Reduce the cost of marker making

Design

RESEARCH REPORT HOW TO INCREASE THE EFFICIENCY OF MARKER MAKING AND DECREASE THE WASTAGE OF FABRIC? TEXTILE INSTITUTE OF PAKISTAN Shakaib Iftikhar (AMM-3) Tariq Zaib(AMM-3) Arsalan Javed(AMM-3) Faiza Noor (AMM-3) TABLE OF CONTENTS ABSTRACT4 INTRODUCTION5 OBJECTIVES6 SCOPE OF THE THIS RESEARCH6 LITERATURE REVIEW7 EXPERIMENTAL METHODOLOGY10 RESULTS11 DISCUSSION OF THE RESULTS14 CONCLUSION16

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means that maker is being made efficient so that fabric wastage can be reduced as much as possible.

There are two methods of marker making, the first one is manually in which a specialized marker maker makes the makers and try to utilize all the fabric so that another piece of fabric is not required. The other method is computerized method called GerberTechnology. In it the markers are made in computers and the efficiency is set by computer to decrease the fabric wastage. Saving the fabric is crucial because is decrease the average cost so that profit maximization can occur. After conducting experiments the best method for increasing the marker efficiency is Gerber (computerized).

It makes the most efficient markers which decreases the wastage of fabric. This saves the cost and benefits the garment manufactures as they can make several pieces (patterns) out of less fabric. INTRODUCTION In recent years the number of markers required by apparel manufacturers has escalated disproportionately to growth. Orders are getting smaller, the number of different styles is increasing, and lead times are getting shorter - all of which put more pressure on the marker making department. So it is no surprise that new automated marker making tools are being launched onto the market.

Niki Tait takes a look. The improved fabric utilisation associated with computerised marker making has helped this technology virtually take over from traditional manual methods over the last 25 to 30 years. With fabric accounting for around 50 per cent of the ex-factory cost of a garment (more than 70 per cent in low cost labour countries), the 5 per cent saving associated with automated systems is key. In reality these marker making

tools are 'computer assisted' rather than 'computerised,' with the skill of piece placement still relying on the experience of the marker maker.

The computer plays a passive role, controlling the nesting constraints such as tilting, rotation and buffering while the operator makes all the decisions. An experienced marker maker will remember combinations which have worked before, he can see what part might fit into which slot, and he knows what he can tilt slightly off gain to fit. In the last few years, however, CAD companies and research organisations throughout the world have been working to develop systems to produce markers fully automatically.

It's an extremely complex process given all the possible combinations of pattern part placements within a lay, and one that only becomes worthwhile if the material utilisation matches that produced by a skilled marker maker using conventional computer systems. It is only now becoming a viable option as the costs of high speed processing power and memory come down and software developments catch up. But for manufacturers the timing is a happy one as the number of markers - and cost of making them - has escalated disproportionately to growth.

Orders are getting smaller, the number of different styles is increasing, and lead times are getting shorter - all of which put more pressure on the marker making department. With automatic marker making a series of parameters can be set. These include: produce the best possible solution in 30 minutes; try different combinations until a minimum of 91 per cent fabric utilisation is achieved; find the best combination within 500 tries etc. The system can be left to work through a batch of instructions unattended both day and night, so time constraints become less of an issue.

With most automated systems, however, there is also the ability to combine human intervention within the automated process. Most CAD companies agree this provides for the best solution, particularly where the marker is going to be used for many repeats, on deep, long lays or where expensive fabrics are going to be cut. OBJECTIVES This research has several objectives which are beneficiary for number of reasons. The first objective of this research is to increase the production per hour by increasing the efficiency. Efficiency is directly related to production because if the marker is efficient, it can be easily layed out on he large bundles of fabric. Another objective is to increase the efficiency of the garment, when the marker made is good, the efficiency will increase and overall quality of the garment will be improved. It will also decrease the waste produced by the cutting department since with marker making technology, fabric will be properly utilized. One more major objective is to meet the international quality standards like for example ISO and etc. The objective goal of 83% percent efficiency which is the best in industries currently has to be met.

This efficiency had to be tested on manual and computerized in order to find which gives the more efficiency and saves the fabric. SCOPE OF THE THIS RESEARCH One of the benefits of finding the efficiency was that the apparel industries require less labour to produce the garmants. The turnaround time of maker making is faster if done all at one time and pricewise, it will cost lessmoneyto manufacture a garment in apparel industries just by paying a flat rate for the whole process versus paying regular prize for each individual job.

The markers can be fully customized to fit any costumer’s designing needs and are offered to apparel companies, Professional business people, Artists, People with new design inventions, young designers trying to launch for the first time a collection and people in general who want to create a small clothing line to sell their designs on an online website store. Turn around time for most jobs done through marker making is faster than making each individual pattern made separately.

An efficient marker coordinates and organizes all the work flow to be done for the costumer and spends a great deal of time explaining each little detail of the design process to its design team who will be in charge and responsible for the completion of a given project. Pricewise, making a garment through 83 percent efficient computerized marker will cost a lot less money versus paying five to ten thousand rupees for the making each single pattern by hand. This amount of money is often spend by manufacturing companies who have the obligation of aying all the salaries of their design team which can add up to thousands of rupees every week not forgetting the fact that paying regular prize for each individual pattern will always be more expensive than paying a flat rate for all the work to be done. In addition an efficient maker has many advantages, one of them is the ability to create many pattern and lay them on several fabrics in one location. This requires less space and the company can save its lot of space. Turnaround time for all pattern to be made are faster if done all at one time. LITERATURE REVIEW

For industrial garments preparation, marker making is a very important chapter 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 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. 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. Constraints of Marker Making During marker making, the work of the marker planner is subjected to a number of constraints. These relate to i. The nature of the

fabric and the desired result in the finished garment. ii. The requirements of quality in cutting. iii. The requirements of production planning. The nature of the fabric and the desired result in the finished garment * 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. * 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. * 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 a constraints for a marker maker. 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 theresponsibilityof the marker planner to code every pattern pieces with its sizes as the marker is planned. 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. 1. Short marker and 2. 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. Methods of Marker Making There are two methods of marker making. i. Manual method. ii. Computerized method.

Here marker is produced in two ways. 1. Marker drawn directly on fabric lay. 2. Marker drawn on marker paper. EXPERIMENTAL METHODOLOGY In order to find out which method gives near 83 % efficiency, the data collected was analyzed by the means of statisticalmathematics. 5 samples had to be selected from each; 1. Manual Marker Making 2. Computerized Marker Making The computerized Marker making will be further tested using 7 different computerized machines for making markers. In total there were 5 samples from manual and 35 samples from Computerized Marker Making which means that there were total 40 samples of markers. 75 yards of fabric was used to lay markers on them. Each technique and machine was given 175 yards of fabric and the total fabric utilized was 7000 yards. The experiment was done 200 times in order to get 5 samples from each technique and method. In order to find out the efficiency, there is a formula which calculates it. The formula is Area of the patterns X 100 Area of the marker Out of 200 samples 40 samples were selected through simple random selection. 5 samples were selected from manual marker and 35 samples were selected from computerized marker making.

After sampling the results were put in the table and the mean of efficiency was calculated for the left out samples in order to find out how much

efficiency at max could be given. RESULTS The 5 selected samples from each method and technique were taken out and their efficiency was calculated. After getting their efficiency they were put in the table to find out the mean efficiency produced by them. MANUAL MARKER MAKING Sample 1 | Sample 2| Sample 3| Sample 4| Sample 5| 76. 56% | 78. 34%| 67. 66%| 61. 2%| 67. 3%| Mean efficiency of manual marker making= 70. 2 % Efficiency from manual marker making can be of maximum 70. % but the required efficiency is 83% which makes the saves the fabric most. COMPUTERIZED MARKER MAKING LECTRA Sample 1| Sample 2| Sample 3| Sample 4 | Sample 5 | 81| 80| 79. 9| 79. 7| 81. 3| Mean efficiency from Lectra = 80. 38% Efficiency from Lectra marker making can be of maximum 80. 38 % but the required efficiency is 83% which makes the saves the fabric most. COMPUTERIZED MARKER MAKING NESTER Sample 1| Sample 2 | Sample 3 | Sample 4| Sample 5| 78. 9 | 77. 7| 81. 2| 81. 3| 80. 18| Mean efficiency from Nester = 79. 85% Efficiency from Nester marker making can be of maximum 79. 5 % but the required efficiency is 83% which makes the saves the fabric most. COMPUTERIZED MARKER MAKING GERBER Sample 1| Sample 2| Sample 3 | Sample 4 | Sample 5| 85| 86| 82. 3| 83. 3| 83| Mean efficiency from Gerber = 83. 92% Efficiency from Gerber marker making can be of maximum 83. 92 % and the required efficiency is 83% which saves the fabric most and it means that Gerber met the required efficiency percentage. Sample 1| Sample 2| Sample 3 | Sample 4 | Sample 5| 82| 82. 2| 81. 37| 82. 67| 82. 73| COMPUTERIZED MARKER MAKING AUTOMATIC NESTER Mean efficiency from Automatic Nester = 82. 1%

Efficiency from Automatic Nester marker making can be of maximum 82. 1 % and the required efficiency is 83% which saves the fabric most. COMPUTERIZED MARKER MAKING ASSYST BULLER Sample 1| Sample 2| Sample 3 | Sample 4 | Sample 5| 81| 79. 8| 81. 8| 81| 80| Mean efficiency from Assyst Bullmer= 80. 72% Efficiency from Assyst Bullmer marker making can be of maximum 80. 72 % and the required efficiency is 83% which saves the fabric most. Sample 1| Sample 2| Sample 3 | Sample 4 | Sample 5| 82. 33| 82. 23| 81. 36| 82. 90| 82. 88| COMPUTERIZED MARKER MAKING TUKATECH Mean efficiency from Tukatech = 82. 34%

Efficiency from Tukatech marker making can be of maximum 82. 34 % and the required efficiency is 83% which saves the fabric most. DISCUSSION OF THE RESULTS Lectra Because material savings are a fundamental factor for every apparel firm, Lectra has spent the last 25 years developing solutions that apply state-of-the-art technology for material optimisation. Diamino V4 is its latest computer assisted version which, when combined with Expert V4, provides an automatic marker-making tool that can handle all kinds of fabrics and generate entire markers or complete partially operator-processed markers.

Lectra says its " intelligent software" takes into account the specific requirements of different garments, fabrics and pattern pieces. Gerber Technology Maximizing fabric utilisation is not the only consideration of marker making: the time it takes is increasingly important too. Gerber Technology has modified its AccuMark and Micromark software to allow parts to be rotated according to specified laying and style rules. The grain line

deviation can also be defined. For the actual automation of the marker production its software has been integrated with Nester Server. Nester

Nester is available in two versions: NesterServer as an upgrade to CAD systems from Gerber, Assyst, Asahi, Toray, PAD and VetiGraph; and the Nester complete nesting system. This software tool automatically generates cost-effective markers for production, costing and engineering. It also combines automatic and semi-automatic options. The company claims Nester's return on investment is realised in under six months. Fabric savings with automatic nesting Nester Inc offers this real-life example of a sportswear manufacturer cutting $30 million of fabric annually. Four production markers were given to Nester to process automatically.

On average, Nester generated layouts that were superior to CAD-based manual results by 1. 05 per cent. The average length used in the four markers was 714. 21 cm with Nester and 721. 85 cm with traditional CAD-based manual nesting. On average, NESTER outperformed a CAD operator by 7. 64 cm, or 1. 05 per cent. If this saving were extended over the entire marker population in this factory, 1. 05 per cent fabric savings would equate to $315, 000 per annum. Pad Systems Although Pad Systems' software integrates with Nester, it also has its own automatic marker making system.

Within this, individual pattern pieces are directly related to the base pattern piece, so any changes to the pattern are automatically reflected in the marker. This feature is important in a fast changing fashion industry where patterns may be modified several times throughout the development of a style. New markers are based on a similar, though previously manually made, marker of a comparable style and material. Thus Pad's automatic

marker combines the original manual skill of the marker maker with the processing speed of the computer.

This combination, the company explains, results in similar fabric utilisation but the new marker is achieved in a fraction of the time. Assyst Bullmer Assyst Bullmer no longer supplies automatic marker making software to its customers, explaining that automarker. com uses the most up-to-date software, is maintenance-free, and is available 24/7. On their own CAD systems customers define the width of marker, the sizes to plan and constraints such as whether rotation or twisting off grain is allowed. This is then sent to the website and the results download by the factory or sub contractor.

Users include manufacturers in Eastern Europe where the comparable cost of manual lay planning on a CAD system would be low. Tukatech Tukatech's automatic marker making facility is called Nest ++ and is of particular use in helping cater for overload or rush orders, for large ratio markers and to estimate the best efficiencies on many fabric widths during pre-production. Efficiencies are said to be comparable to manually placing pieces in the CAD system (approximately 1 to 3 per cent difference). Users can start a marker with manual placement and Nest++ will finish the job automatically.

Benefits are said to include increases in material efficiency with subsequent decreases in material waste, time and labour savings in making markers; improvements in overall marker quality; tighter markers; avoidance of backlogs during peak periods; and fast, precise cost proposals for clients. FINDINGS After experimentation the GERBER machine, is the best in reducing waste and giving the more efficiency. It is better to install Gerber

rather than installing any other experimented CAD machine. Manual should be eliminated as the system is very faulty and old. CONCLUSION

In manual system the system is used to make maker for garment making is traditional. But in CAD system marker making is done in modern system. Marker efficiencies are not visible in manual system. Other hand, marker efficiency is visible in CAD system. Marker length is not visible in manual system while Marker length is visible in monitor screen at CAD system. In manual, once marker is made, it is not possible to increase its efficiency. But in CAD it is possible to increase the efficiency at any time possible which means that fabric can be saved. In manual if the marker is layed, nothing can be done about it.

Marker copying is not possible manually, so it is very time consuming to trace each and every other marker out there. In CAD, by using Plotter as much as possible copy can be done. Manual marker making is very time consuming method whereas, CAD is a faster method. In manual system quality cannot be assured, sometimes markers can be good other times really faulty but in CAD, it has quality assurance. Even though manual system costing is low, CAD is expensive but the labour cost reduced saves cost in the long terms and since markers can be utilized again and again there is no special need of hiring a professional marker maker to make the atterns and lay them on fabrics. Out of all the CAD system Gerber turned out to be the best since it has an automatic efficiency calculator and it evens shows and tells that this much amount of fabric would be wasted if the efficiency percentage is low. Therefore, apparel industries are recommended to use Gerber as their primary source for making Patterns and makers.

APPENDIXES 1. Marker Making Marker is a part of a paper on which the patterns of all parts of the garments are drawn so that garments can be made by usingminimum quantity of fabric. 2. Marker Efficiency

The efficiency of marker making means that how efficient it is in saving the fabric. 3. Computerized Marker Making Markers which are made through the means of Computer 4. Manual Marker Making Markers which are prepared manually by a trained professional 5. Laying The putting of patterns/makers on the bundles of fabric. 6. Plotter This is in computerized maker making. In plotter line diagrams of patterns or makers are drawn. REFERENCES 1. Garment Construction Skills (Premlata Mullick) 2. Apparel Manufacturing (Sewn Product Analysis) 3. Patternmaking for Gerber Technology (Helen Joseph-armstrong) 4. www. scribd. com/doc/61990320/Marker-Making