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Quality control circle research methodology

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Abstract
In modern times, every one including industry, organisation academy and institute need to maintain their quality in their respective field. Quality circle is the technic or method which implies and the organization to maintain and improvise their field of work. In this paper, Quality circle methodology is defined and explained how everyone can implies this methodology in their respective field.

Keywords: Methodology, industry, organisation

Introduction
Quality Circle Definition
According to President of International Association of Quality Circles Dewar "Quality Circle is a way of capturing the creative and innovative power that lies within work force".

Quality Circle is defined as a minor cluster of workforces in the analogous field who willingly meet repeatedly and whose particular task is to classify the complications linked to quality enhancement, articulate optimal explanations and present their consequences to administration along with recommendations for execution.

QC is a slight get-together of 6 to 12 staff members undertaking alike effort who gladly come together on a consistent root for identification and enhancements in their corresponding task zones.

QC characterize an assembly consisted of 3 to 15 employees from internal members of an organization. Basically eight employees are compulsory to make up a QC according to the subject of Statistics when previous data was analysed.

"Quality circle is a small group of employees in the some 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.

"Quality circles are a formal, institutionalized mechanism for productive and participative problem-solving interaction among employees".

"Quality control circle is not just a little room adjacent to the factory floor, whose occupants make a nuisance of themselves to everyone else. It is a state of mind and a matter of leadership with everyone from the president to production trainee involved".

"Quality circle is a small group to perform capital quality control activities within the same workshop. This small group carries on continuously as a part of companywide quality control activities self-development and mutual development and improvement within the workshop, utilizing quality control techniques with all members participating".

Quality Circle History
The credit of QC origin goes to nation Japan. As soon as QC development takes place, more than 50 nations accepted it over the Ishikawa strategy. JUSE alone officially recorded more than 200000 QCs. QCC is responsible for origin of the concept TQM. Initially, Dr. Ishikawa supposed QCs dependence on parameters sole to society of nation Japan. But he imagined that QCs helps to do well in any nation that utilised the Chinese alphabet after looking at results of QCs implementation in nations South Korea and Taiwan.

As time passes away, the accomplishment of QCs from place to place in world led Dr. Ishikawa to an innovative decision i.e. QCs are successful as they are familiar to the autonomous nature of civilization.

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Dr. Ishikawa inscribed "Wherever they are, human beings are human beings" in a 1980 introduction to the English paraphrase of the Koryo. QC is a participative management system in which workers provide suggestions & enhancements for the betterment of the industry.

Meaning of Quality Circle

In Japan, quality circles are organized within a department or work area for the purpose of studying and eliminating production related problems. They are problem solving teams which use simple statistical methods to research and decide on solutions to workshop problems.

Quality circles in North America are similar to Japanese circles in spite of the fact that each may emphasize a particular function such as a problem solving, team building or quality control.

Underlying the quality circle concept is the assumption that the causes of quality or productivity problems are unknown to workers and to management. It is also assumed that shop floor workers have hands on knowledge, are creative and can be trained to use this natural creativity in job problem solving. Quality circles, however, are a people building, rather than a people using, approach.

Quality Circle Characteristics

- QCs are group task.
- QC includes work performers instead of top management.
- QCs are truthfully participative.
- QC is not a procedure but it is a thinking.
- QC is approach from low-to-high management.
- QCs are not supervision focused but administration reinforced.
- QCs are not compelled or essential but voluntary.
- QCs include minimum three members and maximum twelve members i.e. it is a small set of persons from all primary departments.

Outcomes of Quality Circles

- Controller and Quality Enhancement.
- Work life up gradation.
- Enhancement of entire performance.
- Self-development.
- Communal Progress.

Benefits of Quality Circles

Any industry adopting the QC technique as the problem solving technique gets following benefits as output: -

- Endorse best production level along with quality-mindedness.
- Members get self-development as well as mutual development.
- Generating unity in employees and team spirit.
- Enhanced motivation, pride feeling in respective work along with job satisfaction.
- Effective decrease in absenteeism & turnover of labour.
- Emerging a bond of belongingness for a specific industry.
- Reduction of wastage.
- Economical technique i.e. effective and efficient decrease in cost.
- Inspires staff members for training.
- Motivates staff employees for Leadership purpose so that a best leader can lead the whole team towards industry goals.
- Enhancement in safety work.
- Better identification of job correlated difficulties and optimal solution as output.
- Communication gap between staff members is effectively reduced.
- Optimal utilization of all available human resources potential.
- Moral of industry employees and their consciousness is significantly increased through appreciation of their individual specific activities.

De-Merits of quality circle

- Variations in control & system may become essential.
- After QC successful implementation, a time period of confusion may result because everyone will be doing experiment with new ideas, new skills and new roles.
- At the beginning of QCs, the whole productivity may decrease initially because the employees turn from their daily work to the task of organising themselves & undergoing training.
- A huge amount of money & time is needed for a new concept implementation i.e. essentially new & unproven in the industries context.
- The chances of happening mistakes increase at the beginning. Mistakes are inevitable as all staff members adjust to a new idea of doing tasks.
- Due to over-expectation of few members may result in disappointment and drop out because of their initial high excitation.
- QCs may threaten conventional authority structure. Threatened authorities are likely to resist & non-cooperate with the QC activities.
- Some members may feel uncomfortable with QCs as they are dependent on supervisor's instructions & directions for working.

Features of Quality Circles

The main features of quality circles are:

a) Quality circle is a small group of employees

Quality circle is a small group of employee of 8 to 10. A circle with less than 5 members would lose its vitality due to high rate of absenteeism. This may cause a circle to become inactive. On the other hand, more than 15 members in a circle could result in denial of opportunity for active participation by ever one. As such, 8 to 10 are recommended as the minimum and maximum strength of quality circles respectively. The reason for such numbers is that number of interaction among members would be manageable.

b) Quality circle is organized in the same work area or doing similar type of work

A quality circle is a homogeneous group and not an inter-departmental or inter-disciplinary one. Members participating in circle activities must be on the same wave-length. Discussion taking place at the meetings should be intelligible to each one of the members. This is possible only if the composition of the circle includes employees working in the same work area or engaged in a similar type of work. Designations of members need not necessarily be equal but the work in which they all are engaged should be common. For example, in any assembly area, turner, drillers, electricians, and unskilled workers, etc. could decide to from a circle. Similarly, circles could be composed

of stenographers in an office, operators in a group of milling machines, nurses in hospitals, draughts men in an engineering section, clerks in a bank's etc.

c) Quality circles are voluntary
Employees decide to join quality circles on their own willingness. No compulsion, coercion or pressure can be brought on any employee to join or not to join quality circles. This is based on voluntarism principle.

d) Quality circles meet regularly for about an hour every week
Normally, a quality circle meets for about an hour every week. It is therefore possible for the circle to meet at least three or four times a month. The regularity of such meetings is very significant and it must be adhered to. These meetings could be conducted during or after working hours. This decision is left to quality circle members themselves. For example the Bharat Heavy Electric Ltd. Bangalore, have been conducting the meetings for an hour after the shift hours on every Saturdays.

e) Quality circles identifies, analyses and resolves work-related problems
The employees The employees who work continuously in a work area knows best what problems are hindering achievement of high quality, productivity and optimum performance as also how they can be remedied. The members of quality circles themselves can, therefore, identify problems and entertain requests from the management and other departments to look into certain problems that may be worrying them. The focus of quality circles is "work related problems" and not other extraneous issues such as grievances or demands.

For Example in a nonferrous foundry in BHEL, Hyderabad, one of the problems identified by a quality circle was on an unhealthy, smoke polluted environment. Any unenlightened management might construe this problem as a grievance. But managerial maturity would also recognize that productivity and quality of work would be affected by such unclean environmental conditions. In this instance, the problem which had been repeatedly highlighted but had defied a solution for many years in the past was resolved by the quality circle members who analysed the problem systematically, found a solution and got it implemented with the cooperation of everyone in just six months.

f) Quality circle leads to total performance
As quality circles resolve work related problems relating to quality, productivity, cost reduction, safety etc. the total performance of the work area naturally improves. This results in both tangible and intangible gains to the whole organization.

g) Quality circle enrich work life
The spin off benefits of quality circles of the organization includes enrichment of the work life of their employees apart from attitudinal changes, cohesive team culture, etc. Improved working environment, happier relations with co-employees, greater job satisfaction etc. are responsible for this enrichment of their work life.

Operation of Quality Circle
The operation of quality circle takes place following way.
a) The initial meeting is held (week 1): Quality circle members meet at the appointed place and time and choose their leader and deputy leader by consensus [23]. The facilitator or the coordinator provides the members with the necessary stationery such as pens, paper, notebooks, black board and any other items useful and necessary for their activities. Then the group, if it so chooses, gives itself a name for individual identity. The facilitator makes introductory remarks by way of reaffirming the management's support and its best wishes for the success of the circle activities. Thereafter he withdraws and leaves the floor to the leader for conducting further proceedings. The leader and the members take the opportunity to get to know each other better in the new context of the circle activities. The leader concludes the hour long meeting informing the members that they would be conducting brainstorming at the second meeting to identify all the problems coming in the way of better quality, productivity and optimum performance of the work area.
b) The second /third meeting: When the quality circles start functioning, they are able to identify a large number of issues affecting their work adversely during their first few brainstorming sessions. The management, perhaps, may not even be aware of such problems. Through their own brainstorming efforts and suggestions from other related agencies, quality circle members compile a list of all the problems that require to be tackled by them one after the other . It may be so that circle members are exercising their creativity for the first time and therefore, problems may not strike their mind easily.

They could then be guided to ask themselves the following questions which would trigger their thinking.
- What specific jobs give you the most problems?
- What jobs are held up because of delays or bottlenecks?
- What jobs are causing a lot of rework?
- What reports, form or records require unnecessary information?
- Where can an operation be combined with another to save time?
- Can any process be made more efficient by new or modification of fixtures / jigs?
- What jobs or procedures take too long?
- Where can better use of space be made?
- On what jobs are too many mistakes being made or quality and work is unsatisfactory?
- Where can wear and tear or equipment are reduced?
- Where can materials, parts or supplies are reduced?
- What jobs require a lot of checking?
- Can any material be substituted for cost effectiveness?

The problems that may be tackled by quality circles can be classified as
(a) Those which affect their work-area and implementation of their solutions is under the purview of the quality circles.
(b) Those which affect their work area but have in interface with other departments and implementation of recommendations can only be done with the cooperation of others.
(c) Those which are totally outside the purview of the quality circle.
Initially some guidance from facilitators may be necessary so that quality circles do not take up

problems under category © but give priority to problems under category (a) and thereafter to those under (b).

d) The fourth meeting: The circle members now take up the task of assigning priorities to the problems that they have identified. The prioritizing of problems could on the basis of any other three criteria, either simplicity of the problem, which could be taken up first and resolved so that the members start developing self confidence in regard to their own capabilities to identify and resolve problems. Or by collecting or generating data as the case may be and subsequently using the pair to analysis to identify which problem is hurting the work area performance the most. Or the members may also be asked by the leader to give their individual preferences for the selection of the priority problem. Which ever gets the highest number of preferences is taken up for resolving first and others subsequently in order of number of votes received. The circle leader or members may seek the guidance of other executives or the facilitator before coming to any conclusions in this respect.

e) The next two or three meetings: Having decided the priority of problems, and the first one to be tackled, the circle starts systematically analysing the data relating to it. The necessary data is gathered from the concerned agencies or may be generated by observation, if it is not readily available. The data required could be on the frequency of occurrence, quantum of rejections or non-conformances etc., which could indicate the depth of the problem. All the factors identified as responsible for the problems are listed out again by brainstorming. The important ones are segregated from the trivial ones by the use of pare to analysis. Cause and effect diagrams are drawn to analyses the factors. This enables the members to ensure that no probable reason for the problem is overlooked.

f) The factors which are identified as being responsible for the problems are then individually taken up and solutions acceptable to all are arrived at. In order to ensure that solutions which are beneficial to the work area where circles are operating do not pose fresh problems in other related sections, members are advised to involve representatives of other areas which are likely to be affected by the decision at the discussions stage itself.

Circle members usually try out the validity of their recommendation in their free time before it is finally adopted. A quality circle in a workshop decided to incorporate a new fixture in the method of machining, but before declaring the solution arrived at, they, in their own free time, went to the scrap yard, collected the necessary materials, manufactured a prototype outside the working hours and proved the advantages and feasibility of their suggestion before recommending it for adoption in technological documents. In the case of recommendations by quality circles which require the sanction of the highest authorities in the organization, they may be considered by the steering committee at its periodical meetings. Alternately, at the management presentations in the presence of the steering committee, the circle members give the required clarifications and a final decision on the practicality of the recommendation is given.

g) Implementation solutions: After arriving at a solution by consensus the circle members ensure that it is also implemented. If it is falling within their own purview, they may consult the local executives or managers and proceed to execute it. If implementation of their solution has to be followed up by some other agencies or by other higher levels of management, it could be passed on to them through the facilitator. However, even in such cases, the group pressure catalyses prompt action by the concerned agency to implement the circle's recommendations.

Thus the operation cycle for each problem taken up by quality circles is completed. And then the problem next on the list is taken up and is similarly treated in a systematic manner.

Management Presentation

Management presentation is the culmination of a circle's project study. The recommended solution of the selected problem would be more effective and purposeful if the presentation is made in a systematic way. These case studies would also serve as effective educational tools in future.

The benefits of introducing a quality control circle program in the work place are many

▪ Heightened quality awareness reveals faults in the system that might obstruct good practices.
▪ It improves the quality of your firm's products and services, thereby increasing the value of your brand, and securing your customers' confidence. The quality of customer relationship management can be further enhanced by using help desk software from the likes of pro software.
▪ The people who are part of the quality control circle will feel a sense of ownership for the project. Higher yields and lower rejection rates also result in enhanced job satisfaction for workers, which in turn drives them to contribute more.
▪ A quality control circle program also brings about improved two-way communication between the staff and the management.
▪ Finally, the financial benefits will certainly exceed the costs of implementing the program. A study revealed that some companies improved their savings tenfold!

Conclusion

Generally, a quality control circle program requires the same framework as an ISO 9000 quality standard with regard to the management structure and training. Hence, QCCs should be part and parcel of your company's Total Quality Management (TQM) initiative.

However, QC followed some ethics, those are:
▪ Criticize ideas, not persons.
▪ The only stupid question is the one that is not asked.
▪ Everyone in the team is responsible for the team's progress.
▪ Be open to other's ideas.
▪ Pay, terms of employment and other negotiable items are excluded.

Limitations OR when QC is inactive?

▪ Inadequate Training
▪ Unsure of Purpose
▪ Not truly Voluntary

- Lack of Management Interest
- Quality Circles are not really empowered to make decisions.
- Too many suggestions.

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