CHAPTER 6

6. CONCLUSION

When considering the high fabric utilization through cutting room management, the proper and good management of the cutting room which is a definite requirement, should be dealt with its' external and internal processes. To have a proper management system at cutting room, the manager should have an idea of their buyers and their basic requirements not only the pattern but also trend flows / seasonal changes, to stay as a sustainable sourcing entity. Otherwise the required proper plan cannot be worked out. If the plan and organizing is out, no high fabric utilization would be achieved any more. Also a thorough knowledge on pattern and design would give better results on fabric savings as shown in the example 2 and 4 in chapter 4.1.

Basically, the fabric utilization addresses as follows,

$$\text{Fabric utilization (FU)} = \frac{\text{Fabric re-shipped}}{\text{Fabric received}} \times 100\% \quad \rightarrow (1)$$

$$\text{Fabric re-shipped (FRS)} \propto \text{Cutting room management (CRM)}$$

Where this CRM (cutting room management) is an index which varies between 0 to 100, assuming 100 is a perfect management.

$$\text{FRS} = k_1 \times \text{CRM} / 100 \quad \rightarrow (2)$$

Where k_1 is a variable depends on other factors which related to fabric utilization.

Fabric plays the main role when utilizing it highly. Therefore the supplier specification on fabric greatly help the cutting room to plan day today operations. For an example the necessary supplier specification on fabric, gives an idea how to prepare the cut order plan effectively. Supplier specification specifies the nature of the fabric, amount dispatched by supplier, fault rate, shrinkage percentage, GSM etc. which are useful to segregate the fabric received. This segregation helps to achieve high fabric utilization. (see chapter 4.23). Especially, supplier specification helps to forecast possible cut quantity, possible defects, possible remnant sizes and to avoid wastages.

The GSM is one of the key information in supplier specification. But the GSM does not make a significant barrier for high fabric utilization. The effect of GSM

is clearly showed by the author in chapter 4.3, how it helps to achieve high fabric utilization. It is also showed that the GSM sometimes reacts as a barrier to high fabric utilization. If the GSM is higher, then the number of plies can be laid is lesser. Thereby the cut out put per hour or per day becomes lower. It creates problems (heavy work load) in cutting room operations, which then will be an indirect barrier to achieve high fabric utilization. Thereby the cutting room capacity has to be expanded if there are much orders with high GSM.

The length of a roll plays a vital role in high fabric utilization. A great advantage is gained, if fabric is ordered in to exact lengths, which gives remnants as zero or plan according to the lay length by minimizing the remnants. Table 4.28 shows how to minimize the remnants. The length and the weight of a fabric roll will also create an additional cost. Shortages and large remnant pieces are also barriers to achieve high fabric utilization.

Width of a fabric roll also plays a vital role in marker efficiencies, ultimately the high fabric utilization. Thereby an optimum width must be identified and ordered to get high fabric utilization at the fabric ordering / purchasing stage. In the tables 4.2, 4.3, 4.4, 4.5 and 4.6, show an optimum width an economical width. If this situation is identified earlier, then the optimum fabric width can be decided to order fabric by concerning the other factors as well.

Even though fabric is ordered for a specific width , the received width may differ, and these may have several widths. Therefore the cutting process must be carried out by segregating widths in to fare quantities as shown in example 1 in chapter 4.5, without drawing markers for each and every width.

Another main barrier to gain high fabric utilization is the inconsistent width. The chapter 4.4 shows how to react with inconsistent width. However it creates an additional cost and a waste.

The shrinkage also plays a vita role in high fabric utilization. It is a must to test the shrinkage percentage in each and every fabric roll. It is better to test in three places if the shrinkage varies within the roll. Patterns must be drawn based on those results. If there are several types of shrinkage percentages, the best method using in the industry is to segregate fabric rolls with a smaller tolerance.

The biggest support in high fabric utilization is given by the marker making process. The marker makers should be capable enough to select the appropriate and best marker for a particular pattern and particular type of fabric. Also they must do the costing and fabric ordering accurately as much as possible. It is they who decide the fabric width, that must be purchased which is then sent for cutting. Some examples are shown in chapter 4.17 and 4.18. Higher the marker

efficiency, lower will be the fabric fall out. The high marker efficiency is one of the main routes where high fabric utilization can be gained. Tightening the cost markers might be a difficult target to achieve, however maximize fabric utilization must be the end result.

Fabric re-shipped (FRS) α Marker efficiency (ME)

Where

Marker Efficiency (ME) α Width of the fabric roll (W)
Marker Efficiency (ME) α Shrinkage percentage of fabric roll (S)
Marker Efficiency (ME) α Efficiency of marker maker (EM)

Therefore,

Marker Efficiency (ME) = $k_2W \times k_3S \times EM$ → (3)

Where k_2 is a variable (per 1 cm) depends on the fabric width and other factors, k_3 is a variable depends on the fabric shrinkage.

$$FRS = k_4 \times (k_2W \times k_3S \times EM) \quad \rightarrow (4)$$

Where k_4 is a variable depends on the fabric type.

Another highly concerned key point in high fabric utilization is the fabric faults. An additional manpower and time are required to avoid and replace the fabric defects. Totally fabric faults make big losses to the cutting room, even though it passed through any inspection criteria. This dissertation shows that how a high fault rate fabric can be used to get high fabric utilization with an additional cost. There are several possible ways to get used all defect panels, some ways are shown in figures 4.6 and 4.7. However better dealing with high fault rate fabric shows the better cutting room management.

Fabric re-shipped (FRS) α Fabric fault rate (FF)

$$FRS = k_5 \times FF \quad \rightarrow (5)$$

Where k_5 is a variable depends on fabric type and the pattern.

Finding the best method to overcome fabric faults including shrinkage, shortage, narrow width, etc and achieving the required target can be done by pattern engineering. However the pattern engineering helps greatly to increase the fabric utilization, by avoiding lot of barriers as stated above. Any way, to achieve the high fabric utilization through better pattern engineering is also a difficult task to work with other limited resources such as available space, available

manpower, available time and other available resources. Some of the results are shown in tables 4.12, 4.13, 4.14, 4.15, 4.16 and 4.17 in chapter 4.16.

According to the tables 4.12 and 4.13 some of engineered markers, especially, corners rounding, reducing seam allowance, etc show lower efficiencies than the original efficiencies. It can be happened if the off area by panels is greater than the reduced area of marker. It proves by the equation derived in chapter 4.16.

But certain decisions taken in pattern engineering when achieving high fabric utilization may sometimes become a loss, because that the pattern goes out of size or will delay the whole process due to the delay of marker making. Such errors may lead to RTM (return back to manufacturer) or a shipment cancellation or a short shipment or a delay shipment or an additional costs like air freight cost or a ratio out shipments or a high rejection at work-in-progress or even loss of goodwill. Therefore the best method must be evaluated to follow rather than trying to get high fabric utilization at all the time.

Normally the behavior of fabric does not support the higher marker efficiency, as fabric has lot of uncertainties. To overcome these fabric faults and unexpected features the spreading and cutting methods must be improved properly using new techniques. While considering fabric and its' features, they are varied from fabric to fabric, batch to batch, roll to roll. Therefore the styles are varying drastically. Thereby the pattern making methods, marker making methods, spreading methods, cutting methods etc are varying from style to style and fabric to fabric.

The spreading and cutting methods also influence significantly to high fabric utilization. Even though it is cut with higher fabric utilization, the wastages in work-in-progress at the sewing room or at finishing leads to a loss, thereby the effort taken to achieve the high fabric utilization in the cutting room may become useless. Effective bundling, numbering, fusing and panel inspection lead to avoid the above losses at the value addition process.

Achieving high fabric utilization is a profit to a garment sector. Even though, higher fabric utilization is achieved, the end result might be a loss. This can be happened because of useless, unplanned and uncontrolled resource utilization. For example, if high amount of other resources were spent other than fabric to get high fabric utilization it might be a loss. Therefore even the fabric plays a big roll in the process of value addition; it may be in vein if an error occurred at any step in the cutting room.

The customer requirements on product, ethical and environmental rues and regulations should not be violated by any means, because that is the main bond of

customer service. The customer requirements differ from customer to customer, country to country, style to style, fabric to fabric, etc. Sometimes the customer requirements do not help in high fabric utilization. However it is useless to achieve high fabric utilization without attending properly to customer requirements.

Also this dissertation shows that the cutting room management has a great opportunity to mix, control and get the maximum utilization of all available resources. The possible advantages that can be gained are buyer's satisfaction, better Customer – Buyer relationship, profit at manufacturer's end, profit at Buyers end, competitive advantages, etc.

$$\text{Fabric utilization (FU)} = \frac{\text{Fabric re-shipped}}{\text{Fabric received}} \times 100\% \rightarrow (1)$$

$$FRS = k_1 \times CRM / 100 \rightarrow (2)$$

$$ME = k_2W \times k_3S \times EM \rightarrow (3)$$

$$FRS = k_4 \times (k_2W \times k_3S \times EM) \rightarrow (4)$$

$$FRS = k_5 \times FF \rightarrow (5)$$

So the Fabric re-shipped can be derived as, (from equations (2), (3), (4) and (5))

$$FRS = k_5 \times FF \times k_4 \times (k_2W \times k_3S \times EM) \times k_1 \times CRM \ / 100$$

$$= k_1 \times k_2 \times k_3 \times k_4 \times k_5 \times FF \times W \times S \times EM \times CRM \ / 100$$

$$= k \times FF \times W \times S \times EM \times CRM \ / 100$$

Where $k = k_1 \times k_2 \times k_3 \times k_4 \times k_5$

From the equation (1)

$$\text{Fabric utilization (FU)} = \frac{k \times FF \times W \times S \times EM \times CRM}{\text{Fabric received}} \%$$

Thereby, CRM is the most deciding factor for high fabric utilization, as others are common for most of the factories.