Total Quality Management procedures to improve Military Quality System Enterprise

Jaafar Sadeq Abdulhasan, 1Abdul Rashid Abdul Aziz, 1Mastura Jaafar and 1Norhidayah Md Ulang

1School of Housing, Building and Planning, Universiti Sains Malaysia
2Military Training Directorate, Ministry of Defense of Iraq

ABSTRACT

This paper has been highlighted the coordination of tasks between the tools and techniques of Total Quality Management to detect the root causes of stumbling the Quality Management System (QMS) in military construction enterprise. Each and every one tool of TQM has a specified mission and specific position in the development plan. The outputs of a tool represent the input to advanced tools. Conflict between sequential task's results have a negative impact on senior management's commitment to apply the result of the development plan. The Quality Circles (QCs) are used to detect the root cause of problems through brainstorming sessions for senior engineers of the Iraqi Directorate of Military Works (IDWM). Then, Ishikawa and Pareto analysis, are TQM techniques, analysed the root cause of problems which involves arranging and sorting the suggested solutions of the problems, according to their importance to find relatively few solutions which have the majority of effects to reduce or eliminate the existing problems. The Ishikawa analysis helps to identify the main causes and sub causes of the problems. While, Pareto analysis helps to identify the top portion of suggested solutions that need to be addressed to resolve the majority of problems.

INTRODUCTION

The Specialist Missions of IDMW are the planning and implementation of the infrastructure projects for the Iraqi army whether new constructions or rehabilitation constructions. The Regulatory Authorities' reports in Iraq indicated issues in the quality of infrastructure of Iraqi military units that had been inspected[1]. The IDMW must take action steps to remove sources of these deficiencies and avoid repeating these deficiencies in the inspection reports to others army units. The QC's definition as a group of workers voluntarily form (usually 6 to 12 members in each circle) performing similar duties who meet periodically to discuss work-related problems, offer suggestions for improved quality [2]. The QCs' concept is different from Team work's concept, Table 1 illustrates the difference between those two concepts[3].

The Brainstorming is process for generating creative ideas and solutions through intensive and freewheeling group discussion. Every participant is encouraged to think aloud and suggest as many ideas as possible, no matter seemingly how outlandish or bizarre. Analysis, discussion, or criticism of the aired ideas is allowed only when the brainstorming session is over and evaluation session begins. The questions of brainstorming can be regarded as a tool for expressing the real problem in the organization or a tool which helps to detect, and to clarify, while the Brainstorming solutions are a tool for exploratory answers to those problems in the organization. The Brainstorming considers a one of the most important tools QCs, while the Brainstorming solutions are a tool for exploratory answers to those problems in the organization. The Brainstorming considers a one of the most important tools QCs[2], as well as, a tool to thorough examination of the environment of an organization that is starting from the cultural root of the organization or the effectiveness of its divisions up to the highest peak in the organization. Brainstorming's results is the perception of the causes of the current situation of the organization and the appropriate proposals for solutions. The Brainstorming Procedures are summarized in five main stages are:
The first phase, a phase of preparation and training for each the circle element.
The second phase, the generating ideas silently stage.
The third phase, the ideas unification stage.
The fourth phase, the filtering stage without going to discuss the relative importance of any of them or priorities at this stage.
The fifth phase, the voting stage, is sequencing of the factors according to factor’s importance.
The final phase, the weighting factors according to factors importance.

Ishikawa Diagram also called Fishbone diagram is causal diagrams created by Kaoru Ishikawa in 1968. The professor Slack definite cause and effect diagram as that “A technique for searching out the root cause of problems, it is a systematic questioning technique being a particularly effective method of helping to search for the root”, also he adds Ishikawa diagram is a particularly effective method of helping to search for the root causes of problems. Fishbone identify areas where further data are needed.

Pareto diagram is based on the phenomenon of relatively few causes explaining the majority of effects. Alfredo Pareto, Italian economic scientist, found diagram in 1897 first time, analysed the national income, he was discovered that the 80% of local wealth is owned to the 20% of the population. The purpose of the Pareto diagram is to distinguish between the ‘vital few’ issues and the ‘trivial many’. It is a relatively straightforward technique which involves arranging items of information on the types of problem or causes of problem into their order of importance (usually measured by ‘frequency of occurrence’). This can be used to highlight areas where further decision making will be useful. Dr. Juran was the first used the Pareto diagram in quality control to determine the deviation in production processes.

Table 1: Difference between QCs and Team works.

<table>
<thead>
<tr>
<th>Item</th>
<th>Comparison Criteria</th>
<th>The Quality Circles</th>
<th>The Teamwork’s</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Mission</td>
<td>The completion of specific work to solve a specific problem.</td>
<td>Assignation to complete the work or mission integrated.</td>
</tr>
<tr>
<td>2</td>
<td>Participation</td>
<td>They is voluntary and not within the organizational structure of the organization.</td>
<td>They is obligatory as part of the organizational structure of the organization.</td>
</tr>
<tr>
<td>3</td>
<td>Decision Authority</td>
<td>They take decisions consultancy</td>
<td>They provide proposals to take executive decisions</td>
</tr>
<tr>
<td>4</td>
<td>Missions period</td>
<td>They are temporary and end when achieve the goals.</td>
<td>They are Permanent and remain throughout the Organization life.</td>
</tr>
<tr>
<td>5</td>
<td>Duties</td>
<td>Their duties are variable</td>
<td>Their duties are fixed</td>
</tr>
<tr>
<td>6</td>
<td>Target</td>
<td>Encouraging teamwork and enhance team spirit.</td>
<td>Achievement of a specific goal by senior management.</td>
</tr>
<tr>
<td>7</td>
<td>Basic feature</td>
<td>A training tool for the development of the work and solve problems collectively.</td>
<td>Implementation of the work collectively.</td>
</tr>
</tbody>
</table>

Methodology:

Establishment steps of QCs start, when senior management takes in organization decisions the establishment of QCs, then prepares the environment as provide administrative tangible tools, the physical devices, secretaries... etc... The nomination to participate of the QCs is accepted for those who have a degree Director of the Division or onwards. The number of target group, according to the organization staffs. The ages of target group between 34 years to 55 years and there have the actual service between 10 years to 35 years. The number of elements in a quality circle is limited to ten members include the leader and the facilitator of the circle.

Each member of QCs is allowed to submit proposals of merger, modification or deletion from the ideas put forward the consolidated list with an explanation the causes his proposal until an update list which represent the factors that unanimous opinions of the participants as providing appropriate solutions to existing problems without going to discuss the relative importance of any of them or priorities at this stage. Then the voting stage, is sequencing of the factors, according to factor’s importance, so that the members will re-sequence factors on the update list by determining the relative importance of each factor to grant the most important factor sequence number “one” and the granting of the next factor sequence number “two”, and so on until the last factor. After finished last step, the cause’s roots that can be derived from brainstorming sessions are often categorized in Ishikawa diagram or Cause-and-effect diagrams can reveal key relationships among various variables, and the possible causes provide additional insight into QMS behaviour. Then be labelled as categories of Ishikawa diagram can be done depending on the characteristics common to the root cause of problems in the treatment of the problem existing and the nature of the work of the Organization. The main aim of the major classification is to give visualization to the senior management of the organization possible solutions domain in relatively few details because of may be the solutions domain may have been outside their authority such as needs new laws and powers.
RESULTS AND DISCUSSION

(i) **Ishikawa Diagram for causes root of the problems of QMS in IDMW:**

Figure 1, shows Ishikawa Diagram for causes root of the problems of QMS in IDMW. The Diagram shown the following:
- 29.74% of the main problem is caused, arising from people's perspective in IDMW. The sub problems of people's perspective classified into Weakness Focusing on internal and external Customers by 13.94%, Weakness employees of involvement by 10.5%, and Poor participation of suppliers by 5.3%.
- 28.33% of the main problem is caused, arising from Quality Processes perspective of IDMW. The sub problems of Processes’ perspective classified into Inadequate use of Feed-back of processes by 15.17%, Lack of benchmarking by 10.13%, and Weakness communication to prevent mistakes by 3.03%.
- 22.31% of the main problem is caused, arising from powers grant limitation for senior management in IDMW. The sub problems of powers grant limitation classified into weakness strategic planning for quality by 4.88%, Inadequate of Top Management Supporting by 12.44%, and Inadequate use of teamwork by 4.99%.
- 19.62% of the main problem is caused, arising from training program limitation in IDMW. The sub problems training program classified into Lack of proper Training and education by 9.22%, Lack of continuous improvement Programmes by 8.29%, and No common metric to measure the level of quality attained by 4.99%.

![Ishikawa Diagram](image)

Fig. 1: Ishikawa Diagram suggested solutions of QCs in IDMW.

(ii) **Pareto analysis of suggested solutions of QCs in IDMW:**

Figure 2, illustrates a Pareto diagram of suggested solutions for QCs in IDMW. The QCs suggested 25 solutions which they thought necessary to reduce or eliminate the existing problems. The Pareto analysis rearranges this suggested solution according to them important. Than Pareto diagram shown only 14 from 25 of suggested solutions have affected more than 80% of the existing problems. As well as the first seven of suggested solutions have affected more than 50% of the main problem.

![Pareto Diagram](image)

Fig. 2: Pareto diagram of suggested solutions of QCs in IDMW.
Summary:
The improvement of the QMS requires improving the environmental conditions within the organization, encourages employees to take responsibility for improving the quality, liberation from fear, and break the ice with senior management. The TQM philosophy cares complementarity of all operations and activities within the organization, as well as its tendency forward Customer satisfaction. The process of improvement involves the applying TQM tools to understand the quality and improve manufacturing operations. The TQM tools help the organization to gather information, generate ideas, analysis and diagnosis of the causes and develop and evaluate manufacturing processes. The TQM tools illustrate the main problem of drop quality indicator of infrastructure in Iraqi military units, primarily arising from Weakness Focusing on internal and external Customers, Weakness employees of involvement, and Poor participation of suppliers. Secondly, rising inadequate use of feedback about processes, Lack of benchmarking, and Weakness communication to prevent mistakes. As well as the first seven of suggested solutions for senior engineers have affected more than 50% to reduce or eliminate on the Stumblingof QMS reasons in Iraq.

REFERENCES

[5] Slack, N. and R. Johnston, OPERATIONS MANAGEMENT.