

“QUALITY CIRCLE TOOLS AND TECHNIQUES”

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I INTRODUCTION

A quality circle is a volunteer group composed of workers, usually under the leadership of their supervisor (or an elected team leader), who are trained to identify, analyze and solve work-related problems and present their solutions to management in order to improve the performance of the organization, and motivate and enrich the work of employees. When matured, true quality circles become self-managing, having gained the confidence of management. The Japanese description of the effectiveness of a quality circle is expressed as: “It is better for one hundred people to take one step than for one person to take a hundred”. Quality circles were first established in Japan in 1962; Kaoru Ishikawa has been credited with their creation. The movement in Japan was coordinated by the Japanese Union of Scientists and Engineers (JUSE). The first circles were established at the Nippon Wireless and Telegraph Company but then spread to more than 35 other companies in the first year. By 1978 it was claimed that there were more than one million quality circles involving some 10 million Japanese workers. They are now in most East Asian countries; it was recently claimed that there were more than 20 million quality circles in China. Quality circles have been implemented even in educational sectors in India, and QCFI (Quality Circle Forum of India) is promoting such activities. However this was not successful in the United States, as it (was not properly understood and) turned out to be a fault-finding exercise although some circles do still exist.

II. OBJECTIVES OF THE STUDY

Following are the objectives of the study :

- a) To understand the Quality Circle concept.

- b) To know the requirements of Quality Circle.
- c) To know the reasons behind the failures of the Quality Circle.

III. EMPIRICAL STUDIES OF QUALITY CIRCLES

In a structures-fabrication and assembly plant in the south-eastern United States, some quality circles (QCs) were established by the management (management-initiated); whereas others were formed based on requests of employees (self-initiated). Based on 47 Quality Circles over a three-year period, research showed that management-initiated Quality Circles have fewer members, solve more work-related QC problems, and solve their problems much faster than self-initiated Quality Circles. However, the effect of Quality Circle initiation (management- vs. self-initiated) on problem-solving performance disappears after controlling Quality Circle size. A high attendance of Quality Circle meetings is related to lower number of projects completed and slow speed of performance in management-initiated Quality Circle. Quality Circles with high upper-management support (high attendance of Quality Circle meetings) solve significantly more problems than those without upper-management support. Quality Circle membership tends to decrease over the three-year period. Larger Quality Circles have a better chance of survival than smaller Quality Circles. A significant drop in Quality Circle membership is a precursor of Quality Circle failure.

IV. OBJECTIVES OF QUALITY CIRCLE

Following are the objectives of the Quality Circle.

- a) Reduce error and enhance quality
- b) Inspire more effective teamwork
- c) Promote job involvement
- d) Increase employee motivation
- e) Create a problem-solving capability
- f) Build an attitude of "problem prevention"
- g) Improve company communications
- h) Develop harmonious manager/worker relationships
- i) Promote personal and leadership development

- j) Develop greater safety awareness

V. CHARACTERISTICS OF QUALITY CIRCLE

Following are the characteristics of Quality Circle :

A) CIRCLE MEMBERSHIP

It is more or less homogeneous group of people usually from the same work areas. However, whenever required experts may be invited for guidance or advice.

B) CIRCLE SIZE

Usually a group of 6 to 12 members seems quite effective; however, it depends upon the people employed in a particular section.

C) VOLUNTARY PARTICIPATION

The main characteristic of Quality Circle is attendance and participation in meetings voluntarily without any compulsion.

D) QUALITY CIRCLE MEETINGS

An hour's duration is usually quite adequate for a meeting. Whatever may be the frequency, regular meetings should be ensured.

E) AUTONOMY

An important ingredient of a Quality Circle is the sense of autonomy experienced by its members.

VI. REQUIREMENTS OF QUALITY CIRCLE

The problems of adaptation, which have caused quality circles to be abandoned, are made plain by a look at the conditions which the two experts think are necessary for the success of quality circles. Ron Basu and J. Nevan Wright, in their book *Quality Beyond Six Sigma* specified seven conditions for successful implementation of quality circles. These are summarized below :

1. Quality circles must be staffed entirely by volunteers.
2. Each participant should be representative of a different functional activity.
3. The problem to be addressed by the Quality Circle

should be chosen by the circle, not by management, and the choice honored even if it does not visibly lead to a management goal.

4. Management must be supportive of the circle and fund it appropriately even when requests are trivial and the expenditure is difficult to envision as helping toward real solutions.
5. Circle members must receive appropriate training in problem solving.
6. The circle must choose its own leader from within its own members.
7. Management should appoint a manager as the mentor of the team, charged with helping members of the circle achieve their objectives; but this person must not manage the Quality Circle.

Quality circles have been tried in the USA and Europe, often with poor results. For the small business owner, he or she may actually be in a very good position to try this approach if it feels natural. An obviously important element of success is that Quality Circle must be practiced in an environment of trust and empowerment.

VII. BENEFITS OF QUALITY CIRCLES

Organizations adopting quality circles can benefit in several ways. Some gains may be tangible while others may be intangible, but ultimately quality circles will lead to improved performance.

Direct gains are :

Improving quality and productivity

Promoting job involvement and sense of participation

Creating a problem solving and problem- preventing attitude

Developing creativity and an innovative spirit

Inspiring team work and developing harmonious relations.

Quality circles are an important source of job interest; they provide a sense of participation and enhance the ability to work with others. increase productivity, enhance motivation and improve quality.

VIII. QUALITY CIRCLE-PROBLEM SOLVING STEPS

In Quality circle, problem solving is used as a main process to achieve its objectives. Members creativity is tapped to solve their day-to-day work related problems. It is through this process they get become cohesive team and their organizational ownership get developed. Hence it is necessary that the group member should understand this process and following steps very clearly.

1) IDENTIFICATION OF WORK RELATED PROBLEM

Method

- a) Generate a list of problem using Brainstorming
- b) Prioritise problems using ABC analysis

2) SELECTION OF PROBLEM (FROMA LIST)

Method

- a) Pareto Analysis or Rating based on past data
- b) Register the selected problem with coordinator

3) Defining the Problem

Method

Flow Diagram

4) ANALYSE THE PROBLEM

Method

Data Collection of problem on all possible aspects

5) IDENTIFICATION OF CAUSES

Method

Brainstorming and Cause and Effect diagram

6) FINDING THE ROOT CAUSES

Method

Identifying the main relevant causes in Cause and Effect diagram by data collection and discussion.

7) DATA ANALYSIS

Method

- a) Using techniques like bar, pie, areal graph, histogram, stratification, scatters diagram etc.
- b) Why-Why analysis

8) DEVELOPING SOLUTION

Method

Brain storming

9) FORESEEING THE PROBABLE RESISTANCE

Method

Brain storming

- a) Identifying the probable constraints and finding ways to overcome them.
- b) Make a presentation to all involved employees to explain the solution selected.

i.e. Departmental head, facilitator, other officials and non members involved with implementation.
- c) Discuss and evolve a system of implementation.

10) TRIAL IMPLEMENTATION AND CHECKING PERFORMANCE

Method

- a) Data collection after implementation
- b) Comparison of old and new data with Pareto, Histogram, and Control charts
- c) Watch process trend
- d) Analyse the results
- e) Discuss and incorporate the changes needed

11) REGULAR IMPLEMENTATION

Method

Once validity is checked and improvement observed with data, regular implementation can be done.

12) FOLLOW-UP AND REVIEW

Method

- a) Implement evaluation procedure, use control charts and have six monthly reports for evaluation.
- b) Make modification if required.

IX. STUDENT QUALITY CIRCLES

Student quality circles work on the original philosophy of Total Quality Management. The idea of Student quality circles was presented by City Montessori School (CMS) Lucknow, India at a conference in Hong Kong in October 1994. It was developed and mentored by duo engineers of Indian Railways PC Bihari and Swami Das in association with Principal Dr. Kamran of CMS Lucknow India. They were inspired and facilitated by Jagdish Gandhi, the founder of CMS after his visit to Japan where he learned about Kaizen. The world's first Student quality circles was made in CMS Lucknow with then 13-year- old student, Ms. Sucheta Bihari as its leader. CMS conducts international conventions on student quality circles which it has repeated every 2 years to the present day. After seeing its utility, the visionary educationalists from many countries started these circles. The World Council for Total Quality & Excellence in Education was established in 1999 with its Corporate Office in Lucknow and head office at Singapore. It monitors and facilitates student quality circle activities to its member countries which are more than a dozen. Student quality circles are considered to be a co-curricular activity. They have been established in India, Bangladesh, Pakistan, Nepal, Sri Lanka, Turkey, Mauritius, Iran, UK (Kingston University and started in University of Leicester), and USA. In Nepal, Prof. Dinesh P. Chapagain has been promoting this innovative approach through QUEST-Nepal since 1999. He has written a book entitled "A Guide Book on Students' Quality Circle: An Approach to prepare Total Quality People", which is considered a standard guide to promote Student quality circles in academia for students' personality development.

X. CAUSES FOR FAILURE OF QUALITY CIRCLE

Some of the common causes for failure are :

- Low morale of employees due to autocratic management and lack of trust.
- Lack of training.

- Incompetent leadership.
- Lack of management support.

Quality circle concept succeeded in Japan, South Korea and a few other Asian countries, but it was a different kind of experience in Europe and USA. In Europe and USA, it became very popular from middle of 70s to middle of 80s, and subsequently, started its journey of declining from there onwards.

THE REASONS CAN BE ATTRIBUTED TO

In Japan, it was mainly considered as a development process of grass-root employees, and organizational improvement was given secondary importance, whereas in Europe and USA, the focus was given to organizational improvement and no proper attention was paid to improvement of people.

Work associated to Quality Circle is totally carried out as an internal process in Japan, whereas in Europe and USA, the focus was given to organizational improvement and no proper attention was paid to improvement of people.

Work associated to Quality Circle is totally carried out as an internal process in Japan, whereas in Europe and USA, it was left to the external consulting agency. In India too, these reasons are equally valid and applicable.

XI. QUALITY CIRCLE TECHNIQUES

The most common techniques are :

- Brainstorming
- Data Gathering (sampling)
- Check Sheets
- Pareto Analysis
- Cause-&-Effect Problem Analysis
- Presentation Techniques
- Histograms
- Control Charts
- Stratification
- Scatter Diagrams.

BRAINSTORMING

The technique used to bring everyone's ideas out into the open is "brainstorming." Each member, in turn, voice out a possible cause of the problem. These ideas spark enthusiasm and originality, wild ideas are safe to offer because the rules of brainstorming do not permit criticism or ridicule. All ideas are recorded for later analysis.

DATA GATHERING

A major function of Circle is to analyze problems. Usually, before analysis can begin data must be accumulated. This is frequently done by the Circle members. Thus, training in data gathering and sampling techniques is necessary to assure accuracy and save time. Check sheets are convenient and economical ways to collect data.

PARETO ANALYSIS

Pareto analysis is a formal technique useful where many possible courses of action are competing for attention. In essence, the problem-solver estimates the benefit delivered by each action, then selects a number of the most effective actions that deliver a total benefit reasonably close to the maximal possible one.

Pareto analysis is a creative way of looking at causes of problems because it helps stimulate thinking and organize thoughts. However, it can be limited by its exclusion of possibly important problems which may be small initially, but which grow with time. It should be combined with other analytical tools such as Failure Mode Effects Analysis and Fault Tree Analysis.

Pareto analysis helps to identify the top portion of causes that need to be addressed to resolve the majority of problems. Once the predominant causes are identified, then tools like the Ishikawa Diagram or Fish-bone Analysis can be used to identify the root causes of the problems. While it is common to refer to Pareto as "80/20" rule, under the assumption that, in all situations, 20% of causes determine 80% of problems, this ratio is merely a convenient rule of thumb and is not nor should it be considered immutable law of nature.

CAUSE-AND-EFFECT ANALYSIS

This is a widely used and popular quality circle technique. A diagram with the appearance of a fish-bone is constructed

while the problem is being brainstormed for possible causes. Later, cause-and-effect analysis identifies the most likely cause.

PRESENTATION TECHNIQUES

The best plan in the world will fall on its face unless it is properly sold. Several times a year each Circle has to do just that. The members use a presentation setting to make recommendations or provide status to their manager. Their training in presentation techniques includes the basics of public speaking and the fundamentals of preparing and using graphs and charts.

HISTOGRAM

A histogram is a graph that display the distribution of something being measured. Each column in the histogram represent a certain measurement. Circle members are taught to interpret the meaning of various shaped histograms.

CONTROL CHART

Control chart are basically line graph that record the number of defects each period, (e.g. shift, day, week, etc.). what makes these charts different are the control limit lines. These are simply two dotted lines, one above and one below the solid line that depict the actual defect level. If that actual defect line stays within these control limits, all is okay. Circles are trained to use and interpret this problem prevention tool.

STRATIFICATION

Sometimes a problem is best analyzes by taking it apart and examining each piece separately. For example, an excessive number of errors are occurring in one large department. It may be best to separately analyze what the error rate is within each group in that department. Perhaps the problem exists only in one small area.

SCATTER DIAGRAM

A scatter diagram is a useful analytical tool, as it shows relationships between two variables, e.g., weight and volume.

XII. QUALITY CIRCLE SUCCESS STORY IN INDIA

Quality Circle took birth in India in 1982 and some of the

industries to launch Quality Circle first were Bharat Electronics Limited, Bangalore and Bharat Heavy Electricals Limited, Trichy. However, with the progress of time, Quality Circle achieved success in a number of industries in India, to name a few are TATA, TELCO, Reliance Industries Limited and Kirloskar Brothers Limited .

XIII. CONCLUSION

Quality Circle concept if appropriately implemented in industries, the results will not only be amazing but it will also help these companies to stumble on outside over their own lacunae and facilitate designing of better system. Quality circles can be a very useful tool for solving work-related problems. It helps in involvement of employees in decision-making, promoting good relationships among colleagues, encouraging team work and developing problem-solving skills.

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