**

**A Statement showing major exporters of leather garments during 1998 - 2001.**

| Exporting Country | 1998 | 1999 | 2000 | 2001 |
|---|---|---|---|---|
| China | 1406 | 1220 | 1859 | 2007 |
| Italy | 241 | 226 | 327 | 424 |
| India | 377 | 347 | 460 | 379 |
| Turkey | 270 | 221 | 257 | 271<br>i |
| Germany | 197 | 165 | 152 | 180 |
| France | 81 | 78 | 93 | 123 |
| Korea Rep | 135 | 155 | 182 | 108 |
| USA | 78 | 79 | 85 | 87 |
| Spain | 38 | 68 | 54 | 75 |
| Indonesia | 18 | 23 | 65 | 61 |

**Source: ITC, Geneva,**

**(Value in Million US$)**

## *1.8 OVERVIEW OF THE BANGLADESHI LEATHER:*

**The Bangladeshi leather industry occupies a place of prominence in the Bangladeshi**

**economy in view of its substantial export earnings, employment generation and growth. There has been increasing emphasis on its planned development, aimed at optimum utilization of available raw material for maximizing the returns particularly from exports. The export of leather and leather products increased manifold over the past decades. The export increased from US$ 246.89 million in 1999 - 2000 and from US$. 265 million in 2003 - 04.**

**Today the industry ranks 35th in the export trade in terms of foreign exchange earnings of the country.**

**The composition of export of leather and leather products from Bangladesh has undergone a structural change during the last three decades, from merely an exporter of raw material in the sixties to that of value added products in the nineties. The value added finished products presently constitute around 90%, where 65% crust leather, 25% finish leather and other's 10%the total export from the Industry.**

**The large industry employs 1200-1500 people (direct and indirect) and medium large industries employ 500-600 and in small one has 300-500 workers whom major are women. The employment particular is in semi-urban and rural centers.**

***The Bangladeshi leather industry is organized as follows:***

1. **Tanning & finishing**
2. **Footwear & Footwear components**
3. **Leather Garments**
4. **Leather goods (bags, wallets, bells, gloves, accessories)**

***Bangladesh Leather Sector: A Profile***

1. **Bangladesh is the largest livestock holding country**
2. **A source for 1.14% global leather requirements**

3. **Annual production 180 million sq.ft**
4. **Annual export value 64335 US$ million**
5. **Export growth GDP 0.28-0.36% (1992 - 2000)**
6. **Promising technology inflow and foreign Direct Investment**
7. **Top priority to occupational safety and work environment**
8. **Meticulous concern for consumer safety.**
9. **Compliance to environmental standards**
10. Enormous potential for future growth (domestic as well as export)

## *1.9 LEATHER INDUSTRY IN BANGLADESH:*

**The countries total leather and leather goods export from the year of 1999 to 2005 were:**

**Bangladesh export of leather & leather goods (value in US$)**

| Commodities | 1999-2000 | 2000-2001 | 2001-2002 | 2002-2003 | 2003-2004 | 2004-2005 |
|---|---|---|---|---|---|---|
| Leather share | 195.05 (79%) | 253.93 (87.36%) | 207.33 (82.11%) | 191.23 (83.24%) | 211.41 (79.50%) | 223.67 (84.11%) |
| Leather goods share | 51.84 (21%) | 36.75 (12.64%) | 45.16 (17.89%) | 38.49 (16.76%) | 54.50 (20.50%) | 42.25 (15.89%) |
| Footwear | 48.26 | 33.63 | 41.29 | 35.06 | 50.86 | - |
| Leather products | 2.68 | 2.47 | 3.87 | 3.36 | 3.64 | - |
| Hand gloves | 0.90 | 0.65 | - | 0.07% | - | - |
| Total | 246.89 | 290.68 | 252.49 | 229.72 | 265.91 | - |

**Leather, leather goods and footwear industries projection of production, export earning and employment generation by the year 2015 AD**

| Sector | No. of unit | Production (total) | Domestic use | Available for export | Export earning m US$ | Admin | Production | Total |
|---|---|---|---|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| Tannery for finish leather production | 250 | 300 m sft | 45 m sft | 128 m sft | 256 | 3,500 | 24,500 | 28,000 |
| Footwear Industry | 400 | 47 m sft | - | 47 m sft | 235 | 3,200 | 91,600 | 94,800 |
| Leather garment industry | 400 | 50 m sft | - | 50 m sft | 208 | 2,000 | 40,400 | 42,400 |
| Leather goods industry | 500 | 30 m sft | - | 30 m sft | 85.7 | 2,500 | 47,500 | 5,000 |
| Total | 1550 | 300 m sft | 45 m sft | 255 m sft | 784.7 | 11,200 | 20,4000 | 2,15,200 |

**[NB: The domestic uses will be 45 m sft. This portion is not identified on projection. It depends on type of units to be set up local requirements.]**

# *CHAPTER*

***TWO***

## *CD BOX*

***2.1 What Is Box Work?***

***2.2 Definition CD Box Cover***

***2.3 Classification Of CD Box Cover***

***2.4 Design Of CD Box Cover***

***2.5 Function Of CD Box***

### *2.1 WHAT IS BOX WORK?*

**Box work is the name applied to a section of fancy leather work which**

**consists of the covering and lining of wood boxes of many types and designs intended to contain jewellery, manicure instruments, important papers, writing materials, toilet requisites or other articles.**

**Specialists in this class of joinery who are known as pine workers make the wood foundation; the materials employed being principally a clean, well-seasoned species of pinewood. Polywood is also used to a considerable extend for the tops and bottom of the wood works for lightness and strength. The use of polywood for the larger surfaces in this way lessens the troublesome tendency to wrap and twist to which light wood articles are subject when exposed to varying atmospheric conditions.**

**In jewel boxes and toilet cases some elaborate patterns have been evolved in their interior construction, removable trays variously fitted and divided being fairly common. In other models the trays are pivoted so that they may be moved aside to reveal lower compartments. Interior drawers and secret compartments controlled by hidden springs are sometimes fitted, while large types frequently substantial lock, hinges and handles for convenience in traveling.**

**Much depend upon the skill exercised by the pine worker in preparing the wood foundation for the leather worker, particularly in making the necessary allowances for the leather coverings. The accurate judgment of allowances is naturally more important in the making of complicated work. At the same time an intelligent appreciation of the allowances made and the accommodating of the leather substances to them must be observed by the leather worker.**

**A box is constructed by the wood-worker as a complete unit, the outside being glass-papered and finished in the state. It is then sawn into two sections to form the lid and bottom. From this it may be gathered that no two boxes are identical and if more than one of a kind is to be covered it necessary to mark the interior of the lid and the body of each box so that they may be correctly reassembled.**

## *2.2 DEFINITION CD BOX COVER*

**A box which is used for keeping the cd sacredly and to protect the CD from any kinds of scratches and damages. A CD box shape can be circular, rectangle. The CD box can not only use as a protective item but it can also be used as a decorative item which increases the value of the product.**

**In a word CD box is an article for which is manufactured by box work procedure.**

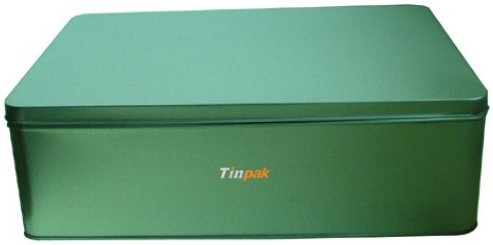
## *2.3 CLASSIFICATION OF CD BOX COVER:*

1) ***based on shape:***
    a) **circular**
    b) **rectangular**
2) ***based on materials:***
    **a) CD box made of leather**
    **b) CD box made of fabric**
    **c) Plastic CD box**
    **d) CD box made of synthetic materials, i.e, raxine.**

## *2.4 DESIGN OF CD BOX COVER*


Tinpak


DVD
VIDEO


Tinpak

## *2.5 FUNCTION OF CD BOX*

***a) To store CD safely:***

**We can store the CD in the CD box with the help of a stand.**

***b) To increase the value of CD box:***

**We can use the CD box as decorative item by adding some style line or design on the upper of the CD box so that it can increase the value of CD box.**

***c) To protect the CD from scratches:***

**By using the CD box cover we can safe the CD from scratches and other natural calamities.**

***d) To satisfy the customer demand:***

**Increasing the quality of the product, to sell it at a cheaper rate and satisfy the customer demand.**

# ***CHAPTER***

***THREE***

# *MATERIALS*

3.1 Raw Materials For The Manufacturing Of CD BOX COVER

***3.1.1 Leather: A New Horizon From Ancient Roots***

***3.1.2 What Is Leather?***

***3.1.3 General Properties Of Leather***

***3.1.4 Uses Of Leather***

***3.1.5 Lining***

***3.2 Consumable Materials For The Manufacturing Of CD BOX COVER***

***3.2.1 Needle***

***3.2.2 Thread***

***3.2.3 Adhesive***

***3.2.4 Reinforcement***

## *3.1 RAW MATERIALS FOR THE MANUFACTURING OF CD BOX COVER*

### *3.1.1 LEATHER: A NEW HORIZON FROM ANCIENT ROOTS*

**The history of leather production goes right back to prehistoric times, when primitive methods were developed for treating animal hides and skins so that they could be used for clothing to protect people from the elements.**

**According to historians, the art of tanning originated before the down of recorded history. Pre-historic people used to live by hunting cloths of some soil were perhaps necessary, for protecting the body from cold and rain. It is very likely that for clothing the pre-historic hunter utilized the skins of the animals he killed. He might have noticed that raw hides and skins putrefied in kept wet and turned hard and rough when dried out. The dry, hard skin was certainly inconvenient to warp up his body. It would thus be only natural for him to try to soften the fur while drying it and in this attempt to render the skin soft and convenient to wear that the foundation of the art of tanning was perhaps laid by the prehistoric people.**

**Primitive men might also have notice that the skins thus smeared with fats dried priced one among them any ways in which the primitive people tried to preserve animal skins. Dressing of skins by the application of fatty and albumin's matter like tallow, oil egg yolk, milk, cured etc. is practiced even today by many. Furs are dressed more or less according to the above process even today.**

**It is to be assumed that the raw hides and skins were at first merely dried and preserved by smoking until with the advance of civilization, it was found that they could be made much more durable by treating them with vegetable matter containing tannin (crushed bark, wood or fruits). It was also discovered that by suspending the hides in water (controlled decomposition process) treating them with ash (liming), it was possible to remove the hairs if the "tanned" hide material was not to be used as fur but as leather.**

**In addition to various types of vegetable tannage (bark tannage), chamois tannage with fish oil, fat or oil is also known to have existed in ancient times and is still sometimes practiced today. White tannage with alum was presumably a later addition to the methods used by the early tanners.**

**The use of alum in tanning came to be known within historic period. From these early beginnings a craft steeped in tradition developed over the centuries. Following that of the salts of chromium is quite recent data, i.e. the latter part of the 19th century. The discovery of chrome tanning is attributed to Knapp in 1885. The first commercial production of chrome-tanned leather was done by an American chemist, Augusts Schultz in 1884. The chrome-tanned leather could be produced quicker than other types of leather and was very resistant to water. This craft evolved into an industry of great economic significance which has now become established throughout the world.**

**The practice of dyeing (originally painting) leather with coloured materials of vegetable, animal or mineral origin likewise goes back thousand of years.**

**The growing tendency to consider ecological requirements will be future place heavy demands or the leathers manufacturer, but also on the producers of chemical and auxiliaries these issues are no doubt resolvable. So that we can look forward to having the natural products leather and its excellent wearing properties, for which there is still no Perfect substitute for a long time to come.**

### *3.1.2 WHAT IS LEATHER?*

**Hides and skins are of proteinous substance and therefore putrefy unless preserved. By the application of various chemicals (tanning) and mechanical treatments such putrescence outer covering are preserved from decay and converted into non-putrescence which is suitable for convenient use known as leather.**

**Real leather is a natural product. It breathes warm and durable and has individual characteristics, which make each hide unique. Leather will always bear the marks of its natural origin and these characteristics can show as scratches, growth marks areas of differing fiber density and hair pore structure.**

**A general term for hide or skin with original fibrous structure less intact, tanned to be imputrcscible. The hair or wool may or may not have been removed. Leather also made from a hide or skin which has been split into layers or segmented mechanically and/or chemically into fibrous particles, small pieces or powders and then with or without the combination of binding agent, is made into sheets or other forms such sheets or forms are not leather.**

### *3.1.3 GENERAL PROPERTIES OF LEATHER*

The following characteristics of leather processing are:

- **Leather is the strongest and flexible material.**
- **Leather is micro porous substance, which are permit air and water vapor.**
- **Leather can resist severe friction and heavy strains.**
- **Leather is having pliability and durability.**
- **It can easily be ductile.**
- **It is not readily inflammable.**
- **It is having an aesthetic appeal where synthetic material does not posses this.**

- **It is easy to join or subdivided the leather.**
- **According to the necessary leather can be imparted extra properties like smooth, feel softness and rigidity.**

### *3.1.4 USES OF LEATHER*

**Throughout the ages man has found thousands of uses of leather. It provided the first clothing and footwear. As people learn more about the methods of tanning it would become to be used for many different purposes including water purposes as water containers, boats parchment and vellum for writing on, chariots and upholstery.**

**Today, new uses are continuously being found for this age old material, conveyor, belts, washers and packing made from leather are a common feature of modem industrial machinery. Leather plays a very important part in the equipment of the armed forces.**

**For example, more than 2500 leather packing are used in the main armament machinery and steering gear controls of a modern battleship. Gas masks, boots and gloves for servicemen are also made from leather. Leather is used for car and furniture upholstery, luggage, wall panelling, gloves, hats, coats, dress, handbags, wallets, bookbinding and numerous other products. In the world of sports, leather is essential cricket, soccer and rugby balls are made from it. And then there are such items as boxing, gloves and head guard football boots saddles harnesses, ski and riding boots. Leather gloves and leather covered steering wheels help racing divers to keep their cars under precise control leather protective motor cycle racing have helped to reduce injuries in accidents. The biggest use of leather is in the manufacture of shoes. The table shows the uses of leather for different purposes in approximate percentages**

| | |
|---|---|
| **Footwear** | **50%** |
| **Garments leather** | **25%** |
| *Gloves Hand bags & Luggage* | *10%* |
| **Upholstery** | **8%** |
| **Others** | **7%** |

***Table: Uses of leather***

## *3.1.5 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.**
**fTo make an unlined leather garment, purchase specially processed leathers with insides as nice as outsides.**

## ***Objectives:***

**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):***

**A smooth and highly lustrous surface and a dull back characterize this lining. 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.**

## *3.2 CONSUMABLE MATERIALS FOR THE MANUFACTURING OF CD BOX COVER*

### *3.2.1 NEEDLE*

**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 point determines the seam style.**

***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** |

### *3.2.2 THREAD*

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.

## Types of thread

**The following types have been offered for leather garments.**

| | | |
|---|---|---|
| **Mercerized 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.***

***Fibers are two types.***

- **Natural Fibers**
- **Synthetic/ Man made Fibers**

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

## *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**

***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** |

## *3.2.3 ADHESIVE*

**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.**

## *3.2.4 REINFORCEMENT*

### *Definition:*

**In the construction of leather goods it becomes necessary, with few exceptions, to introduce additional material between the outside and lining of an article in order to strengthen all over or only in parts the outer material or to add substance or impart rigidity to the leather.**

**A particular leather may be too soft or limp for its intended purpose, so necessitation a foundation or stiffening. Or the leather may be inferior in quality, in which case it is build up and strengthened by the application of a secondary layer of other material. Again the article may have an attachment, such as a handle, which imposes a stain on the part to which it is attached, so requiring additional strength at that place.**

**Such applied materials known as reinforcement.**

### *Types of reinforcement:*

**There are different types of reinforcements. They are as follows:**

1) ***Tip:***

**It is the name given to a stout, air-dried, rough-surface paper supplied in wide rolls or in large sheets and used for reinforcing whole area of solid leather to make the finished article more rigid.**

***2) Split cane:***

**It is a reinforcement used as a foundation for hide, raw hide, and canvas trunks. It consists of the center section of canes of ½ in. to 5/8 in. diameter, the rounded surfaces of the canes having been split off and discarded and the flat center portion about 3/16 in. in thickness laid side by side and adhered to a coarse canvas on one side only.**

***3) Polywood:***

**In its thinner substances, is used in the production of light-weight turned-edged travel goods of the suit case type and is particularly suitable for ladies hat cases of rounded shape. It should not be used for cut edged-case.**

***4) Fibre board:***

**It is the name applied to many grades and substances of reinforcing**

material made, in its best qualities, from pulped vegetable fibre such as esparto grass and jut. It is a heavily compressed, smooth surfaced board of red, brown or black coloring supplied in sheets usually measuring 60 in. by 40 in.

***5) Millboard:***

**Mill Board is a hard-surfaced board of mottled drab color. Cheap qualities are made from an inferior base such as old hemp and jute refuse boiled with old paper refuse and according to grade of pulp the mill board is more or less brittle. Mill board is more generally used in its thinner substances in the leather goods industry for light reinforcements.**

***6) Leather board***

**Leather board is of softer texture than fiber board but even in strength through out its substance. It is made form a good clean mixed base and is so named because of its use as reinforcement for leather and not by reason of its leather content, which is nil. It is of a pink or fawn coloring and is usually employed in its stouter substances as medium**

**grade reinforcement for suit cases and similar goods.**

***7) Strawboard***

**Straw is one of the best known and most generally used kinds of reinforcement. It is made from pulped straw and recognized by its yellow color. It is soft, easy to cut and work, light in weight and not subjected to distortion by atmospheric condition.**

***8) Wood Ply Boards***:

**These are white in color, soft in texture and brittle. They are useful because of their light weight to give substance where required but because of their lack of strength are not suitable as reinforcement for the exteriors of articles which are likely to be subjected to rough sketches.**

***9) Paper reinforcements:***

**In the construction of fancy leather goods and to a smaller degree in the lining up of solid leather goods, considerable use is made of paper reinforcement. The paper used must be firm but not harsh, just to make up for the deficiency in the leather characteristics. There are various types of paper reinforcements, they are-**

1) **Kraft Brown is one of the most useful reinforcing papers, being very suitable for the making of moulded articles and as a reinforcement for the interior parts of stiffened goods.**
2) **Stout unglazed brown is a class of wrapping paper useful for some moulded goods. It is paper of inferior quality and less strength but more absorbent.**
3) **White Cartridge paper in its cheaper grades is used for the same a purposes as Kraft brown.**
4) **Sugar paper: sugar paper is used to a great extent as a reinforcement for the linings of certain types of hand bags and other classes of fancy leather goods**

**and to smaller degree for the outsides of semi-limp articles.**

# *CHAPTER*
# FOUR

## ACCESSIORIES FOR THE MANUFACTURING OF A CD BOX COVER

*4.1 Zipper*

*4.2 Functions Of Zipper*

*4.3 History Of The Zipper*

**4.4 Different Types Of Zipper**

*4.5 Different Designs Of Zipper*

## *4.1 ZIPPER*

**Fasteners have come a long way since the early bone or horn pins and bone splinters. Many devices were designed later that were more efficient; such fasteners included buckles, laces, safety pins, and buttons. Buttons with buttonholes, while still an important practical method of closure even today, had their difficulties. Zippers were first conceived to replace the irritating nineteenth century practice of having to button up to forty tiny buttons on each shoe of the time.**

**In one word zipper is a fastening device consisting of parallel rows of metal, plastic, or nylon teeth on adjacent edges of an opening that are interlocked by a sliding tab.**

## 4.2 Functions of zipper

**Zippers may:**

- **increase the size of an opening to allow the passage of larger objects, as in the fly of trousers or in a pocket.**
- **join or separate completely two ends or sides of a single garment, as in the front of a jacket.**
- **attach or detach completely one separable part of the garment to or from another, as in the conversion between trousers and shorts.**
- **decorate an item.**

## 4.3 History of the zipper

**An early device superficially similar to the zipper, "an Automatic, Continuous Clothing Closure", was patented in the United States by Elias Howe in 1851. Unlike**

**the zipper, Howe's invention had no slider; instead a series of clasps slid freely along both edges to be joined, with each clasp holding the two sides together at whichever pair of points along them it was located. The clasps were joined together by a string, which, when pulled taut, caused the clasps to be evenly spaced along the closure, thus holding the two edges together. Pulling in the other direction caused the clasps to become bunched up at one end, by which means the device was opened.**

**The true zipper was the product of a series of incremental improvements over more than twenty years, by inventors and engineers associated with a sequence of companies that were the progenitors of Talon, Inc. This process began with a version called the "clasp locker", invented by Whitcomb L. Judson of Chicago (previously of Minneapolis and New York City), and for which a patent (No. 504,038) was first applied for on Nov. 7, 1891. It culminated in 1914 with the invention, by Gideon Sundback, of the "Hookless Fastener No. 2", which was the first version of the zipper without any major design flaws, and which was essentially indistinguishable from modern zippers.**

**Initial versions of the zipper were based on the "hook and eye" principle, rather than on interlocking teeth, and tended to come apart easily. Some versions depended on constant pressure from one side of the joined fabric in order to hold together at all, which limited applications. In the 1891 version, the slider detached entirely from the zipper when not being used to open or close.**

**Judson, together with business partner Harry Earle, founded the first incarnation of what was to eventually become Talon Inc., in Chicago in 1894, as the Universal Fastener Company. The design deficiencies, combined with difficulties in getting the machinery needed for mass production to work, prevented the early devices from reaching market, which led to financial hardships for the company. This in turn led to a series of reorganizations and name changes, as well as relocations, first to Catasauqua, Pennsylvania; then to Elyria, Ohio; Hoboken, New Jersey; and finally Meadville, Pennsylvania.**

**Sundback, a Swedish-born immigrant, joined the company, then called the Automatic Hook and Eye Company, in Hoboken, in 1906. At that time the**

company's product, still based on hooks and eyes, was called the "C-curity Fastener". Sundback developed an improved version of the C-curity, called the "Plako", but it too had a strong tendency to pull apart, and wasn't any more successful than the previous versions. Sundback finally solved the pulling-apart problem in 1913, with his invention of the first version of the zipper based on interlocking teeth, the "Hookless Fastener No. 1". That version, however, had a tendency to wear out quickly, and again was not a commercial success. Finally, in 1914 Sundback developed another version based on interlocking teeth, the "Hookless No. 2", which solved the last remaining major design defect, and opened the way to commercial success. The principle is, each tooth is punched to have a dimple on its bottom and a nib or conical projection on its top. The nib atop one tooth engages in the matching dimple in the bottom of the tooth that follows it on the other side as the two strips of teeth are brought together through the two Y channels of the slider. The teeth are crimped tightly to a strong fabric cord that is the selvage edge of the cloth tape that attaches the zipper to the garment, with the teeth on one side offset by half a tooth's height from those on the other side's tape. They are held so tightly to the cord and tape that once meshed there is not enough play to let them pull apart - - a tooth can't rise up off the nib below it enough to break free, and its nib on top can't drop out of the dimple in the tooth above it. The classic zipper was made of a brass alloy, a metal that has low friction and is long-wearing.

Sundback's invention of the Hookless No. 2 took place while he was working for the Hookless Fastener Company in Meadville, which had previously been set up to manufacture the Hookless No. 1. Depending on which improvement one wants to consider to constitute the "invention" of the zipper, the zipper was invented either in Meadville, Chicago, or one of the other previously mentioned cities. The B. F. Goodrich Company coined the name *Zipper* in 1923 for the line of rubber overshoes that it made using the fastener. The name slowly came to be associated with the fastener itself, and eventually acquired generic status.

The zipper slowly became popular for children's clothing and men's trousers in the 1920s and 1930s. In the early 1930s the haute couture designer Elsa Schiaparelli

**featured zippers in her avant-garde gowns, helping it to become acceptable in women's clothing. In 1934, Tadao Yoshida founded a company called San-S Shokai in downtown Tokyo. Later, this company would change its name to YKK and become the world's largest manufacturer of zippers and fastening products. By World War II, the zipper had become widely used in Europe and North America, and after the war quickly spread through the rest of the world.**

**Clergy in the 1920s and 1930s described zippers as allowing one to take one's clothes off too quickly, thus hastening illicit sexual activity. Clothing with zippers was seen as inappropriate to be worn by women because of this fact, and was not fully adopted until the late 1950s.**

**Today, such leading global companies as YKK, TALON, Ideal, NEO, KCC Group, and Tex Corp, make various types of zippers including "invisible" zippers, metallic zippers, and plastic zippers.**

**Recently invented is the Excoffier zipper, which possesses a new shape of zipper teeth. In a January 2007 television show in Canada, the zipper was chosen as No. 8 on the list of The Greatest Canadian Inventions; it qualified because Sundback had been president of a Canadian-based company that was one of the earliest manufacturers of the zipper.**

## 4.4 Different types of zipper

**◉Coil zippers now form the bulk of sales of zippers world-wide. The slider runs on two coils on each side; the "teeth" are the coils. Two basic types of coils are used: one with coils in spiral form, usually with a cord running inside the coils; the other with coils in ladder form, also called the Ruhrmann type. This second type is now used only in a few parts of the world, mainly in South Asia.**

**Coil zippers are made of polyester coil and are thus also known as polyester zippers. Nylon was formerly used and though only polyester is used now, the type is still known as a nylon zipper.**

**⊙ Invisible zippers' teeth are behind the tape. The tape's color matches the garment's, as does the slider, so that, except the slider, the zipper is "invisible". This kind of a zipper is common in skirts and dresses. Invisible zippers are usually coil zippers or to be precise polyester zipper.**

**⊙Metallic zippers are the classic zipper type, found mostly in jeans today. The teeth are not a coil, but are individual pieces of metal moulded into shape and set on the zipper tape at regular intervals.**

**Metal zippers are made in brass, aluminium and nickel, according to the metal used for teeth making. All these zippers are basically made from flat wire.**

**A special type of metal zipper is made from pre-formed wire, usually brass but sometimes other metals too. Only a few companies in the world have the technology. TALON is the pioneer of this zipper in the world. These type of pre-formed metal zippers are mainly used in high grade jeanswear, workwear, etc., where high strength is required and zippers need to withstand tough washing.**

**⊙Plastic-molded zippers are identical to metallic zippers, except that the teeth are plastic instead of metal. Metal zippers can be painted to match the surrounding fabric, plastic zippers can be made in any color of plastic. Plastic zippers mostly use polyacetal resin though other resins are used too like polyethylene.**

**⊙Open-ended zippers use a "box and pin" mechanism to lock the two sides of the zipper into place, often in jackets. Open-ended zippers can be of any of the above specified types.**

**⊙Closed-ended zippers are closed at both ends; they are often used in baggage.**

## 4.5 Different designs of zipper

# CHAPTER

***FIVE***

## *MACHANARIES FOR THE MANUFACTURING OF CD BOX COVER*

*5.1 SEWING*

*5.1.1 History of Sewing*

*5.1.2 The Purpose of Sewing*

*5.1.3 Definition of sewing*

*5.1.4 Types of seam*

*5.1.5 Study of stitch formation*

*5.1.6 Sewing machine types*

*5.1.7 Sewing machine brands*

*5.1.8 The feed mechanism*

*5.1.9 Process Control of Sewing*

*5.1.10 Instruction of Sewing*

*5.1.11 Acceptance Criteria*

*5.1.12 Sewing Problems and Solutions*

*5.1.13 Sewing Tools and Accessories*

*5.2 SPLITTING*

## *5. Machineries for the manufacturing of CD box cover*

**For the maunufacturing of a classic waist coat as a leather garment sewing machine is the main machineries that is used for sewing. Besides these other machineries which can be used for the manufacturing process are:**

- **Cutting machine**
- **Skiving machine**
- **Splitting machine.**
- **Button attaching machine.**

**Before introducing of these machines some general informations about sewing are included in this chapter.**

## 5.1 SEWING

### *5.1.1 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.**

### *5.1.2 The Purpose of Sewing*

- **Joining**
- **Reinforcing**
- **Decorating**

### *5.1.3 Definition of sewing*

**Sewing is an ancient art involving the stitching of cloth, leather, furs, or other**

**materials, using needle and thread. Its use is nearly universal among human populations and dates back to Paleolithic times (30,000 BC). Sewing predates the weaving of cloth.**

**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.**

### *5.1.4 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):**

**Seam**

| | | | |
|---|---|---|---|
| **Close Seam** | **Decorative** | **Lapped** | **Butt** |

| | | |
|---|---|---|
| **Cable** | | **Cording** |

| | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Plain** | | **Brooklyn** | | **Silked** | | **Reversed** | | **Welted** | | **Piped** | | **Blind** |

*5.1.5 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:***

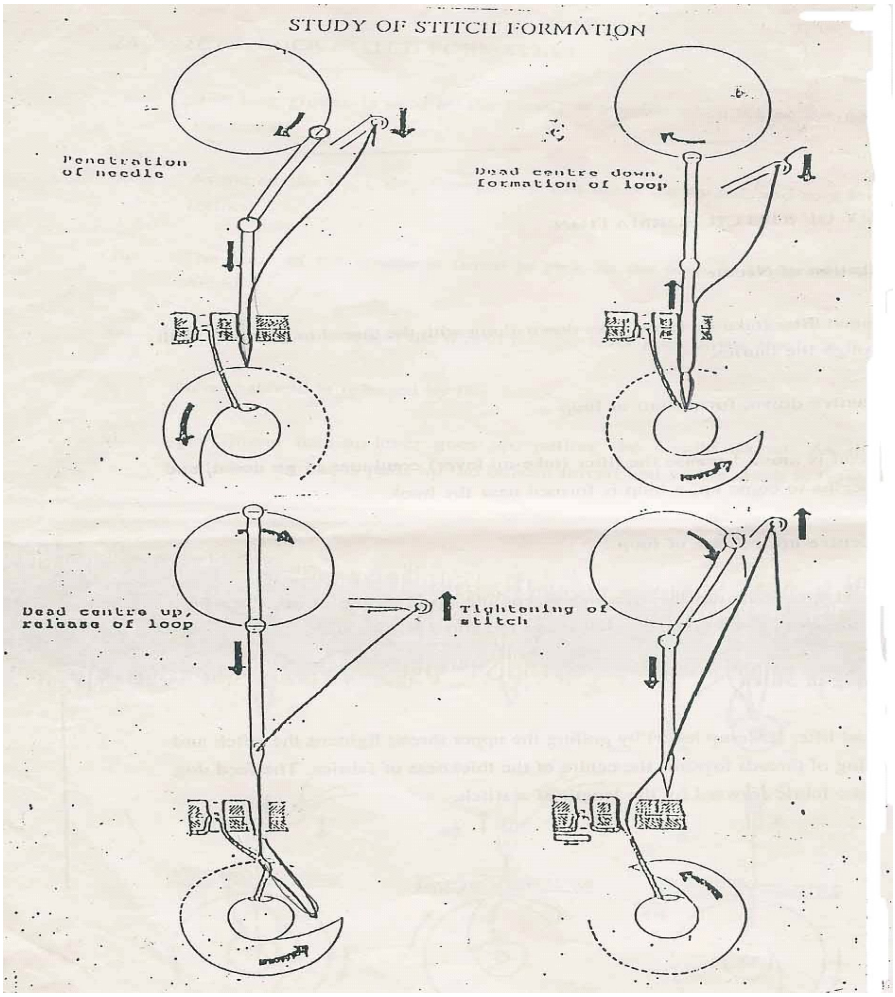
The thread is loose, because the lifter continues to go down and as the needle begins to come up, a loop is formed near the hook.

***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.**


STUDY OF STITCH FORMATION
Penetration of needle
Dead centre down, formation of loop
Dead centre up, release of loop
Tightening of stitch

### *5.1.6 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.**

***Besides these, there are also three types of sewing machine-***

- **<u>Mechanical Sewing Machines</u>**

**A mechanical sewing machine is controlled by a rotary wheel. Any adjustment like**

**the tension or the length or width of the stitch is made by moving a dial. These machines are very basic and tend to be less expensive than the other sewing machines.**

- **Electronic Sewing Machines**

**An electronic machine differs in that there are some functions that can be accomplished by pushing a button. A machine can have a number of motors for various duties and they are run via electricity.**

- **Computerized Sewing Machines**

**As sewing machines became more complex, more of these motors were added. A computer then coordinates all these functions. Think about a repetitive sequence of stitches being programmed, so you no longer have to replicate these movements over and over again.**

### *5.1.7 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 |

### *5.1.8 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.**

### *5.1.9 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**

### *5.1.10 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'**

### *5.1.11 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.**

### *5.1.12 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 | Change to thread with lower |

| | |
|---|---|
| elongation. | 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. |

## *5.1.13 Sewing Tools and Accessories*

Sewing box (~1955) with sewing notions

- stitching awl

- **bobbin**
- **bodkin**
- **dress form**
- **dressmaker's or tailor's shears**
- **measuring tape**
- **needle**
- **pattern**
- **pattern weights**
- **pin**
- **pincushion**
- **rotary cutter**
- **scissors**
- **seam ripper**
- **sewing table**
- **tailor's chalk**
- **thimble**
- **thread**
- **tracing paper**
- **tracing wheel**
- **wax, often beeswax**

*5.2 SPLITTING*

**The machine which is used for splitting to the required thickness is called Splitting Machine. This is the second machine operation in the series of unit operations.**

**Normally splitting machines used in footwear and leather goods industry have working with 300m.m.**

***Machine Model:*** **Torielli Splitting Machine CN-403.**

### *5.2.1 Objects of Splitting*

- **To reduce the thickness of cut leather.**
- **To maintain the uniformity of thickness of cut leather components**

### *5.2.2 How to Operative Splitting Machine?*

***Equipments/Tools & Materials:***

- **Thickness measuring gauge**
- **Dressing stone**
- **Spanner and Alen key**
- **Cut components oil**

### ***5.2.3 Process Control:***

- **Check the band knife if it is in proper position and tension.**
- **Ensure that the band knife is sharp enough.**
- **Choose the right top bar on roller to set the required thickness.**
- **Choose the right speed of feeding.**

### *5.2.4 Instruction:*

- ✓ **Switch on the machine and check if the band knife is rotating in clockwise direction and ensure the knife width is above 15m.m.**
- ✓ **Check the position and sharpness of the band knife through the optical viewers.**
- ✓ **Dress the grinding rollers if necessary.**
- ✓ **Sharp the knife edge with great is to assure a gradual and symmetrical movement of grinding stone.**
- ✓ **Set the knife tension if necessary.**
- ✓ **Set the required thickness by adjusting the top bar and roller.**
- ✓ **Adjust the bottom roll pressure by using the rotating knob.**
- ✓ **Keep the component to be splitted on the machine bed and feed it to the feeding roller. For suede leathers feed into the machine with flesh side up and for other leather feed into the machine with grain side up.**
- ✓ **The component passes through the band knife and the split waste goes to the dust, the thickness reduced pieces come out of the machine.**
- ✓ **Use pedal to feed hard pieces and to remove the stick pieces.**
- ✓ **Before starting the actual production ensure the output thickness by trying it with a waste leather piece.**
- ✓ **After the trial performance with the waste piece, check the thickness using thickness using thickness gauge. If necessary do the machine settings.**
- ✓ **Then proceed with the normal production.**

### *5.2.5 Acceptance Criteria:*

- ❖ **The material split should have uniform required thickness.**
- ❖ **No under or over splitting.**
- ❖ **No components out of original cut shape.**

**[Note: After splitting the splitted cut piece is taken for the skiving operation.]**

## *5.3 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.**

### *5.3.1 Object of Skiving*

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

**Fig: Skiving Machine**

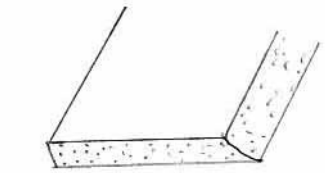
### *5.3.2 Classification of Skiving*

**There are four types of skiving. They are**

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

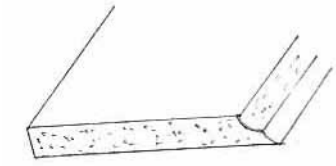
***Edge skiving:***

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** |

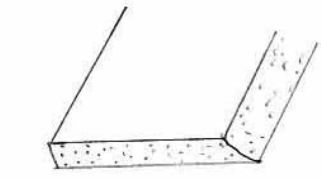
***Dart skiving:***

**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** |

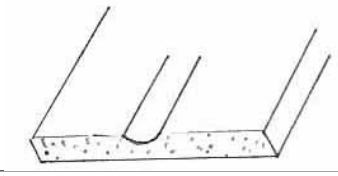
***Bevel skiving:***

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** |

### *5.3.3 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** |

### *5.3.4 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 |

### *5.3.5 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.**

### *5.3.6 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.**

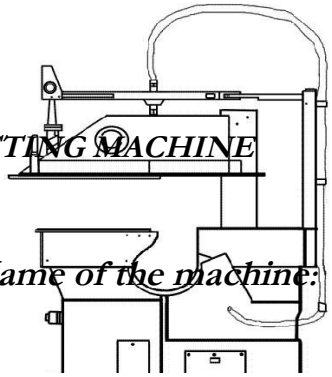
### *5.3.7 Maintenance of Skiving Machine*

- **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.**

### **5.3.8** ***Acceptance Criteria***

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

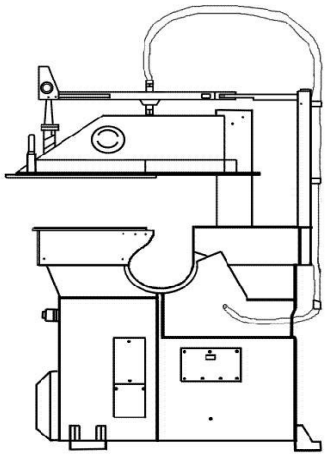


## *5.4 CUTTING MACHINE*

***5.4.1. Name of the machine:*** **Cutting Press with turning arm.**

***5.4.***

2 Block Diagram:



### *5.4.3.Working principle:*

**The MULTIFORCE adjustable stroke – end device is the main feature of the turning arm clicking presses series MF, which allows:**

- **Cutting with dies of different linear development (but same height) adjustment.**
- **Cutting of materials with different hardness without adjustment.**
- **Minimum cuts for longer cutting boards lasting.**
- **Higher easiness in machine use.**

This clicking press can be use to cut natural or synthetic leather/ hide, cloth, cardboard etc. No metallic materials or materials having metals inside, as well as materials which could be prejudicial to operations health (i.e. asbestos) should be cut.

The machine must not be used in an explosive environment or to cut materials cut with hazard of explosion.

A SINGLE OPERATOR must use the machine at a time. Therefore delimit a security area around the machine with YOLLOW paint inside which only the operator can work to define this area refer to the page stating machine overall dimensions.

### *5.4.4. Function of the machine:*

a) The turning arm clicking presses allow: --

- Cutting with different dies linear development (but same height) without adjustment.
- Cutting of materials with different hardness without adjustment.
- Minimum cuts for longer cutting boards lasting.
- **Higher easiness in machine use.**

b) This clicking press can be used to cut natural or synthetic leather/ hide, cloth, cardboard, etc. No metallic materials or materials having metals inside, as well as materials which could be prejudicial to operations health (i.e. asbestos) should be cut.

### *5.4.5 Machine operation:*

⦿Function of the machine control devices:

- The hand wheel locked on the sight side of the arm is used to adjust the turning arm stroke. By turning it clockwise, the arm moves downward. Counter clockwise, the arm moves upward.
- The stroke and hand wheel is used to adjust the stroke and of the turning arm. By turning it counter clockwise, the stroke – end sets upon the correct height by turning it clockwise, the stroke – end value is stored.
- The arm can be moved both to the left and to the right (with a total rotation of 180 Deg. about) by mean of two the handles. To set the machine in motion press the two push buttons simultaneously being the machine equipped with an electric synchronal– temporization device (equivalent to 3/10 second). Release the push – buttons only when the arm being to move upward.
- The ring nut advances (counter clockwise rotational) delay (clockwise rotational) the cutting and, thus decreasing or increasing the cutting power.

### ⦿*Cutting stroke and adjustment:*

Before die cutting it is necessary to provide for cutting stroke and adjustment therefore act as follows:

- Lay a large sized cutting die (taking consideration ever maximum cutting power of the machine) on the cutting table without material to be cut.
- Move the arm over the cutting – die.

- Turn the cutting stroke and hand wheel 1 counter clockwise then slowly turn clockwise the hand wheel 2 till the arm gently touch the cutting – die.
- Turn the adjusting hand-wheel '1' clockwise, the stroke – end valve, set up on the cutting die height, is stored. Turn the hand-wheel 2 counter clockwise so as the arm will move up of approx. 1 cm from the cutting- die.

## ⊙*Residual Risk On machine switching off:*

In case of an electric blackout, as well as on machine turning off, the hydraulic pump stops completely in 40 seconds approx. and the rotating arm begins its slow descent. Therefore it is necessary than in such events the operator takes care, not to loose any part of his body or any other object between the cutting table and the turning arm.

**Maintenance of the machine**:

*Periodical maintenance:*

For good machine efficiency it is advisable to carry out the following maintenance operations periodically:

a) Turn upside-down the cutting pad every week and plan it whenever there are wears or sinking of approx. 2 mm.
b) Turn upside-down and front back the aluminum plate on the arm at least every 3 months to guarantee the flatness of the contact surface and its gradual wear.
c) Clean with a cloth (which leaves no thread) the seal collar on the column from residuals and dusts of cut materials every month.
d) Replace the hydraulic oil and relevant filter every 8000 working

hours.

e) The hydraulic oil must have the following chemical-physical features at 50 Deg. For instance:

# Shell Tulles 46

# Esso Nuto H 46

# TOTAL Azolla 46

# AGIP Oso 46

f) We recommend collecting burst oils in the suitable tanks delivered to the companies entitled for their collection.

### *5.4.6 Advantages:*

The MULTIFORCE adjustable stroke is the main feature of the turning arm clicking presses series MF, which allows:

1. Cutting with dies of different linear development (but same height) without adjustment.
2. Cutting of materials with different hardness without adjustment.
3. Higher easiness in machine use.
4. This clicking press can be used to cut material or synthetic leather/hide, cloth, cardboard, etc.

### *5.4.7 Disadvantages:*

1. The machine must not be used in explosion environment or to cut material, with hazard explosion.
2. A SINGLE OPERATOR must use the machine at a time.
3. No metallic materials or materials having metals inside, as well as materials which could be prejudicial to operations health (i.e. asbestos) should be cut.

### *Suggestion from the observation:*

⦿The machine should be handled with care.

⦿A single operator must operate the machine.

⦿The measurement should be right.

⦿After use all the equipments should be kept on right place.

⦿We should not waste leather.

# *CHAPTER*

# SIX

## PATTERN CLASSIFICATION

**6.1 Introduction Of Pattern Engineering**

***6.2 Pattern Making / Designing Methodology***

**6.3 Grading**

***6.4 Designing & Pattern Cutting***

***6.5 Pattern Classification***

## 6.1 INTRODUCTION OF 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.**

Technical advice

Technical and esthetic advice

**STAGES OF COLLECTION**

| | | |
|---|---|---|
| **Fashion Designer** | **Exchange of ideas techniques Style** | **PATTERN – MAKER / DRAPER Materializes the sample garment** |

**Fittings, adjustments, verifying the sample made in muslin/draper**

| |
|---|
| **PATTERN – MAKER / TECHNICIAN** |
| |
| **SAMPLE MACHINIST**<br>**Makes up the sample garment in fabric in the basic size** |
| |
| **Study of manufacturing details and modifications** |
| **PATTERN – CUTTER / GRADER**<br>**Grads the sample pattern adjusted in the basic size** |
| |
| **SAMPLE MACHINIST (OR FACTORY)**<br>**Production of 1st range in leather made up in 3 different sizes to check the conformity and the style of the garment.** |
| |
| **RESEARCH AND LAUNCHING DEPARTMENT**<br>**Studies and launches the production after calculation of the manufacturing time (1/10000th of hour)**<br>- **Marker is made for all the sizes**<br>- **Leather is matched**<br>- **Components are cut** |
| |
| **Give the instruction to the foremen** |
| **PRODUCTION LINE FOR** |


**Figure: 8.1: Stages of Collection**

## *6.2 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**

## *6.3 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.**

## *Pattern symbol*

**Operation to line continue**

**Direction to continue from a particular point**

**Parallel line**

**Or** **Mirror**

**Or** **Offset**

**Button stand**

**90º** **Perpendicular**

**Folded portion**

**Hem = Bottom line / end of the garment**

**S.H. = Sleeve Head / Crown.**

**C.F. = Center front**

**C.B. = Center back**

**R.S. = Right side**

**C.F.F. = Center front fold**

**C.B.F. = Center back fold**

**W.S. = Wrong side**

**M.P. = Make Point**

**S.S. = Side seam**

## *Pattern instruction*

**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.**
- ✓ **Center 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 neckline.**

**Sleeve, front and back bottom have 4 cm hem folding allowances.**

**The ready patterns are pinned on to the thick pattern board using a compos, 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.**

---

## *Role of a garment pattern designer*

- **Liaison with buyers**
- **Planning the objectives for the forthcoming seasons**
- **Resource collection**
    - **Sample**
    - **Lining fabric**
    - **Buttons**
    - **Accessories & fittings**
- **Create new collections**
    - **Working sketches**
    - **Specification sheets**
- **Supervising the sample garment production**
- **Liaison with production control**
- **Maintenance of records**
    - **Sampling**
    - **Costing**
- **Training new recruits**
- **Overall responsibility of sample room and staffs**

## *Tools and equipments used in pattern making*

1. **Knife**
2. **Awl**
3. **Ruler**
4. **Pencil**
5. **Oil stone**
6. **Tape measure**
7. **French Curve**
8. **Punches & hammer**

9. **Flexible rubber ruler etc.**

**Besides these we can also used the following tools and equipments for pattern making, a short brief about the tools & equipments is given below-**

***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, 41T), colored pencils are useful for outlining complicated areas.**

***Curved Rule:***

**These are used for drawing long curves.**

***Set square:***

**A large setsquare with a 45° angle is very useful; metric-grading squares can be obtained.**

***Fiber 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, paperweight, bradawl, snips, proctor, pantograph, rubber, metric ruler, metric tape, metric stick.**

### *Materials used in pattern making*

1. **Pattern board = to making basic pattern**
2. **Mill board = to making cutting pattern**
3. **Mica with Board = to make working pattern**
4. **Metal plate = to make tracing pattern**
5. **Zinc sheet/ Polymer board = used as cutting surface**
6. **Fiber board = to cut the pattern on cutting press**

## 6.4 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 would 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.**

## *What is pattern?*

**A shape cut out of leather or other materials to be fitted together with other pieces to form leather products in account with its style. In a word, "Pattern" is the flat representation of a specific figure/article.**

## *How can we classify Pattern?*

**We can classify the pattern into two categories, which are given below-**

- **According to function: Mainly 3 types;**

**I.Basic pattern/Bodice pattern/Block pattern/ Foundation pattern**

**II.Making pattern**

**III.Cutting pattern**

**Besides these-**

- **Ready pattern/Sectional pattern/Master pattern**
- **Lining pattern**

- **According to purpose:**

**I.Copied pattern**

**II.Commercial pattern**

**III.Ready to wear garment pattern**

## *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.

### *Pattern information*

**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).**

**Gusset 2 * 46 with folding allowance 7mm all sides**

Outer top
**38 * 16**

## *6.5 PATTERN CLASSIFICATION*

**1)**

**2)**

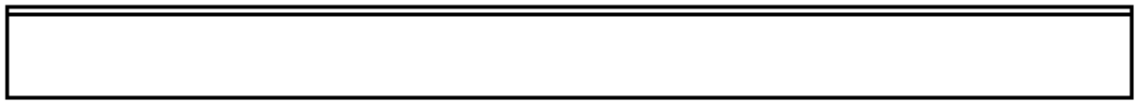
Zipper stopper

**Holding Strap 2 * 10**

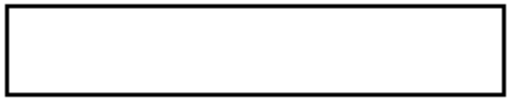
**3 * 7, 7mm allowance two side (widthwise)**

**Fold part 2 ( 51 with folding allowance 7mm one side (lengthwise)**

**3)**



**4)**



**5)**

# CHAPTER
# *SEVEN*
## ***MANUFACTURING OF CD BOX COVER***

### *7.1 Perspective Drawing Of A CD Box Cover*

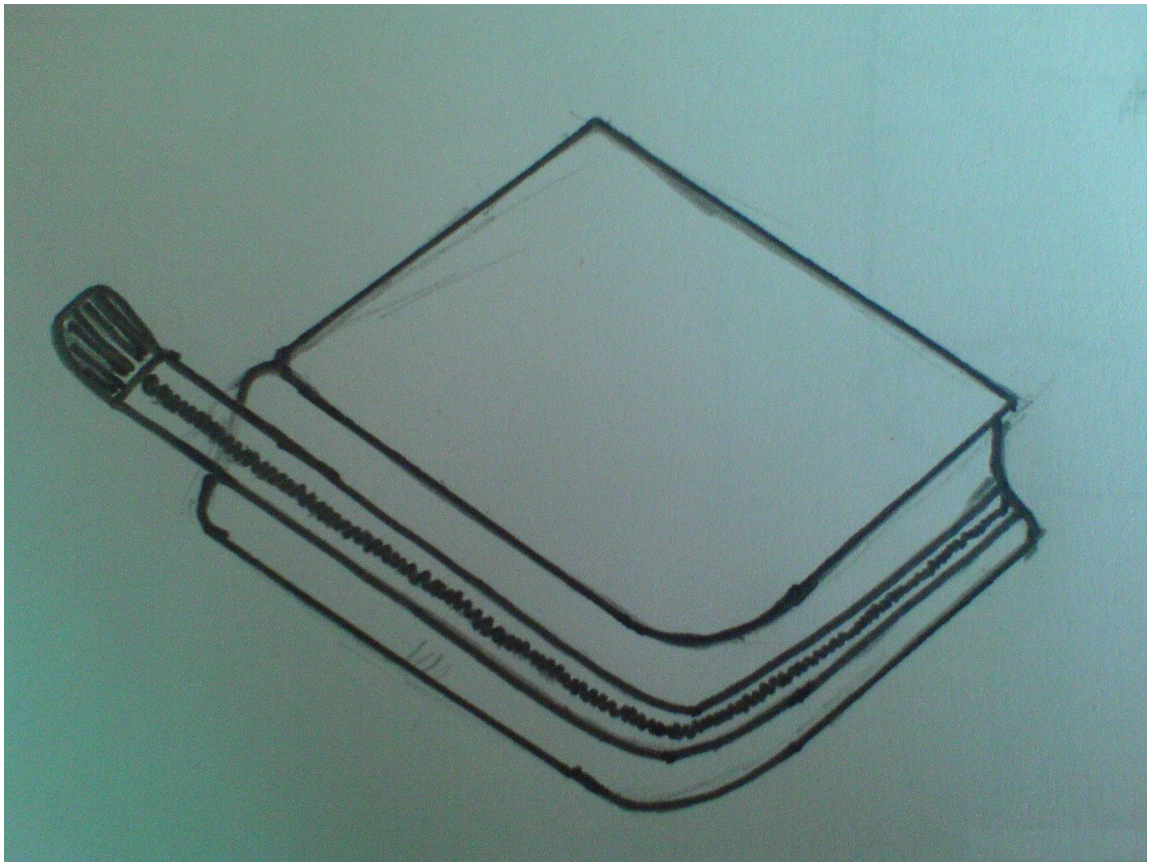
*7.2 List Of Components*

*7.3 Measurement Instructions*

*7.4 Details Of Leather Consumption*

*7.5 Making / Construction*

## *7.1 PERSPECTIVE DRAWING OF A CD BOX COVER:*



## 7.2 LIST OF COMPONENTS

**I.** ***Leather:***

| Serial no. | Component | No. of pieces |
|---|---|---|
| 1. | Outer top | 1 |
| 2. | Gusset | 2 |
| 3. | Fold part | 1 |
| 4. | ***Holding strap*** | 1 |
| 5. | ***Zipper stopper*** | 1 |

**II.** ***Lining (leather):***

| Serial no. | Component | No. of pieces |
|---|---|---|
| 1. | Inner lining | 1 |

**III.** ***Other material(foam):***

| Serial no. | Component | No. of pieces |
|---|---|---|
| 1. | Outer top | 1 |

**IV.** ***Other material(stiffener):***

| Serial no. | Component | No. of pieces |
|---|---|---|
| 1. | Outer top | 1 |

## *7.3 MEASUREMENT INSTRUCTIONS:*

**I.** ***Outer leather:***

| Serial no. | Component | Exact size In cm | Folding allowance | Extra cutting allowance | No of pieces |
|---|---|---|---|---|---|
| 01 | Outer top | 38 × 16 | _ | _ | 01 |
| 02 | ***Gusset*** | 2 × 46 | 7 mm all side | _ | 02 |
| 03 | ***Fold part*** | 2 × 102 | 7 mm one side(lengthwise) | _ | 01 |
| 04 | ***Holding strap*** | 2 × 10 | _ | _ | 01 |
| 05 | ***Zipper stopper*** | 3 × 7 | 7mm allowance, two sides (widthwise) | _ | 01 |

**II.** ***Lining (leather):***

| Serial no. | Component | Exact size | Folding allowance | Extra cutting allowance | No of pieces |
|---|---|---|---|---|---|
| 01 | Outer top | 37 × 16 | _ | _ | 01 |

**III.** ***Foam***

| Serial no. | Component | Exact size In cm | Extra cutting allowance | No of pieces |
|---|---|---|---|---|
| 01 | Outer top | 36.6 × 14.6 | _ | 01 |

**IV. *Stiffener***

| Serial no. | Component | Exact size In cm | Extra cutting allowance | No of pieces |
|---|---|---|---|---|
| 01 | Outer top | 38 × 16 | _ | 01 |

## 7.4 DETAILS OF LEATHER CONSUMPTION:

| Serial no | Component | Measurement (cm) | Quantity | Area in sq cm |
|---|---|---|---|---|
| 01 | Outer top | 38 × 16 | 1 | 608 |
| 02 | Gusset | 3.4 × 47.4 | 2 | 227.52 |
| 03 | Lining | 37 × 16 | 1 | 592 |
| 04 | Fold part | 2.7 × 102 | 1 | 275.4 |
| 04 | ***Holding strap*** | 2 × 10 | 1 | 20 |
| 05 | ***Zipper stopper*** | 3 × 8.4 | 1 | 25.4 |
| | | | Total | 1739.12 |

**Total pattern area = 1739.12 sq. cm.**

**20% estimated wastage = 347.824 sq. cm.**

**Total consumption of leather = 2086.944 sq. cm.**

**=20.86944 sq dm (1 sq dm = 100 sq cm)**

**=2.2464413 sq. ft. (1 sq ft = 9.29 sq dm)**

**= 2.3 sq ft (Approx.)**

***Total Cost of the CD Box Cover***

Style no: 001

Types of Goods: **CD box cover**

Customer: all ages

Costing for: 100 pcs

Price Validity: From 1June 07 to 8 June 07

Currency Unit: Taka

| **Material Name** | **Quantity** | **Unit** | **Rate** | **Cost (Tk)** |
|---|---|---|---|---|
| Leather: cow hide (Including 15% wastage) | 2.3 | Sq. ft | 120 | 276 |
| Needle 90/100 | 4 | Pieces | 20 | 80 |
| Thread | 250 | Meter | .5 tk per meter | 125 |
| Pattern Paper | 3 | Pieces | 15 tk per piece | 45 |
| Consumables (Adhesive for folding, Rubber solution etc) | 7 | Pot | 50tk/pot | 350 |
| Poly packing | 100 | Pieces | 1tk/piece | 100 |
| Other packing | 100 | Pieces | 5tk/piece | 500 |
| Finishing materials (wax, Lacquer etc) | 4 | Unit | 50 | 200 |
| Others | | | | 200 |
| | **Total** | | | **1,876** |
| ***Direct Expenses*** | | | | |
| **Labor** | | | | |

| | | | | |
|---|---|---|---|---|
| Cutting | | | | 300 |
| Assembling | | | | 400 |
| Stitching | | | | 600 |
| Finishing (Packing room) | | | | 400 |
| | **Total labor cost** | | | **1700** |
| **Other Expenses** | | | | |
| Dies | | | | 300 |
| Other Tools | | | | 200 |
| Miscellaneous | | | | 150 |
| Reserve | | | | 500 |
| | **Total Expenses** | | | **1150** |
| **Prime Cost (Materials + Direct expenses)** | | | | **4726** |
| | | | | |
| ***Production Over Head*** | | | | |
| Machine depreciation cost | | | | 100 |
| Samples | | | | 200 |
| Rejects & repair | | | | 500 |
| Light | | | | 100 |
| Fuel | | | | 100 |
| Power | | | | 150 |
| Cost of design | | | | 200 |
| Cost of pattern making | | | | 150 |
| **Total production O/H** | | | | **1500** |
| | | | | |
| ***Administration over head*** | | | | |
| Salaries and wastages of office staff & management | | | | 5000 |
| On cost/ social cost | | | | 1000 |
| Office costs for telephone stationary & office equipment | | | | 2000 |

| | | |
|---|---|---|
| Rent | | 5000 |
| **Total administration O/H** | | **13000** |
| ***Marketing and distribution O/H*** | | |
| Salaries & wages | | 5000 |
| Carriage | | 2000 |
| Stock holding | | 2000 |
| Travel expanses | | 2000 |
| Advertising | | 2000 |
| **Total Marketing and distribution O/H** | | **13000** |
| **Total ex-factory** | | **32,226** |
| | | |
| ***Export oriented cost*** | | |
| Pre-shipment charge<br>(survey, documentary preparation etc) | 2% | 644.52 |
| Clearing & forwarding | 2% | 644.52 |
| Customs | 15% | 4,833.9 |
| Vat | 2% | 644.52 |
| Shipment | 20% | 6,445.2 |
| | | |
| Others | 1% | 322.26 |
| **Total export oriented cost** | | **12,890.4** |
| Bank interest | 3% | **1,353.492** |
| **Profit (20%)** | | **9,293.9784** |
| Total (100 pieces) | | 23,537.8704 |
| **Selling Price per piece** | | **235.378** |

*Skiving instruction*

| Serial no | Component | Side to be skived | Width | Thickness | Type of skiving |
|---|---|---|---|---|---|
| 01 | Outer top | All sides | 7 mm | 0.5 mm | Parallel |
| 02 | Gusset | All sides | 7 mm | 0.5 mm | Parallel |
| 03 | Lining | All sides | 7 mm | 0.5 mm | Parallel |

## 7.5 MAKING / CONSTRUCTION

Cutting

Cut all components- outer leather, lining and reinforcement as per cutting patterns.
Skive as per instructions.

Assembling & stitching

***a) Joining of gusset with zipper:***

**i) By keeping the working pattern on flesh side trace the out line on all four sides.**

**ii) Apply cement to a width of 13mm of all sides.**

**iii) Apply cement at the zipper edge 7mm width.**

**iv) Now fold the gusset 7mm at one side lengthwise and fold the one edge of the gusset 7mm at width wise.**

**v) Then apply cement on the fold part of the gusset.**

**vi) Fix the gusset on the zipper.**

**vii) Apply 2mm and 5mm top stitch. Apply cement at another width wise edge of the gusset and fold it.**

***b) Preparation of Lining:***

**i) Fix the CD bags with the lining and cut a straight line on the folding**

**portion of the lining and join the folding strap by 2.5mm stitching.**

***c) Assembling of gusset with lining:***

**i) Apply cement all sides to a width of 7mm on the grain side of the lining.**

**ii) Now fix the gusset on the cementing area of the lining, and then slightly hammer.**

***d) Assembly of lining reinforcement on lining assembly:***

**i) Apply cement all sides to a width of 7mm on the flesh side of the lining.**

**ii) Apply cement all four side of the reinforcement at 7mm width.**

**iii) Fix the reinforcement on the lining assembly.**

***e) Joining of foam on the reinforcement lining assembly:***

**i) Apply cement all four sides of the reinforcement at 7 mm width.**

**ii) Cement 1cm all four sides of the foam and fix the on the reinforcement.**

***f) Outer top preparation:***

**i) Place the folding part on the outer top grain side face to face 5mm top stitch all side then turn it over.**

**ii) Apply cement on other edge of the fold part at a width of 7mm.**

***g) Assembly of outer top assembly and lining assembly:***

**i) Apply cement on the gusset 5mm at the edge.**

**ii) Then fix the outer top assembly on the lining assembly, then fold the folding part on the cementing area of the gusset slightly hammered, apply 5mm top stitch all four sides of the joining.**

***h) Runner fixing:***

**i) Fix the runner or introduce the runner in to the zipper, then fix the leather stopper at the zipper end and stitch 2.5 mm top mm all four sides.**

## *7.6 DIFFERENT VIEWS OF COMPLETE PRODUCT*

# CHAPTER

# *EIGHT*

## ***PRODUCTIVITY IMPROVEMENT***

***8.1 The Need For Productivity Improvement***
***8.2. Three Factors Of Increasing Productivity***
***8.3 Productivity Improvements Of CD Box Cover***
***8.4 Average Time For Completation***
***8.5 Conclusion***

## *8.1 The need for productivity improvement:*

**Increasingly change in politics, economy culture in other parts of the world have causes in our politics, economy and culture. Remaining a spectator to all such changes would only cause is to be left behind with regard to rest of the world. Therefore, new methods must be conceived and applied keep abreast.**

**In order to cope with the many changes, domestic and foreign and to achieve a healthy and stable economy, national effort for the improvement of productivity in all fields is essential. From this stand point, the planning of the productivity movement must be based on a deep understanding by, and support of , the people and must be evolve as a people's movement. The three guiding principles for movement are:**

a) **The principle of Maintaining and Expanding Employment.**
b) **The principle of labour – management consultation and corporation.**
c) **The principle of fair distribution.**

**And the five fundamental concepts of the productivity movement are as follows:**

a) **Seek the increased well-being of the entire society.**
b) **Attain the desired advancement with the conviction that "today is better than yesterday"**
c) **Respect human dignity**
d) **Seek material and spiritual richness simultaneously through economic prosperity**
e) **Understand the nature of continued existence of productivity, thet it will last as long as man exists**

## *8.2. THREE FACTOR OF INCREASING PRODUCTIVITY:*

**The three factors increasing productivity must be understood before any productivity improvement can be realized. I modern terminology these are labeled as hardware, human ware and software.**

a) **hardware is define as the mechanical equipment necessary for conducting business activities. If a man carries a load on his back, the maximum load is approximately 100 pounds .However, by using a hand cast the same man can now carry the same load faster and more easily. It is well known that one of the major factors of increased productivity by Japanese manufactures has been continuous heavy investment in mechanization.**
b) **Human ware is defined as the quality of workers who operate the machine. There is a substantial difference in productivity between the output of well-educated and well trained workers, and that of unskilled worker. In addition apart from the skill of the employee, such basic factors as willingness of the employee to work, Job attitude, teamwork and communication in the worksite basically affect productivity increase.**
c) **Software is defined as the management skill that aims at the most efficient combination of machines and workers, which will produce maximum results. The productivity of the same machines and the same worker will vary according to their combination and manner of operation.**

## *8.3 PRODUCTIVITY IMPROVMENTS OF CD BOX COVER.*

**# The design of waist belt has to perform according to customer's profile, that is, his or her age and socioeconomic background.**

**# The design of be age demanding and should have uniformity. It has to be adjustable with the BOX COVER. For this,**

- **Various types of fashion magazines should be read.**
- **The designer should attend various forecast and trend shows.**

**# The pattern has to cut out according to the design with accuracy.**

**# The raw materials and accessories should fulfill the following requirements as possible.**

## *8.4 AVERAGE TIME FOR COMPLETATION:*

| Serial no. | Operation description | Time suggested (Min) |
|---|---|---|
| 01 | Basic pattern making | 10 |
| 02 | Working pattern making | 05 |
| 03 | Cutting pattern making | 05 |
| 04 | Leather cutting | 05 |
| 05 | Reinforcement cutting | 05 |
| 06 | Inspection | 05 |
| 07 | Leather splitting | 05 |
| 08 | Lather skiving | 05 |
| 09 | Assembling & stitching | 20 |
| 10 | Finishing | 05 |
| 11 | Packing | 05 |

**Total time: 80 minutes or 1.33 hours.**

## *8.5 CONCLUSION.*

**Leather has played an 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.**

**In the era of globalization the usage of leather garment is surprisingly increased due to the implementation of updated fashion and manufacturing technology and thus the leather garment sector has a very good prospect. China and India provide more than 50% of leather garments through out the world. Once upon a time Korea was the first largest producer of leather garment but now it has collapsed. At present China is the first producer of leather garments.**

**Bangladesh with quality hides and skins, the basic raw materials for leather and leather products industries, lower labour cost in the world and supportive fiscal and financial facilities available can be an ideal location for competitive production of leather and leather products. Production in Bangladesh is being constrained by limited technical know-how and marketing knowledge. Foreigners with manufacturing knowledge and experience in overseas marketing can invest in leather sector or enter into technical collaboration with local entrepreneurs to take the opportunity of competitive production.**

**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 the very beginning operation of leather garments (selection of leather) to the finishing operation packing.**