

Impact of the Quality Circles on the productivity of the Manufacturing Industries- BHEL (Bhopal) and RECRON Synthetics Ltd. Naini Allahbad (formerly Raymond Synthetics Ltd)

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Abstract : In this paper we have tried to study the impact of the Quality control/circles on the manufacturing industries- BHEL (Bhopal) and RECRONS Synthetics Ltd. Naini Allahbad (formerly Raymond Synthetics Ltd). We have taken one private industry and one public sector industry in our study for the sake of the microscopic analysis and a comparative study is done in reference to these two organizations. In our study general perception of the QC is taken and genesis and the development of QC are also taken.

We have constructed the empirical results through the primary data obtained via questionnaire in which we have studied the various aspects of the QC- Its functioning, impact on productivity and the other factors. Moreover the status of the organization is also analysed pre and post implementation of the QC measures. Based on the study some recommendations are given so that the productivity, customer satisfaction and the market share can be increased to a larger extent.

IndexTerms – Productivity, Quality Circle, Quality Control .

I. INTRODUCTION

Quality control can be defined as a process in which a business's product quality can be maintained and/or improved and/or reducing or eliminating the manufacturing errors. It requires both- management as well as the employees of the organization to work together to achieve the goals for the quality control. This can be achieved by setting benchmarks for the product quality and performing the proper product checks in order to obtain the statistical significant variations.

Quality testing does not mean that it's done the end product it's done on each step of the manufacturing process. It starts with the testing of the raw materials, followed by taking samples at the different stages of manufacturing process and then it ends after the product is finally consumed by the customer.

Quality controls can be studied under the Quality circles in which a group of six to twelve employees is voluntarily formed in order to improve the productivity, quality, safety and the most important cost reduction. There are two main tasks assigned under the quality circles: Identification of the root cause which lead to the problem and then suggestion of the proper policy implications to overcome the problem.

The benefits from QC are an economic necessity of Indian industries that are facing problems of inferior quality, low productivity, under-utilization of capacity, unreliable delivery of raw materials etc. In the 1990s, several success stories of Japanese and American manufacturing sectors motivated Indian industries to implement QC techniques in India. Attempts are being made in several Indian industries for implementation of their basic principles.

Global competition increased rapidly and the markets become multinational and dynamic Market conditions fluctuated widely. Customers demanded high quality, low cost products and on time delivery. To respond to these needs while keeping manufacturing and related cost down is a constant challenge to manufacturing companies and an issue crucial to their very survival.

The issue that is becoming important nowadays with respect to manufacturing costs is to reduce the production of defective product in manufacturing. The cost which is associated with the manufacturing of defective product is known as Quality costs. Quality costs have been categorized as costs of control and cost of failure. The process of quality improvement plays a dominant role in reducing the above costs. Activities to integrate quality in manufacturing have two objectives, to prevent defects and to minimize variability in processes. To be more competitive in the market there should be continuous improvement, waste elimination, customer focus etc. There are different event tools available to control and improve the quality while keeping the cost low, with min. lead time. Some Philosophies were evolved to use these tools to reach the goals of an organisation as well as customer satisfaction.

How much QC is successful in improving productivity of an organization in Indian industries and if they have failed what are the causes of their failure? To discover the facts necessary to answer the above questions, an in-depth study of QC seems to be essential. It is in this background that an empirical and critical study has been made of "Impact of Quality Circle on productivity" in context with two organisations BHEL (Bharat Heavy Electricals Limited) and RECRONS Synthetics Limited (Formerly Raymond Synthetics Limited).

Literature Review:

The basic idea originated in the United States, the right combination of factors existed only in Japan. The seeds planted by the American were accepted by the Japanese and nourished to the fullest extent. There are different studies on Quality circle conducted on improving the productivity on the manufacturing sector, some of them are stated as follows:

1. Steel and Shane (1986), conducted a study on, "Evaluation research on Quality Circles: Technical and analytical implications", The results of well-designed quality circle evaluation studies may be misleading if relevant organizational circumstances are not given due consideration when a change agent selects quality circles from his or her repertoire of organizational development (OD) interventions. The effectiveness of quality circles, depends upon the compatibility of the intervention and attributes of the organization's situation, the demand placed upon tangible and intangible resources, and the type of response desired from participants.

2. Feriman and Saxberg (1989), in their study on "Impact on the Quality Circles on productivity and quality: Research limitations of a field research", They conducted a natural experiment which was an attempt to measure the impact of the quality circle intervention on productivity and quality in a multi-plant food manufacturing firm. The study used multiple time series design for the analysis of the performance indices having a time span of about 23 months. There were uncontrollable factors at the site which demonstrated the pitfalls of evaluating a managerial intervention and its impact on the performance of the organization. The results thus obtained were inconclusive but illustrated the hazards in the field research.

3. Brah, Wong and Rao (2000), in their paper "TQM and Business Performance in the service sector: A Singapore study", focussed on gaining insight into the impact of TQM on the business performance of the service sector of the economy. The study yields clear evidence that TQM implementation improved business performance in the service sector of Singapore. Success of TQM implementations appears to be more effective on the basis of its implementation rather than the duration. The study concluded that benefits can be attributed to some of the tools of TQM- customer focus and quality improvement rewards, the key to the success of TQM lies in its behavioural and intangible features such as top management support, employee empowerment and employee involvement.

4. Feng, Prajogo, Tan and Sohal (2006), conducted a study on "The impact of TQM practices on performance: A comparative study between Austrian and Singaporean Organizations", their paper analyses the multidimensionality of TQM and its relation with innovation and quality performance. The results coincided with the survey that TQM practices take place along several practices. This comparative analysis is based on both-structural and descriptive relationships.

5. Srivastava (2012), in his study on "A study of the quality circles concept in Indian Industry (A case study on Bharat Electronics Limited)", he analysed that how the quality control proponents suggest a wide array of positive results when this chipping in technique is either used in the industrial or the service sector.

Research Methodology:

It is for the sake of microscopic analysis, diagnosis and prescription, the QC in one public sector i.e. BHEL (Bhopal) & Quality Circle in one private sector i.e. Recrons Synthetics Ltd. Naini Allahabad (Formerly Raymond Synthetics Ltd.), has been taken as sample unit for this study. The study of QC in India with particular reference to BHEL (Bhopal) Public Sector and Recrons (Allahabad) Private Sector intends to focus its attention on the impact of QC on the total productivity.

The concept of taking one public sector and one private sector was to make a comparative analysis. Firstly a general perception of QC is taken. Focus is also given on the various aspects of QCs and an empirical study is done on the functioning of QCs in BHEL & Raymond's.

The various responses are collected from respondents of both the organizations and are analyzed with the help of 2 tables.

Grouping of questions were done according to common objectives of the questions. The responses were tabulated and analyzed with the help of statistical tools.

Great care is taken that a comparative analysis could be done for both the organizations. In the end various conclusions and suggestions are given.

Analysis:

TABLE1-Awareness, Membership, Training &Meetings

Question no. from Questionnaire	Awareness		Membership						Training		Meetings							
	1	3	4		22				5		6		27					
Question	Are you aware	Are you member	How did you become the member			When do you leave			Have you got training		What is meeting frequency		What should be the meeting gamp					
Categories of answers	Yes	No	Yes	No	Voluntarily	Under Pressure	Some times	Most of the times	Very rarely	Never	Yes	No	Some times	Regularly	Monthly	in 15 days	Weekly	
RECRONS Sample Size 30	Total no. of employees from a total of 30	30	0	30	0	30	0	10	0	15	5	27	3	3	27	0	9	19
	Percentage	100%	0%	100%	0%	100%	0%	33%	0%	50%	17%	90%	10%	10%	90%	0%	30%	70%
BHEL Sample Size 25	Total no. of employees from a sample of 25	25	0	25	0	25	0	5	0	7	13	15	10	7	18	4	4	7
	Percentage	100%	0%	100%	0%	100%	0%	20%	0%	28%	52%	60%	40%	28%	72%	16%	16%	6%

Sample Size of Recrons: 30
 Sample size Of BHEL: 25

Awareness- Table 1 revels that employees in both the organizations were aware of the Quality Circles and the response was 100%.

Although the data that we collected from the responses of the workers depicted that there is 100% awareness but various observations and discussions revealed that this awareness lacked in depths.

Membership- All the respondents were member of Quality Circles and they accepted that they had acquired the memberships of QC voluntarily. This finding supports the basic definition of Quality Circle which includes its voluntary nature.

When asked about how often they leave the membership of QC, 50% respondents from RECRONS answered that very rarely they leave the membership.17% replied that they never leave the membership and 33% said that sometimes they leave the membership.

In BHEL 52% of the respondents said that they never leave the membership which is a good sign and is definitely a high proportion as compare to the other organization-RECRONS, 20% said they may sometime leave the organization whereas 28% said that they very rarely leave the membership.

Work should be done by the management so as to reduce this leaving percentage to zero. The management must find out the reasons regarding the workers leaving the membership and should gradually work to remove them.

Training- In Recrons 90% respondents said that they received the training while in BHEL only 60% of the respondents had received the training. Thus we could say that, possibly the private sector is investing more in training as compared to the public sector. As BHEL is the starter organization for QC in India that is why it's not paying much attention for training in QC.

When asked about the reasons for this the employees of BHEL replied that as it is an old practice in Their organization that everybody is aware and thus they normally learn from their colleagues regarding the proceedings of QC.

Today Quality is considered as a vital instrument to improve productivity and sustain the outer competitiveness thus making workers conscious about the quality control is very important.

Meetings-Table 1 reveals that 90% respondents in Recrons attend meetings regularly while in BHEL only 72% of the total respondents attend the Q.C. meetings. This figure reveals that the attendance is at all up to the mark. Efforts should be made to find out the reasons for the same and solve them.

Meeting Frequency: In Recrons 70% of the respondents felt that the meeting should be held weekly. They felt that weekly meetings will help in a better understanding of the problem as well as in the implementation of its solutions. Whereas 30% of the employees recommended that meetings should be held quarterly as it will give them enough time to collect data & to think on the solution of the problem.

In BHEL 68% workers recommended that meetings should be held weekly because due to regular meetings a rapport is always built amongst them which give them an advantage in solving the problems. Whereas 16% of the workers said monthly and 16% said quarterly as very frequent meetings disturb their work, also they do not get time to work on the solutions and resolutions taken at QC meeting.

In both the organizations majority of the work force wanted the meetings to be held weekly. The percentage favoring this frequency is nearly same in both the organizations. But together with this the management should also take care that their work is not hampered and ultimately there is no decrease in the productivity of the organization.

Table 2- WORKERS OPINION ABOUT QUALITY CIRCLE

	Question	Solving problem		Platform for Expressing Views			Motivation			Shairing of Knowledge			Satisfaction by taking to others			Helpful in achivement of goals			
		yes	no	yes	to some extent	no	yes	to some extent	no	yes	to some extent	no	yes	to some extent	no	A	B	C	D
RECRONS Sample size 30	Total no. of employees from a sample size of 30	29	1	29	1	0	24	4	2	28	0	2	26	3	1	7	9	10	4
	Percentage	97%	3%	97%	3%	0%	80%	13%	7%	93%	0%	7%	87%	10%	3%	23%	30%	34%	13%
BHEL Sample size 25	Total no of employees from a sample size of 25	24	1	17	8	0	13	12	0	16	9	0	21	4	0	3	5	5	12
	Percentage	96%	4%	68%	32%	0%	52%	48%	0%	64%	36%	0%	84%	16%	0%	12%	20%	20%	48%

Sample Size of RECRONS=30

Sample Size of BHEL=25

Solving Problem And Platform For Expressing Views-The employees work best and produce qualitative products only when they are valued and encouraged to contribute their own thoughts, express their views frankly. Thus employee’s involvement, commitments and promotion of open discussions making are a necessity for QC and many employees favor it. The figure is comparatively lesser in Public Sector as compare to in private sector which directs to the necessity of promoting this culture in public sector also.

Motivation- In Recrons 80% of the respondents thinks that Quality Circles helps in motivating them , 13% think that yes it help but only to some extent and 2% said no. In BHEL 52% said yes QC helps in motivating and 48% thinks only to some extent.

Each and every employee must contribute significantly to the organization and employee must maintain motivation of working with zeal, enthusiasm, will power and involvement. This motivation can be provided by the Quality Circle.

Sharing Of Knowledge: About sharing of knowledge as one aspect in QC, 93% respondents in Recrons and nearly 100% in BHEL agreed to this aspect of QC .They said that QC meetings definitely helps them in increasing their knowledge and information.

Satisfaction-87% respondents from Recrons and 84% from BHEL agreed that they get satisfaction by talking to a QC member.

Human resource satisfaction monitoring is very important. For the full use of the potential of employees it is very important that employee satisfaction level should be regularly reviewed and existing system of incentive and reward should be adequate for maximization of employees individual contribution.

Goals Achievement-

- A - Systematic work with planning
- B- Team work/More discussions more ideas/Change in their attitude
- C- Problems arising at work place sorted regularly, the process of Q.C.
- D- Stress on Quality, Productivity, Cost cutting & Customer satisfaction

In **Recrons** 23% respondents said that QC helps in achievement of goals as it helps the work to be done with planning and in a systematic fashion. 30% respondents believe that QC helps in achievement of goals as because of team work a natural change in attitude comes into the members of QC. As now many brains are working together thus the solutions can be thought of quite easily. One employee believes that with the help of QC an employee develop an affection and involvement towards their work. 34% of respondents believe that QC helps in achieving the goals as the problems arising at work place are sorted out regularly with the help of QC whereas 13% felt that since Quality Circle focuses on Quality, Higher productivity, Cost cutting and Customer satisfaction, therefore it helps in the achievement of goals .

In **BHEL** 12% felt that QC helps in goal achievement as it helps the work to be done with planning and in a systematic way. 20% said that because of team work and the change in qualities which takes place in them as natural outcome of Quality Circle, QC helps them in the achievement of Goal. Again 20% said that as the problems arising at work place are sorted regularly QC helps in goal achievement. 48% of the respondents gave the highest value to the point that since QC focuses on Quality, productivity, cost cutting and customer's satisfaction it helps in goal achievement.

After studying the detailed answers of the respondents on this issue from BHEL it is reasonable to conclude that focus on Quality, Productivity, Cost cutting and Customer satisfaction is one of the major dimensions of QC which helps in achievement of goals. Now a day's more stress is given on problems related to Customer satisfaction in QC. The responses from Recrons reflect that not much stress is given on Customer satisfaction.

Conclusion:

Quality circle is an important and effective tool used to solve problems that occur in an organization at different levels. The Quality circle helps to find out the relationship between different factors in an organization and there effect on each other so that we can find out major and minor factors based upon which management can take action to improve organization's effectiveness

It is a way of forming better human relations at work place and promotes the feeling of cooperativeness, mutual development and team spirit among the members. Three major aspects of QC are Motivation, Participation & Recognition.

It is an effective technique to solve work related problems, unless that doesn't need a great deal of specialization. It is the best way of utilizing the hidden talent and creative abilities of the organization members.

Difference in productivity primarily depends upon two factors- attitude and motivation of the workforce. QC helps in changing the attitude of employees and motivating them and thus help in improving productivity and thus leading to efficiency.

In both organisations (BHEL and Recrons), people were trained for QC tools but the software part of the quality integration i.e. quality culture and team working has not been developed. However there is a passion to know about quality tools but a lack of depth in using them, as a result of which even if the teams are operational, they cannot function effectively. Effectiveness would depend upon: the Indian workforce situation, people's

socialization behaviour pattern, personality traits, attitudes and values. Private sectors are investing more in training than the public sectors. It is generally observed that employees after their association with groups through QC show more inclination in using safety methods.

In the context of globalisation of the Indian economy it can be expected that India will emerge as an economic force by the next decade. Helping the industry in becoming world class, (QC) seems to be holding the promise. QC has therefore to be implemented with a sense of urgency. It cannot be implemented without the help of top management commitment and leadership, continuous improvement, customer focus, education & training, quality awards.

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