

An Investigation of Strategies to Improve Organizational Performance – A Case Study from Apparel Industry in Sri Lanka

Rajapaksha AM¹
Wattegama WGEJ²

ABSTRACT

The main goal of any organization is to maximize profits through improving organizational performance. When the Sri Lankan economy is considered, 71% of the total exports are represented by the apparel industry which is 7% of the total GDP of the country. Therefore, the apparel industry is one of the most important industries for the Sri Lankan economy. But with the global competition, the innovations and use of latest technologies are very important for these domestic organizations in order to survive in the market. As a result, organizations of Sri Lankan apparel industry continuously try to find ways to improve organizational performance. Among such ways, most of organizations use “Quality Circles” to improve their productivity as it is a technique to practice the participative management concept. Therefore in this research, Quality Circles approach was used to achieve its main objective. Primary data and secondary data were gathered and tested quantitatively and qualitatively to find the correlation between organizational performance and Quality Circles. As the findings, there was a correlation between organizational Key Performance Indicators (KPI) and Quality Circles KPIs. In the conclusions, some strategies were introduced to improve organizational performance and those can be tested empirically as future research opportunities.

KEYWORDS: First Time Through (FTT), Key Performance Indicators (KPI), Productivity, Quality Circle

INTRODUCTION

Apparel industry contributes Sri Lankan Economy in a significant way and the 71% of the total exports are represented by this industry which is 7% of the total GDP of the country. To face the global competition successfully, the organizations of this industry need to improve their productivity using innovative strategies like Lean Manufacturing, Toyota Production System, 5S, etc. The major value adders to products are shop floor employees and also they are the main contributors for innovations. Therefore through Quality Circles, new strategies could be surfaced to improve organizational performance in the industry. However, it is almost two years

that Quality Circle concept has been established in Sri Lanka and still there are only a few no. of researches have been carried out in Sri Lankan context in order to investigate how Quality Circles were effected to improve organizational performance. Therefore, to fill this gap, the present research was carried out.

RESEARCH OBJECTIVE

The main objective of this research was to investigate strategies to improve organizational performance through Quality Circles Key Performance Indicators (KPI).

LITERATURE REVIEW

To find out the correlation of Quality Circles to organizational performance, some Quality Circles KPIs were used, representing as the independent variables of study and were Absenteeism, Wastage, and Machine Down Time. However, there are

¹Graduate, Department of Industrial Management, Faculty of Applied Sciences, Wayamba University of Sri Lanka.

²Lecturer, Department of Industrial Management, Faculty of Applied Sciences, Wayamba University of Sri Lanka.

many other ways through which the performance could be measured in an organization.

Quality Circles

Udra (1992) has defined Quality Circle as a "Small group of employees in the same work- area or doing a similar type of work who (voluntarily) meet regularly for about an hour every week to identify, analyze and resolve work- related problems, leading to improvement in their total performance, and enrichment of their work life". This is one popular way of involving shop floor level employees for decision making process through that to improve organizational performances.

Key Performance Indicators (KPIs)

According to Hirshfield (1983), KPIs are "Quantifiable measurements of financial and non-financial processes which help a business evaluate how successful it is". Because, KPIs reflect critical success factors of an organization and how the company is making progress in attaining its long-term organizational goals.

Organizational KPIs

There are many variables that could be considered as KPIs in an organization and could be used to evaluate the organizations current status. Some of those KPIs are Deliver in Full on Time (DIFOT), First Time Through (FTT), Productivity Per Man Hour (PPH), Yield, Doc To Doc (DTD) and Machine Up Time (MUT).

Quality Circles KPIs

According to Udra (1992), Quality Circles maintain some KPIs to make sure Quality Circles' activities are on track. Some of those KPIs are absenteeism, wastage, machine down time, target vs actual, yellow/red tags, accidents, quality failures and scraps/ defects.

Related Previous Research Findings

Mullens (1998) had used Kaizen and Simulation Models to improve the performance of an organization. He had focused on innovations to reduce the operational cost and develop the organization. In his research, first he had visited each manufacturer to identify and understand production challenges and opportunities. After that, he had assisted manufacturers of the sites to solve small scale problems and by that, the trust was built. Modeling tools had been used as a finding to manufacturers to design and upgrade systems and solve problems. To carry out this research, Mullens had used benchmarking to identify improvement opportunities and 'Kaizen' to develop business activities. As the findings of the research, small scale productivity improvements projects had been implemented, new modular factory was designed and established, and kaizen recommendations had been implemented.

METHODOLOGY

Research Approach

To achieve the objective of the present research, the apparel industry was selected as it represents relatively a large portion of Sri Lankan GDP. Then, from the organizations available in Sri Lankan apparel industry, a group of companies was selected randomly. Then, purposive sampling was done to select an organization from the selected group of companies. The selected organization was the only one that has been implementing Quality Circles over two years and it was the best Quality Circles implementing organization out of the selected group of companies.

The present research was carried down in a natural environment as the data collection for the selected variables had to be done in a real world working environment. Then, throughout the research, it would test the data to check the applicability of already established

theoretical phenomena called Quality Circles. Hence, the research was applied type in nature. Further, it was a cross sectional study of its' time horizon.

There are many ways that the organizational performance could be measured in the selected organization. Out of these available ways, Lean Matrix is one alternative which includes 6 variables / KPIs to evaluate organizational performance monthly. Those KPIs are Deliver in Full on Time (DIFOT), First Time Through (FTT), Productivity Per Man Hour (PPH), Yield, Doc To Doc (DTD) and Machine Up Time (MUT).

All of these KPIs could be given monthly targets and the actual levels also could be evaluated monthly. With the current status of these KPIs, most of them have reached the targeted levels. Still there's a significant gap exists between the targeted level and actual level of FTT.

FTT was a very important KPI for the selected organization as the quality of the final output was directly evaluated through this KPI. To face the domestic and international competition successfully, FTT rate should be reach a higher level than its competitors. It was crucial for this organization to find ways to reduce this gap. Therefore, for this research FTT was selected as the organizational performance measuring variable to find some ways to reduce the existing gap through Quality Circles.

Management of the organization have allocated higher amount of resources for Quality Circles' activities with an ultimate target of improve organizational performance. To evaluate Quality Circles performances, this organization has used another set of KPIs which were aligned to organizational KPIs and were; absenteeism, wastage, machine down time, target vs actual, yellow/red tags, accidents, quality failures and scraps/ defects.

These KPIs were given daily targets or monthly targets, depending on the nature of KPIs. For the study, Absenteeism,

Machine Down Time and Wastage KPIs were used since past records were properly kept only for these KPIs.

Then, following model would be used to achieve the research objective;

FTT = f (Absenteeism, Wastage, Machine Down Time)

DATA COLLECTION AND ANALYSIS STRATEGY

The present research was based on both primary data and secondary data. To collect primary data, Informal Interviews, Observations and discussions were carried out using standard Questionnaires. The secondary data which were related to organizational KPIs and Quality Circles KPIs were collected from the monthly reports, policies and manuals of a period of 9 months.

To test the data, qualitative aspects and quantitative aspects were considered. Some statistical tests were used to measure the quantitative aspects and those were as follows;

Simple Correlation Coefficient Test

The Karl Pearson Correlation Coefficient was used to measure correlation coefficient between the variables of productivity (X) and wastage (Y). The following formula was used to measure the simple correlation coefficient between the X and Y.

$$\text{Correlation} = \frac{\sum XY - nXY}{\sqrt{[(\sum X^2 - nX^2)(\sum Y^2 - nY^2)]}}$$

Hypothesis Testing

To check significance of correlation coefficient there should have to develop Hypothesis as null and alternative.

In here, it has to test;

$$H_0 : \rho = 0$$

$$H_1 : \rho \neq 0$$

where, ρ = the population correlation coefficient and, n = the number of observations considered to get R value.

Then, to get conclusion of the H_0 , the 't' table has been used.

Least Square Method

Least square method is used to find the straight line that gives or provides the best approximation for the relationship between two variables. The format for the least square equation is $Y = a + bX$

P-value Test

P - value of a statistical significance test represents the probability of obtaining values of the test statistic that are equal or greater than in magnitude than the observed test statistic.

If p- value < 0.05 then H_0 is rejected

If p- value > 0.05 then H_0 is accepted

Development of Hypotheses

According to the objective of the research, the following hypotheses were established to test the correlations between variables,

1. H_0 = No relationship between FTT & Absenteeism
 H_1 = Relationship exists between FTT & Absenteeism
2. H_0 = No relationship between FTT & Wastage
 H_1 = Relationship exists between FTT & Wastage
3. H_0 = No relationship between FTT & Machine Down Time
 H_1 = Relationship exists between FTT & Machine Down Time

DATA PRESENTATION AND ANALYSIS

Data Presentation

The structure of Quality Circles of the selected organization has been shown in Figure 1.

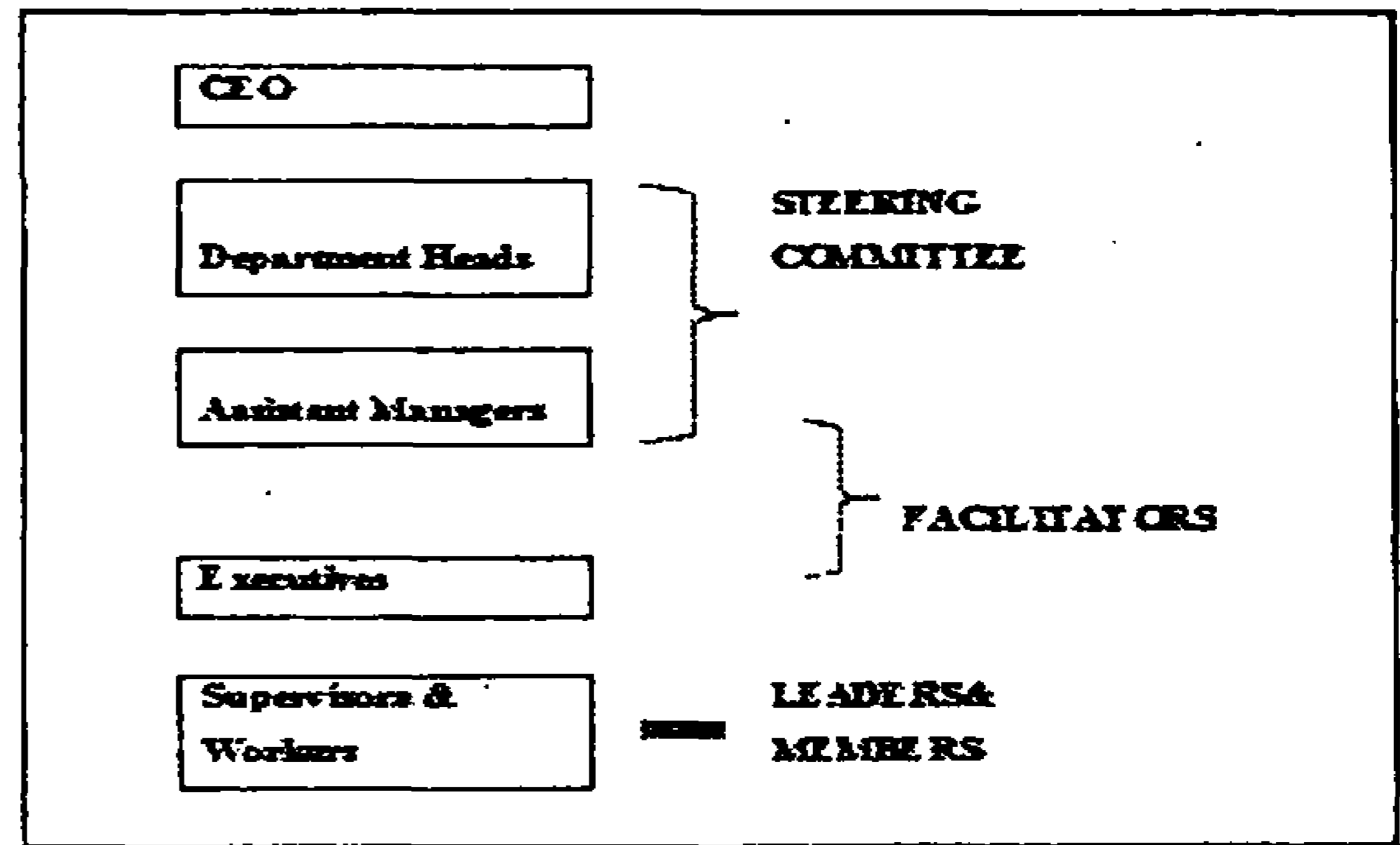


Figure 1: Structure of Quality Circles

There were sixteen Quality Circles in the selected organization and were distributed in 6 sections. From the available Quality Circles, only twelve Quality Circles were used for the study as other four circles (belonged to Dye House section and Ware House section) have been started in the recent past and the data were not available about those circles. The selected 12 Quality Circles have been distributed only in 4 sections which were Hook & Eye, Soft Seal, Shoulder Straps, Under Wire. The summaries of selected circles were shown in Table 1.

Table 1: Selected Quality Circles with section

Section	Quality Circle name
Hook & Eye	Warriors, Super King, Solid Boys
Soft Seal	Dynamic, Majestic, Romantic
Shoulder Straps	Wimmers, Expert Boys, 09 Stars
Under wire	OMER 01, Creative Boys, Gold Stars

The FTT status of this organization was shown in Table 2 from January 2009 to September 2009.

Table 2: Monthly FTT Data

Month	Actual Rate	Targeted Rate
January 2009	75.26%	74%
February	72.98%	74%
March	74.70%	75%
April	71.56%	75%
May	73.01%	76%
June	74.60%	76%
July	71.44%	77%
August	78.35%	77%
September	77.17	78%

The statuses of selected Quality Circles' KPI rates from January 2009 to September 2009 were shown in Figure 2 & 3. According to the figures, the rates were considered as the average rate of selected 9 months. Also average rates of each section are displayed, by taking average of three Quality Circles per section.

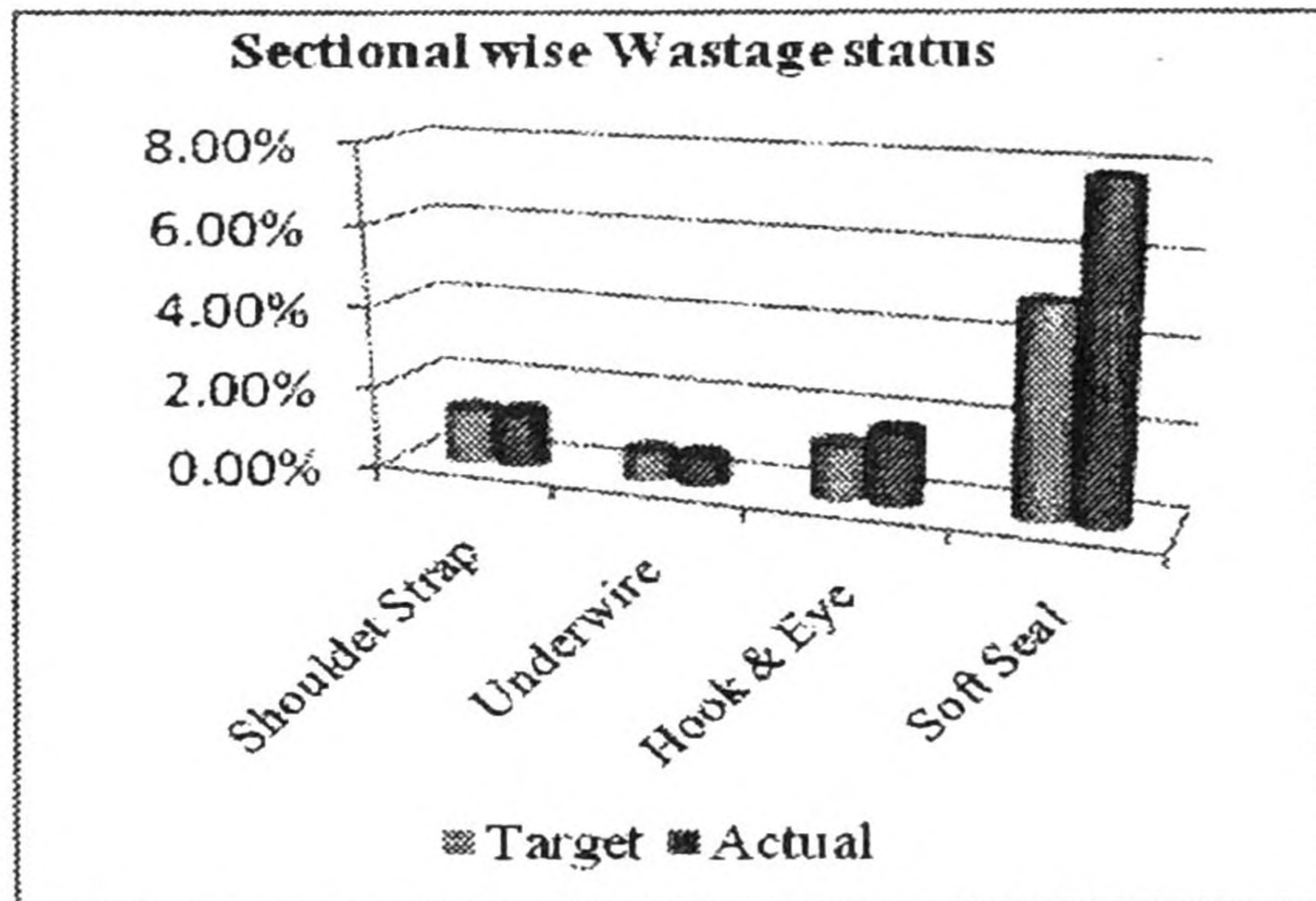


Figure 2: Sectional wise Wastage Status

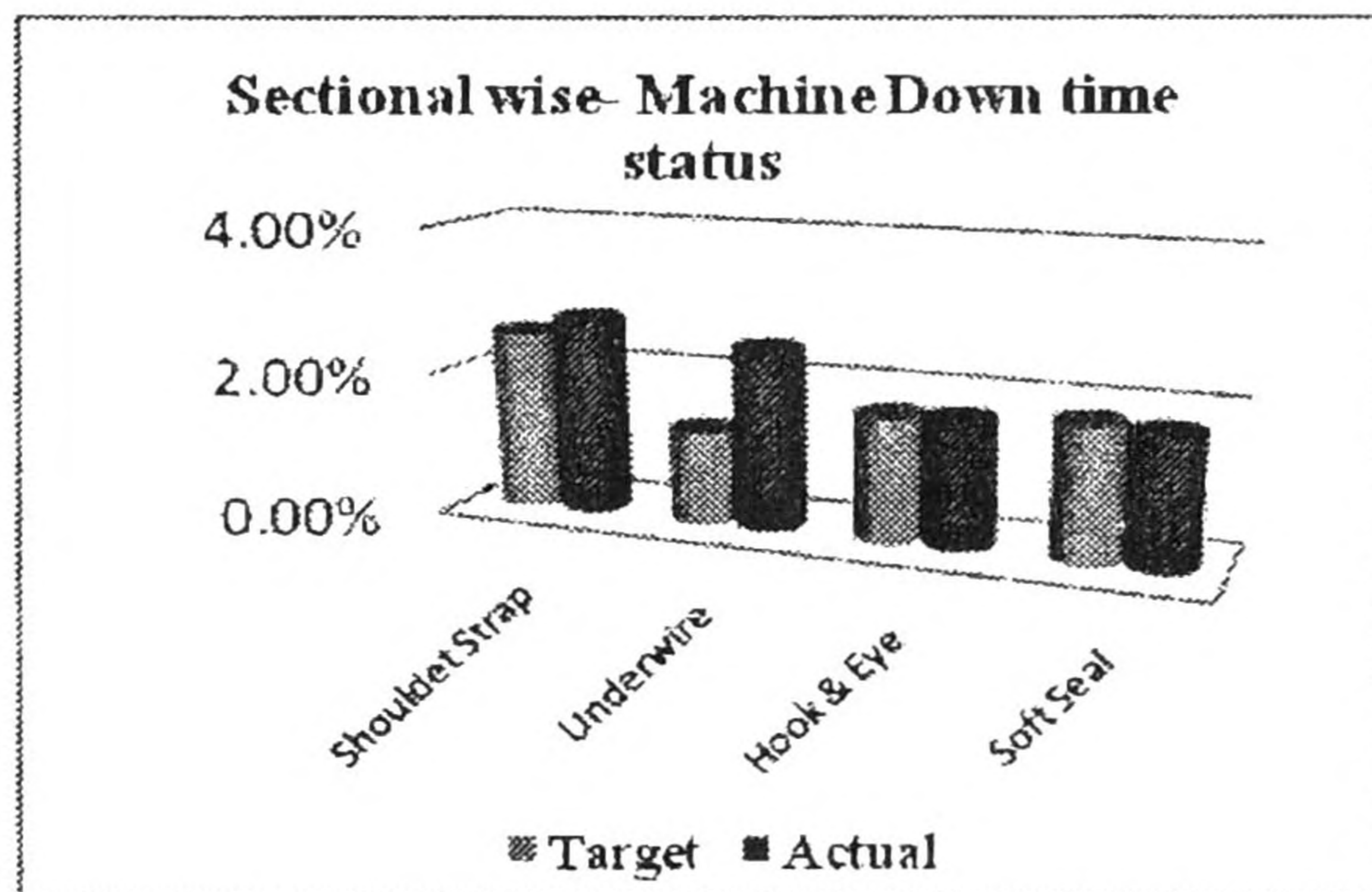


Figure 3: Sectional wise Machine Downtime Status

Table 3: Correlation Values

Section	Absenteeism	Wastage	Machine Down Time
Hook & Eye	-0.805	-0.758	-0.615
Soft Seal	-0.916	-0.61	-0.509
Shoulder Straps	-0.766	-0.861	-0.533
Underwire	-0.882	-0.773	-0.854

The correlation between FTT & Quality circles KPIs was calculated in the

Table 3.

According to the calculated correlation values, all Quality circle KPIs have a negative correlation to FTT. Therefore FTT has inverse relationships with All Quality circle KPIs.

A line of best fit was drawn in order to study the correlation between the variables. Hence, the equations for correlations between variables could be determined by establishing best-fit procedures.

Hook & Eye Section:-

$$FTT = 0.775 - 0.00235 \text{ Absenteeism}$$

$$FTT = 0.821 - 4.83 \text{ Wastage}$$

$$FTT = 0.78 - 0.00142 \text{ Machine DT}$$

Soft Seal Section:-

$$FTT = 0.776 - 0.0022 \text{ Absenteeism}$$

$$FTT = 0.818 - 1.04 \text{ Wastage}$$

$$FTT = 0.776 - 0.0026 \text{ Machine DT}$$

Shoulder Straps Section:-

$$FTT = 0.767 - 0.0039 \text{ Absenteeism}$$

$$FTT = 0.867 - 9.21 \text{ Wastage}$$

$$FTT = 0.765 - 0.818 \text{ Machine DT}$$

Underwire Section:-

$$FTT = 0.758 - 0.0027 \text{ Absenteeism}$$

$$FTT = 0.782 - 6.75 \text{ Wastage}$$

$$FTT = 0.753 - 0.001 \text{ Machine DT}$$

In order to check the goodness of fitted models, coefficient of determination values were calculated as percentages. The calculated R² values were shown in Table 4. Averagely, the most of R² values exceed 50%. Therefore, coefficient of X variables has some value though it was not perfect. Therefore, fitness of drawn regression lines to the sample data was not very poor.

Table 4: Coefficient of Determination Values

Variables	R ²
FTT & Absenteeism	64.9%
FTT & Wastage	51.4%
FTT & Machine DT	57.8%
FTT & Absenteeism	83.9%
FTT & Wastage	37.3%
FTT & Machine DT	57.3%
FTT & Absenteeism	58.7%
FTT & Wastage	74.2%
FTT & Machine DT	28.5%
FTT & Absenteeism	77.8%
FTT & Wastage	59.8%
FTT & Machine DT	72.8%

RESULTS AND DISCUSSION

According to the correlation values that were given in the Table 4, there were negative correlations between all the Quality Circle KPIs and FTT. Therefore, there was an inverse relationship between Quality Circle KPIs and FTT. Finally, based on correlation values, all Quality Circle KPIs that are used at present were appropriate as they have a significant correlation with the organizational performance measuring KPIs.

In order to improve FTT, Quality Circle KPI values needed to be decreased as there was an inverse relationship between Quality Circle KPIs and FTT. The FTT value could be improved by reducing the values of Quality Circles' Absenteeism, Wastage, and Machine Down Time.

The root causes of problems that were found through informal discussions with Quality Circle members, leaders & facilitators and background investigations have been explained in Figure 4.

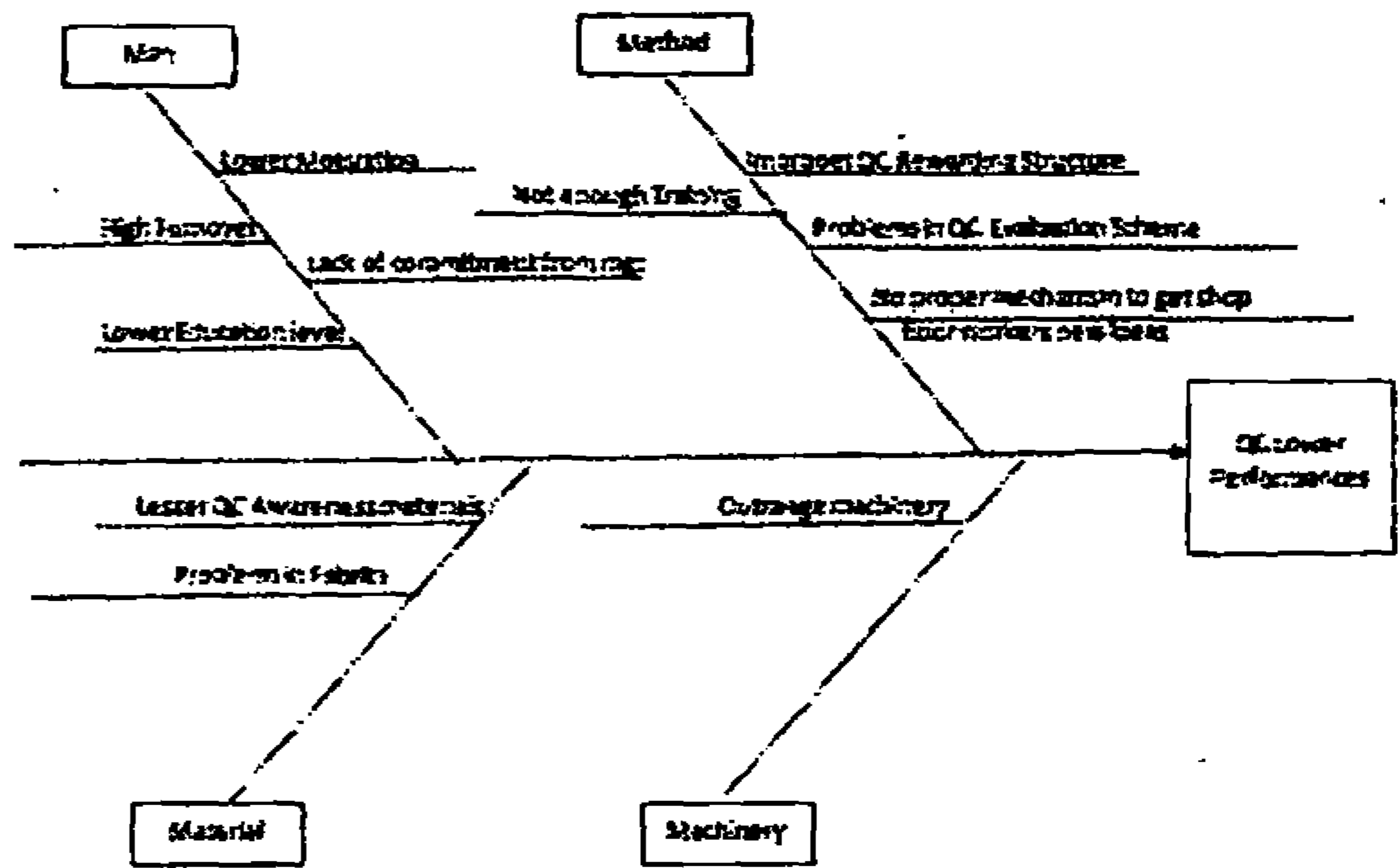


Figure 4: Fish Bone Diagram

Strategies to improve Organizational Performance

1 - Introducing a Proper Quality Circle Rewarding Structure

With a proper rewarding structure, inter-competitiveness of Quality circles could be improved and that will result high Quality Circle performances with lower KPI values. Examples for such rewards could be Monthly Gifts, A certificate of Appreciation, Tea party with CEO, Announce the winning team, Send the winning information for their personnel files, Lunch Outing, etc.

2 - Prepare suitable Quality circles Evaluation Schemes

At present, there has no proper procedure for setting leaves targets. The Table 5 is a solution procedure to set such leave targets.

3 - Include Kaizen Activities to Quality Circles Evaluation schemes

To reduce current wastages, absenteeism levels and the Machine down time levels, the best way is to get new improvement ideas from shop floor level employees. If the relevant Quality Circle members have presented any kaizen activity,

Table 5: Absenteeism Marks Distribution

Phase	No of Ideas	Marks dist ^a	Total marks(%)
Idea	n/4 or more	100	15
	(n/4)-1	60	
	(n/4)-2	40	
	Less than(n/4)-2	0	
To do	(n/4)-1 or more	100	25
	(n/4)-2	60	
	Less than (n/4)-2	0	
Doing	2 or more	100	20
	1	60	
	0	0	
Done	2 or more	100	40
	1	60	
	0	0	

Where, n = Total No of members in the Quality circle/2

then it could be evaluated and rewarded. In here there is a higher probability of getting new ideas from Quality Circles' members. The suggested kaizen evaluation mechanism is shown in Table 6.

Table 6: Kaizen Marks Distribution

No of Leaves	Marks (100%)
0 to (n-2)	100
(n-2) to (n-1)	75
(n-1) to (n)	50
More than (n)	0

4 - Conducts more Quality circle Awareness Programs

That means to prepare a Training Calendar for the employees of the organization

5 - Improving the Interest of Management Team on Quality Circles

At present, the management team has lower interest on Quality Circles. But for successful implementation of Quality Circles, the management role is very important. The suggestions to improve their interest are making Quality Circles' facilitators' personal KPIs, conducting monthly Quality Circles Progress Review, Rewarding a gift & a certificate of appreciation, Arranging foreign tours, etc.

6 - Use New/Advance Machinery for Production

7 - Assign a New Employee to Re check the

Production Invoices

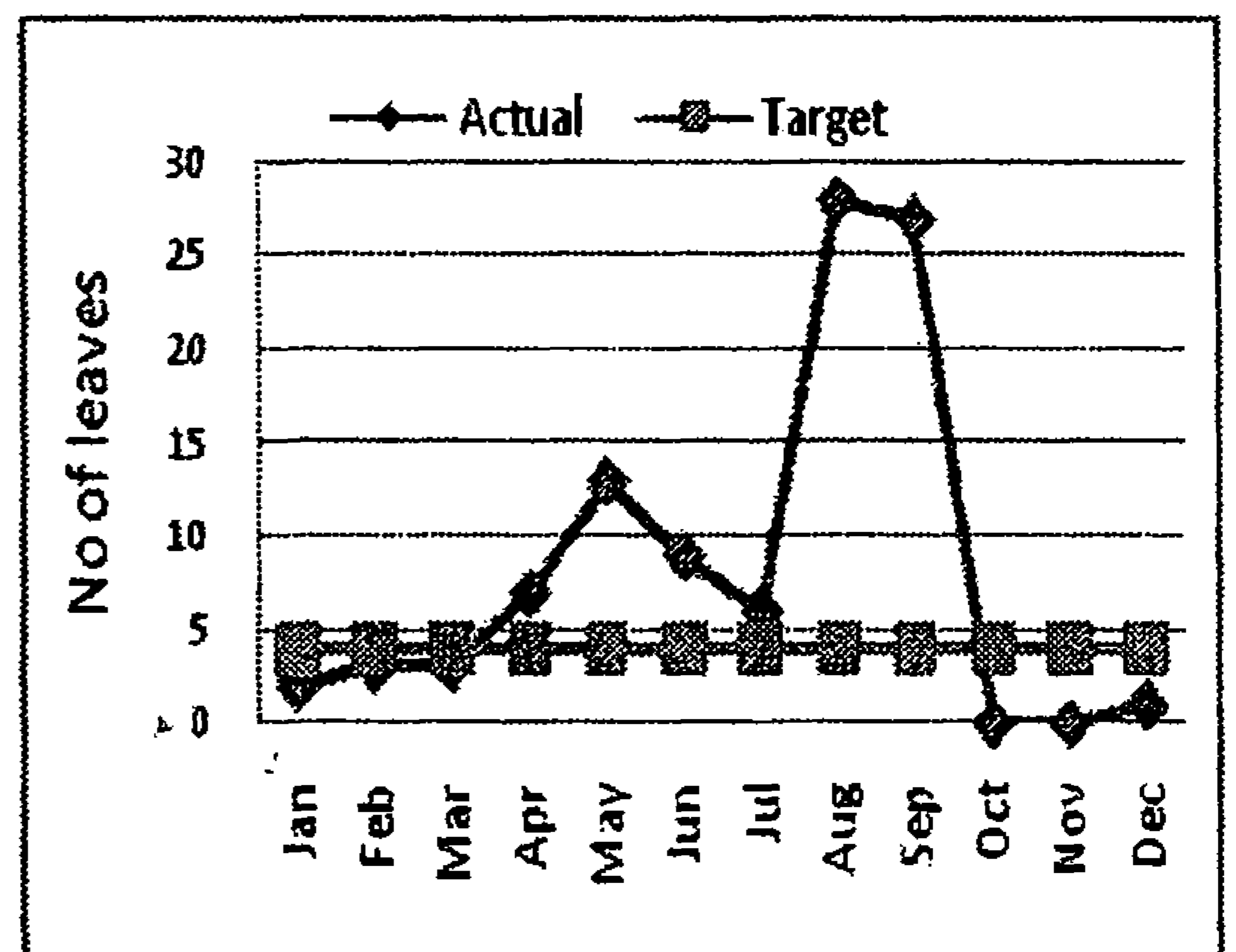
8 - Allocate one Quality Checking Associate to each machine of Hook & Eye Section

9 - Train Quality Circles Leaders regarding

Problem Solving Tools

After carrying out the cost - benefit analysis, the six solutions of 1, 2, 3, 4, 5, and 9 were implemented in the organization to improve the Quality Circle's performances. After implementing the selected solutions, there were some significant improvements in some Quality Circles. The result of the best Quality Circle after the implementation is shown in Figure 6

Figure 6: Pre-Post Analysis of Absenteeism Marks



CONCLUSIONS

The main objective of this research was to investigate strategies to improve organizational performance. To achieve it, the Quality Circle approach was used to enhance the organizational performance since there is a correlation between Quality Circles' KPIs and organizational KPIs. A model was developed to check this correlation. The analyzed data were proved this correlation in a practicing environment. Some strategies were identified in order to achieve the objective of the study. Some of the suggested strategies were implemented at the selected organization after carrying

out a feasibility analysis and cost- benefit analysis.

The strategies that have been suggested in this research were subjected to improve organizational performance through Quality Circles improvements and to the organizations which belong to the Apparel industry and have similar functionalities these suggested strategies could be generalized.

REFERENCES

- Cole, Robert E, (1999) *Managing Quality Fads: How American Business Learned to Play the Quality Game*, first edition, Oxford University Press, New York.
- Hirshfield, C, (1983) "Quality Circles in the Classroom: An Experiment in the edagogical Uses of Japanese Management Methods." Paper Presented at the Annual Conference of the Eastern Community College Social Science Association, Williamsburg, Virginia
- Hutchins, David C, (1985) *The Quality Circles Handbook*. New York: Pitman Press
- S.R.Udra, (2002) *QUALITY CIRCLES Progress through Participation*, second edition, Tata McGraw- Hill Publishing Company Limited, New Delhi
- Mike Mullens, (1998) *Manufacturing / Construction Productivity*