International Journal of Innovative Research and Reviews, 3(1) 21-24

International Journal of Innovative Research and Reviews
ISSN: 2636-8919
Website: www.injirr.com
doi:
Research paper, Short communication, Review, Technical paper

RESEARCH ARTICLE

Investigation of Capacity Utilization Rates of Cutting Room Departments of Apparel Companies

Mahmut KAYAR[1,*]

[1] *Marmara University, Faculty of Technology, Department of Textile Engineering, Istanbul – Turkey*

* *Corresponding author E-mail: mkayar@marmara.edu.tr*

HIGHLIGHTS

> This study provides information about the importance of the capacity utilization rate of companies.
> In this study, a survey was conducted to apparel companies for investigating the capacity utilization rates of cutting room departments of apparel companies and the data obtained were evaluated. Research results have shown that the companies have 4 different problems on low capacity utilization rate.

ARTICLE INFO

Received : 05.14.2019
Accepted : 06.24.2019
Published : 07.15.2019

Keywords:
Apparel
Cutting
Capacity
Capacity utilization rate
Survey method

ABSTRACT

The cutting process is one of the most important steps for apparel production and it creates the actual production stages with the sewing process. Because of this importance, the capacity utilisation rate of cutting room department affects the whole production. In this study, a survey was conducted to apparel companies for investigating the capacity utilization rates and problems on the low capacity utilization rate of cutting room departments of apparel companies and the data obtained were evaluated. Research results have shown that the capacity utilization rate of the companies varies between 75-100% and the companies have 4 different problems on low capacity utilization rate.

Contents

1. Introduction

When apparel production is investigated, the actual process occurs two steps which respectively are cutting and sewing. For this reason, cutting efficiency directly affects sewing efficiency. Another expression of that; the decrease in the capacity utilization rate of the cutting department will directly affect the number of products to be sewed, which will reduce the sewing capacity [1].

Cutting in general; a process of splitting a physical object or a portion of a physical object into two or more parts by the application of a sharply oriented force. Cutting in the apparel industry; it is the separation of textile surfaces (fabric, linen etc.) by using cutting patterns to form all the pieces of a garment [2].

Cite this article Kayar M. Investigation of Capacity Utilization Rates of Cutting Room Departments of Apparel Companies. *International Journal of Innovative Research and Reviews (INJIRR)* (2019) 3(1):21-24
Link to this article: http://www.injirr.com/article/view/28

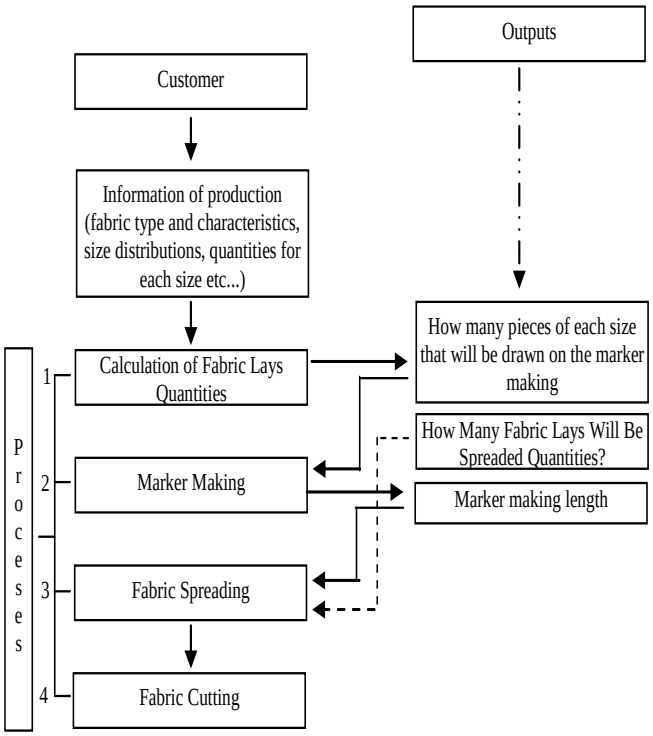

Figure 1 Operations of the Fabric-Cutting Department [3].

Figure 1 shows the workflow of the cutting room in apparel companies. The first step is called “calculation of fabric lay quantities”. This calculation provides two important answers respectively, one of them is how many pieces of each size that will be drawn on the marker making and the other one is how many fabric lays will be spread. This information is used for the next processes as data.

The second step is called as marker making. The marker making is the graphic which is laid out on the top of the spread out the fabric, and which shows the optimum cutting of the fabric. The first answer of “calculation of fabric lay quantities” is used for this step. Marker making provides marker making length and this information is used for fabric spreading with the second answer of “calculation of fabric lay quantities”.

The third step is called as fabric spreading and the fabrics are spread on the cutting table by hands or spreading machines.

The last step is fabric cutting and the fabrics are cut by the cutting machines [4].

Capacity is the level of the production system’s production [5].

In a general mean, capacity is the maximum production amount in a specific time [6].

Capacity utilization rate is, actual capacity’s rate to normal capacity, and it’s indicated by the following formula [7].

$$\text{Capacity Utilization Rate} = \frac{\text{Actual Capacity}}{\text{Normal Capacity}} \quad (1)$$

2. Material and Method

In this research, a survey is conducted to apparel companies which are operated in Istanbul area and the survey results analyzed and evaluated with SPSS program.

In the scope of the research, 20 apparel companies were asked open-end questions about the capacity utilization rate and problems on the low capacity utilization rate.

3. Results and Discussion

In the scope of the research, the frequency tables (Table 1-Table 7) of the answers given by the apparel companies in response to the survey questions which applied to apparel companies are given below.

Table 1 The frequency table of the question "What is the daily cutting capacity of the cutting department?"

Daily cutting capacity	Frequency	Percent	Valid Percent
4000 – 10.500	8	40	40
10.600 – 17.100	6	30	30
17.200 – 23.700	4	20	20
23.800 – 30.300	1	5	5
30.400 – 37.000	1	5	5
Total	20	100	100
Missing System	0	0	
Total	20	100	

20 of the companies which participated in the study answered that question. Considering the answers to that question; according to the 8 companies constituting 40% of the companies had 4000-10.500 pieces/day, according to the 6 companies constituting 30% of the companies had 10.600 -17.100 pieces/day, according to the 4 companies constituting 20% of the companies had 17.200 -23.700 pieces/day, according to the 1 company constituting 5% of the companies had 23.800 -30.300 pieces/day, according to the 1 company constituting 5% of the companies had 30.400 -37.00 pieces/day capacity.

Table 2 The frequency table of the question “Is the capacity utilization rate of the cutting department calculated in your company?"

Is the capacity utilization rate calculated?	Frequency	Percent	Valid Percent
Yes	19	95	95
No	1	5	5
Total	20	100	100
Missing System	0	0	
Total	20	100	

20 of the companies which participated in the study answered that question. 19 of the companies stated that they calculated the capacity utilization rate.

Table 3 The frequency table of the question "What is the capacity utilization rate of your cutting department in your company?"

Capacity utilization rate (%)	Frequency	Percent	Valid Percent
75,0 – 79,9	1	5	5
80,0 – 84,9	2	10	10
85,0 – 89,9	4	20	20
90,0 – 94,9	5	25	25
95,0 - 100	8	40	40
Total	20	100	100
Missing System	0	0	
Total	20	100	

20 of the companies which participated in the study answered that question. Considering the answers to that question; according to the 8 companies constituting 40% of the companies had 95 – 100%, according to the 5 companies constituting 25% of the companies had 90 – 94.9, according to the 4 companies constituting 20% of the companies had 85 – 89.9, according to the 2 companies constituting 10% of the companies had 80 – 84.9, according to the 1 company constituting 5% of the companies had 75 – 79.9 capacity utilization rate.

Table 4 The frequency table of the question "What are the causes of capacity utilization rate below 100% in your cutting department? – (Fabric defects)"

Reasons for low capacity utilization rate (Fabric defects)	Frequency	Percent	Valid Percent
Yes	13	65	72.2
No	5	25	27.8
Total	18	90	100
Missing System	2	10	
Total	20	100	

18 of the companies which participated in the study answered that question and 13 of them stated that they had a problem with fabric defects on low capacity utilization rate.

Table 5 The frequency table of the question "What are the causes of capacity utilization rate below 100% in your cutting department? – (Fabric delay)"

Reasons for low capacity utilization rate (Fabric delay)	Frequency	Percent	Valid Percent
Yes	7	35	35
No	13	65	65
Total	20	100	100
Missing System	0	0	
Total	20	100	

20 of the companies which participated in the study answered that question and 7 of them stated that they had a problem with fabric delay on low capacity utilization rate.

Table 6 The frequency table of the question "What are the causes of capacity utilization rate below 100% in your cutting department? – (Lack of operators)"

Reasons for low capacity utilization rate (Lack of operators)	Frequency	Percent	Valid Percent
Yes	6	30	30
No	14	70	70
Total	20	100	100
Missing System	0	0	
Total	20	100	

20 of the companies which participated in the study answered that question and 6 of them stated that they had a problem with lack of operator on low capacity utilization rate.

Table 7 The frequency table of the question "What are the causes of capacity utilization rate below 100% in your cutting department? – (Pattern approve delay)"

Reasons for low capacity utilization rate (Pattern approve delay)	Frequency	Percent	Valid Percent
Yes	7	35	35
No	13	65	65
Total	20	100	100
Missing System	0	0	
Total	20	100	

20 of the companies which participated in the study answered that question and 7 of them stated that they had a problem with pattern approve delay on low capacity utilization rate.

4. Conclusions

The answers given by the companies within the scope of the study revealed these results;

1. The daily cutting capacity of the companies varies between 4000 and 37000 pieces.
2. 95% of companies calculate the capacity utilization rate.
3. The capacity utilization rate of the companies varies between 75 – 100%.
4. The companies have 4 different problems on low capacity utilization rate.

4.1. Suggestions

According to the answers given by the companies within the scope of the study, it is seen that the most important of these problems are fabric defects. Fabric defect is followed by fabric delay, pattern approval delay and lack of operator.

Fabric is the main raw material of apparel enterprises. Therefore, all the problems related to the fabric negatively affect all production steps. As a result, production is made under actual capacity and capacity utilization rate decreases. Therefore, garment enterprises should be very careful about the quality and deadline performance of suppliers when selecting fabric suppliers.

In addition, problems related to the operators that determine the capacity together with the machine also affect negatively capacity utilization rate. Therefore, companies should make

the necessary arrangements regarding the current personnel and provide necessary working conditions and facilities to their operators.

Pattern approval is required for fabric cutting, and the delay in this issue leads to a reduction in capacity utilization rate. Therefore, it is important that the pattern-house has to do the work early related to the pattern with better planning and it is very important not to cause delays.

Acknowledgments

This paper has previously been presented in 2nd International Congress on Engineering and Architecture (ENAR) held in Marmaris / TURKEY on 22-24 April 2019.

References

[1] Özel Y, Kayar M. An application of neural network solution in the apparel industry for cutting time forecasting. In: *Proceedings of International Conference on Simulation, Modelling and Optimization*. Santander (2008). p. 214–218.

[2] Kayar M, Özel Y. Using Neural Network Method to Solve Marker Making "Calculation of Fabric Lays Quantities" Efficiency for Optimum Result in the Apparel Industry: Simulation, Modelling and Optimization. In: *Proceedings of International Conference on Simulation, Modelling and Optimization*. Santander (2008). p. 219–223.

[3] Kayar M, Dal V, Mıstık Sİ. Investigating the Effect of the Marker Assortment Size Distribution and Fabric Width on the Fabric Use Efficiency. *Industria Textila* (2015) **66**:142–145.

[4] Kayar M. *Production and Productivity: Basic Principles and Applications*. Bursa, Turkey: Ekin Press (2012).

[5] Acar N. *Üretim Planlaması Yöntem ve Uygulamaları*. Ankara: Milli Prodüktivite Merkezi (1989).

[6] Kobu B. *Üretim Yönetimi*. İstanbul: Beta (2006).

[7] Kayar M. An Investigation of the Relation Between Using Outsourcing and Capacity Utilisation Rate for Apparel Companies. In: *International Symposium on Engineering and Architectural Sciences of Balkan, Caucasus and Turkic Republics*. Isparta, Turkey (2009). p. 214–220.