

# Meticulous Overview on Apparel Marker Construction and Appliance: A Milieu of Apparel Industry in Bangladesh

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## Abstract

Marker making is one of the most important tasks in garments manufacturing industry. This study uttered about accurate marker making and the facilitation to reduce fabric wastage which ultimately reduces the cost of making the garments. The marker determines how the parts that make up an article of clothing are cut from a bolt of cloth. To improve cloth utilization, the parts for many articles of clothing are included in the same marker. This manuscript also signifies the different types of marker making method which typically used in readymade garments sector in Bangladesh. An indispensable pace in the manufacture of clothing is the generation of a cutting plan or marker. The study analyses the generation of an optimal marker arrangement which is theoretically intractable. Using a CAD system, well-trained people can engender near-optimal markers manually, but it is a difficult and time-consuming job. Study ends-up by showing the automatic generation of markers which would better enable the manufacturers to keep up with customer demands for different styles and sizes.

**Keywords:** Marker, Construction, Appliance, CAD, Thorough Method, Garment, Technology and so on.

## 1. Introduction

For industrial garments preparation, marker making is a very important section for highest usage of fabric and for lowest wastage of fabric. This is a process which is performed to draw the pattern pieces on the fabric before cutting. This may be done by drawing the pattern pieces on the fabric directly or by drawing the pattern pieces on a thin marker paper and then placement the paper onto the fabric lay. So, we can define the marker as bellow. Marker is a thin paper which contains all necessary pattern pieces for all sizes for a particular style of garments in such a way that, fabric wastage would be least. The representation or drawing of the arrangement of identified garment pattern is relevant to the cutting of a batch material. The marker is placed on the material and provides guideline for cutting. Marker may be on fabric or held in computer data files. Marker width is equal to the minimum fabric width and its length depends on the no of pattern sizes that will be drawn.

## 2. Actual Paper

### 2.1. Definition of Marker

A marker is a diagram of a precise arrangement of pattern pieces for sizes of a specific style that are to be cut from in one spread

### 2.2. Marker Making

Marker making is the process of determining a most efficient layout of pattern pieces for a style, fabric and distribution of sizes (source: Apparel Manufacturing, Glock and Kunz). Factories those don't have CAD system perform this process manually. In manual marker making to make an efficient marker one need time, skill and concentration. Now-a-day Marker making is mostly done by CAD systems which give accuracy, increase control over variables and reduces time required in making markers.

### 2.3. Marker Efficiency

Marker efficiency is defined as a ratio of area of marker used in a garment and area of total marker.

The ratio of area for pattern pieces that are placed on the marker to the total area of the marker expressed as percentage is called marker efficiency. Marker efficiency is the important part of garments manufacturing. Direct cost of garments could be utilized by marker efficiency. Salary of a marker planner truly depends upon the capability to increase the marker efficiency.

Marker efficiency is determined by fabric utilization, the percentage of the total fabric that is actually used in garment parts. The area not used in garment parts is waste. Marker efficiency depends on how tightly the pattern pieces fit together within the marker. The total surface area of the pattern pieces is compared to the total area of the marker to calculate the percentage of fabric that is used. This is determined automatically by marker-planning software. If marker-making and marker planning technology is not available, the area of each pattern piece may be determined by a perimeter – a mechanical device that calculates the surface area as the outline of the pattern is traced. Factors that affect marker efficiency are fabric characteristics, shape of the pattern pieces, and grain requirements.

**Note:** Marker efficiency and Fabric utilization is not same thing. In marker efficiency calculation fabric wastage due to end bits and end loss is not included but in fabric utilization calculation all kinds of fabric wastage are included.

## 3. Calculation for Marker Efficiency

Calculation method of marker efficiency has been explained below with formula.

### Formula#1

Marker efficiency% = (Area of marker used for garments / Area of total marker) \* 100

Area of marker used for garments: In case of CAD marker, CAD system automatically calculates total area of garment pattern pieces placed in a marker. So you get area of marker that is consumed by garments from CAD system.

Total Marker Area: To calculate total marker area simply multiply marker length by marker width.

In manual marker it is difficult to measure surface area of garments patterns in a marker. You can use a mechanical device, Panimeter, to calculate the surface area of pattern pieces from outlines of the pattern pieces.

Another method can be practiced to calculate marker efficiency when you don't have CAD system or Panimeter. Calculate ratio of weight of fabric consumed by pattern pieces and total weight fabric under total marker area. So a separate formula is used to find marker efficiency.

#### Formula#2

Marker efficiency% = (Weight of fabric consumed by patterns pieces in a marker / Total weight of fabric of under the marker area)\*100

Weight of garment parts: To calculate weight of garment parts cut one layer of fabric according to markers and weigh all garment parts that are included in a marker.

Weight of marker total area: Measure weight of fabric (one layer) of total marker area.

#### **4. Objectives of Marker Efficiency**

- Examine how fabric utilization affects marker efficiency
- Enumerate the factors affecting material utilization

#### **5. Factors of Marker Efficiency**

- Fabric Characteristics
- Characteristics of Pattern Pieces
- Grain Line Orientation
- Standards of Fabric Utilization

#### **5.1. Factors of Marker Efficiency in Detail**

##### **5.1.1. Fabric Characteristics**

Fabric characteristics that affect utilization include differences in face and back, lengthwise directionality, crosswise symmetry, need for matching the fabric design, length of design repeat, and fabric width. These fabric characteristics frequently limit the arrangement of pattern pieces. Matching fabric designs requires special marker preparation and extra piece goods. Stripe or plaid lines must be indicated on pattern pieces and markers for accurate alignment and matching to corresponding pieces. The greater the length between repeats increases the potential for fabric waste.

##### **5.1.2. Characteristics of Pattern Pieces**

Characteristics of pattern pieces may limit fabric utilization. Generally the fabric utilization percentage increases when a variety of garment sizes pieces are used in the same marker and when the marker contains both large and small pieces. Smaller pieces can often be nested with larger pieces. The shape of the pattern pieces determine close they can be fit together (interlock). Irregular shaped pieces are difficult to fit together with other pieces. Large pattern pieces are less flexible and often dictate the placement of other pieces.

##### **5.1.3. Grain Line Orientation**

Grain line markings determine the placement of the pattern relative to the warp yarns in woven's or Wales in knit fabrics. Pattern pieces with a similar grain orientation, if grouped together on the marker, generally produce better utilization. Combining several bias pieces and straight grain pieces may not fit together as well and create more fabric waste. Markers usually have good utilization when all pattern pieces are on the bias or all pieces are cut on straight grain.

The firm's standards for grain tolerance may also affect marker efficiency. Tilting specific pattern pieces 1 or 2 percent may not be noticeable, and it may increase fabric utilization noticeably. This practice can impact the fit and drape of the finished garment but it may not be noticeable to the untrained eye. Computer marker-making programs will lock in the grain orientation of each piece unless an override function is used to adjust them. This can be done on a piece-by-piece basis.

##### **5.1.4. Standards of Fabric Utilization**

Firms often establish fabric utilization standards. Firms producing basics may strive for 90 to 97 percent utilization, while fashion-firms may be able to achieve only 80 to 85 percent. It is important for firms to document material utilization and variances from the standards to monitor improvements or factors that impact the utilization. Better utilization is normally developed for basic styles because optimum fabric widths are used consistently and more time invested in cut planning and manipulating pattern pieces in the markers to reduce waste of materials. Markers for basic styles are used to cut large volumes of piece goods and may be kept on file and used repeatedly; thus, the time invested in improving utilization results in greater savings. Markers for fashion styles and Quick Response strategies may be used only once or for a limited number of spreads and few ply. Fashion garments are subject to constant changes in styling and materials and tight deadlines that limit the time available to develop efficient markers.

#### **6. Preparations of Marker Making:**

Before the marker making, some preparatory processes would be followed. The processes are discussed ago (In preparatory processes chapter). Without those, some others preparations are

- Marking Grain Line: Before marker making, the grain line of pattern and fabric must be marked.
- Fabric Measurement: Before marker planning, the fabric must be measured carefully. Because, marker width is relevant to the minimum fabric width.
- Fabric Faults: Fabric faults would be also under consideration. In a fabric roll, where any faults found, that points must be avoided for quality production and to least the fabric wastage.
- Cutting Table: Marker planner should consider the cutting table length before making marker. Marker length must

be less than the cutting table length.

## 7. Constraints of Marker Making

During marker making, the work of the marker planner is subjected to a number of constraints. These relate to:

- The nature of the fabric and the desired result in the finished garment
- The requirements of quality in cutting
- The requirements of production planning

## 8. The nature of the Fabric and the desired Result in the Finished Garment

### 8.1. Pattern Alignment in relation to the Grain of the Fabric

Pattern pieces normally carry a grain line. When pattern pieces are laid down the piece of cloth, the grain line should lie parallel to the line of the warp in a woven fabric or the Wales in a knitted fabric. Where pattern pieces are laid across the piece, the grain line should lie parallel to the weft or course direction. If the marker planner lays down a pattern outside the stated rules for grain lines, then the finished garment will not hang and drape correctly when worn. This requirement to follow the grain lines restricts the freedom of the marker planner in choosing how to lay the patterns in the marker.

### 8.2. Symmetry or Asymmetry

Many fabrics can be turned round (through 180.) and retain the same appearance are called symmetrical. They require no special attention during marker making. Asymmetrical fabrics are those which are turned (through 180.) and do not retain the same appearance. Examples of such fabrics are pile which is brushed in one direction and which show different reflection of light. The marker should be planned in such a way that it is in accordance with symmetry, asymmetry of the fabric. All pattern pieces of a garment should be along the same direction when laid down on a symmetrical fabric

### 8.3. Design Characteristics of the Finished Garments

If a vertical stripe does not show a complete mirror image repeat, the right and left sides of a garment may be mirror images of each other. In this case, a pattern should be placed on checks in such a way that the design matches when sewing up. During marker planning, a marker maker must have to think about matching the checks and stripes in a garment. His freedom is restricted here. So I think it's constraints for a marker maker.

## 9. The Requirements of Quality in Cutting

- For majority of cutting situations where a knife blade is used, the placements of the pattern pieces in the marker must give freedom of knife movement.
- A blade, which has width, cannot turn a perfect right angle in the middle of pattern piece and space must always be allowed for a knife to turn such corners.
- The amount of space depends on the actual cutting method employed.
- Pattern count check that the complete menu of pattern has been included.
- Correct labeling of cut garments parts is essential to identify correctly the garment parts for whole garment sizes. It is the responsibility of the marker planner to code every pattern pieces with its sizes as the marker is planned.

## 10. The Requirements of Production Planning

When an order placed for a quantity of garments, normally specifies a quantity of each size and colour. If the sewing room requires the cut work urgently, the marker may make two markers.

- Short marker and
- Long marker.
- For long marker, it can be made according to the size proportion and different sizes. This process is very much efficient and takes more time and increased shade variation.
- For short marker and for the particular order two marker can be made, this process is less efficient but takes less time and more production and small cutting table.
- For complex garments long markers generally offer more opportunities for savings than do short ones.
- The more sizes that included in a marker, the greater are the scope for fabric savings.
- Greater fabric savings and after lower total cost would normally result, from cutting a stepped lay with paper markers on top.
- However, though for greater efficiency, a marker maker needs opportunity to work with freedom, but for maintaining proper quality some criteria must be followed.
- That is why there are some constraints of marker making.

## 11. Objectives of Marker Planning and Marker Making

Understanding the importance of the same in apparel and garments manufacture is very important part of textile production and proper marker planning and marker making is the heart of garments manufacturing. The results of cut order planning are cutting orders that direct marker planning and lay planning. Optimum use of textile material and cutting systems are important considerations in planning cutting orders as more firms incorporate new technology. The purpose of marker planning is to determine the most efficient combination of sizes and shades for each order and to produce the best fabric yield and equipment utilization. One garments cutting order may require several markers to achieve optimum efficiency of marker. Usually one of these is a remnant marker for the short pieces and ends of rolls left over. This helps to reduce fabric waste.

Each marker requires a lay of fabric.

A marker is a diagram of a precise arrangement of pattern pieces for a specific style and the sizes to be cut from a single spread. Marker making is the process of determining the most efficient layout of pattern pieces for a specified style, fabric, and distribution of sizes. The process of arranging Pattern pieces in the most efficient manner requires time, skill, and concentration. Markers may be made by manually tracing master patterns onto fabric or paper or by manipulating and plotting computerized pattern images

## **12. Methods of Marker making**

There are two methods of marker making.

- Manual method
- Computerized method

Here marker is produced in two ways:

- Marker drawn directly on fabric lay
- Marker drawn on marker paper.

### **12.1. Marker drawn directly on Fabric Lay**

This is the oldest and mostly used method for marker making. In this processes fabric is spreaded on cutting table and setting up all pattern pieces directly on to the fabric. Marking is done by chalk, pencil or pen. In order of this method, needs more time and experience.

### **12.2. Marker drawn on Marker Paper**

In this process marker is made on marker paper. All the pattern pieces are laid on a thin marker paper and drawn it. Then the marker paper in placed on fabric lay and used for fabric cutting. Before planning the marker, fabric length and width must be taken under consideration.

#### **12.1.1. Principle of Computerized Marker Making System**

The principles of computer maker making system are given below.

- At first pattern need to make directly by CAD or Digitized System into computer.
- Then, pattern grading is essential by CAD with the help of Grade Rules.
- Then, for making maker need to fill up a sheet in the computer which contents.
  1. Marker Ratio: S: M: L: XL
  2. Marker Width
  3. 1 way or 2 way marker
  4. Pattern to pattern distance (it depends on knife thickness).
- On the computer screen, miniatures of the graded pattern are displayed graphically.
- Finally, press auto button within few seconds marker will be made automatically by computer.
- Once the marker is completed, a full scale marker is printed by " PLOTTER" on a long paper sheet.

In the modern times, various types of software are used for making a marker. Manual marker making: Manually produced markers may be created by arranging full pattern pieces on marker paper or directly on the top ply of fabric in a spread. Pattern pieces are traced using a pencil or tailor's chalk. Manual methods of marker planning and making are time-consuming and require a great deal of space. Full-size pieces must be manipulated, adjusted, and readjusted on normal fabric widths. Manually made markers are also subject to errors and inconsistencies that may occur in grain variations, poor line definition, placement and alignment of pieces, and omission of pieces. Accuracy of a manually made marker depends on the skill of the individual who laid out the marker and traced it.(Reference No:5)

### **12.2. Garments Marker Process**

Marker is a thin paper which contains all necessary pattern pieces for all sizes for a particular style of garments. It is made just before cutting and its purpose is to minimize the wastage. the width of the marker is equal to the width of the fabric and it should not be greater than the width of the fabric .i.e. fabric width is greater than or equal to marker width. The pattern pieces should be placed very carefully in such a way 5that it would minimize wastage.

The garment industry has to pay a great attention to the marker planning because when the cutting room cuts cloth it spreads around half the company turnover .any reduction in the amount of cloth used per garment leads to an increase in profit. Marker planning is a conceptualizing, open and creative process .in order to plan efficiency, it is necessary to visualize the marker as a whole or to see it at a glance.

### **12.3. Points should be considered before Marker making**

The following points to be remembered before marker making:

- Usable fabric width must be higher than marker width (at least half inch at each edge) or marker width must be less than the useable fabric width.
- Marker length must be kept less (at least one inch at each end) than the length of the spread fabric.
- Grain line i.e. when pattern pieces are placed on the marker paper .the grain or the line should be parallel to the line of the warp in a woven fabric or the Wales in a knitted fabric.
- In bias cutting, the grain lines should be at 45deg to warp or Wales.
- All the pattern pieces of a garment should lie in the same direction when laid down the asymmetrical fabric.
- Marker planner should have a clear idea on the order sheet including quality of each size and condition of the

sewing room.

- The marker planner will also have to think about the length and width of the cutting table whether the marker paper suit them or not.

#### **12.4. Points during Marker making**

- Nature of the fabric. The fabric may be either symmetric or asymmetric .thus the nature of the fabric should be considered during marker making.
- Lay planning of patterns. Improper lay of patterns may create more wastage. Thus it should be taken under consideration.
- Alignment of the patterns pieces according to the grain line.
- It is also another important factor that must be considered .the warp direction of a fabric is very much important for a garment and the grain line indicates the warp or Wales direction.
- Requirements of cutting. Before placing the pattern pieces onto the marker or during marker making the cutting allowances are considered where necessary and where not.
- It may produce more wastage and may reduce the dimensions of patterns.
- Production planning. Different types and sizes of garments manufacturing may run at a time in an industry. So during marker making it should be considered

#### **12.5. Advantages of Computerized Method & Comparing with the Manual Method**

##### **Advantages**

- More suitable for large scale production than the manual method.
- Marker efficiency is higher than manual.
- Least wastage of fabric.
- Low production cost.
- Low labor cost.
- If required, print out of the marker could be got.
- Grading of the pattern could be done automatically.
- Few time consumption.
- Marker can be prepared quickly than manual.

##### **Disadvantages**

- Initial investment is higher than manual.
- More skilled operator is needed than manual.

However, everything has its positive and negative sides. But in comparison, the advantages of computerized marker are more than the manual. It increases the efficiency, workability and production of the factory. It saves valuable time and least's fabric wastage. Thus saves money too. Moreover it attracts buyers with its modern facilities.

#### **13. End-Notes**

A marker is a diagram of a precise arrangement of pattern pieces for a specific style and the sizes to be cut from a single spread. Marker making is the process of determining the most efficient layout of pattern pieces for a specified style, fabric, and distribution of sizes. The process of arranging Pattern pieces in the most efficient manner requires time, skill, and concentration. Markers may be made by manually tracing master patterns onto fabric or paper or by manipulating and plotting computerized pattern images.

Plotting is the process of drawing or printing pattern pieces or markers on paper so they can be reviewed or cut. Computer-driven plotters may draw pattern pieces, graded nests of patterns, and/or markers with complete annotation, depending on the needs of the apparel firm. New multithread jet plotters are much faster and can print variable line density and width, text identification information, and bar codes. Some garment manufacturers have devices to copy original markers when multiple copies are needed. Plotting is often the bottleneck in the preproduction processes, especially if a firm runs a lot of copies. Many firms run their plotters 24 hours a day to keep up with demand. Firms using computerized cutters may not need paper markers to guide the cutting process and therefore may only print identification information for bundles.

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