Supporting Cocument 10.2

Total Quality Control System

(a) Definition to Quality Control

The terms of Quality control, Total quality control and Quality are defined as follow;

Quality Control is a system of means to economically produce goods or service or services that satisfy customer requirements. When QC was firstly introduced in 1950, the main emphasis was on improving product quality by applying statistical tools in the production processes. Now QC is used as a tool to build a system of continuing interaction among all elements responsible for the conduct of a company's business so as to achieve the improved quality that satisfies the customer's demand.

Total Quality Control organized QC activities involving everyone in a company - managers and workers - in a totally integrated effort toward satisfying such cross functional goals as quality, cost, scheduling, manpower development, and new product development. It is assumed that those activities ultimately lead to increased customer satisfaction. (also referred to as CWQC – Company Quality Control)

Quality is anything that can be improved, In TQC, the first and foremost concern is with the quality of people. A company able to build quality into its people is already halfway toward producing quality products. The three building blocks of business are Hardware, Software and Human-ware, Only after the Human-ware is squarely in place should the hardware and software aspects of business be considered. According to the JIS (Japan Industrial Standards), the term of TQC is also explained as follows;

Implementing quality control effectively necessitates the co-operation of all people in the company, including top management, managers, supervisors, and workers in all area of corporate activities such as market research and development, product planning, design, preparation for production, purchasing, vendor management, manufacturing, and training and education,

Quality control carried out in this manner is called company-wide quality control or total quality control.

In order to satisfy customer requirements, essential 3 condition to QC system are QCS (Quality, Cost, Scheduling).

Quality products or quality service within a certain reasonable costs have to be delivered to customers within a certain limited period.

(b) PDCA Cycle

The PDCA (Plan, Do, Check, Action) Cycle is an adaptation of the Deming wheel.

Where the Deming wheel stresses the need for constant interaction among research, design, production, and sales, the PDCA Cycle asserts that every managerial action can be improved by careful application of the sequence: plan, do, check, action.

As for refinement of the PDCA Cycle, it will be useful to apply SDCA (Standardizes, Do, Check, Action) Cycle i.e., management decides first to establish the standards before performing the regular PDCA function.

Steps of Plan, Do, Check and Action are explained as follows:

a) Plan: It beginning with a study of the current situation, during which data are gathered to be used in formulating a plan for improvement.

The study is made by using statistical tools such as the seven tools of QC as shown in later part.

b) Do: Once this plan has been finalized, it is implemented by applying the above plan.

c) After that, the implemented condition is checked to see whether it has brought about the anticipated improvement.

d) When the experiment has been successful, action such as methodological standardization, institutionalization of the improvement is taken to ensure that the new methods introduced will be practiced continuously for sustained improvement.

The series of PDCA activities are cycle and the improvement/upgrading should be continued. PDCA Cycle and Problem solving cycle are illustrated in the next page.

(c) Standardization of Results

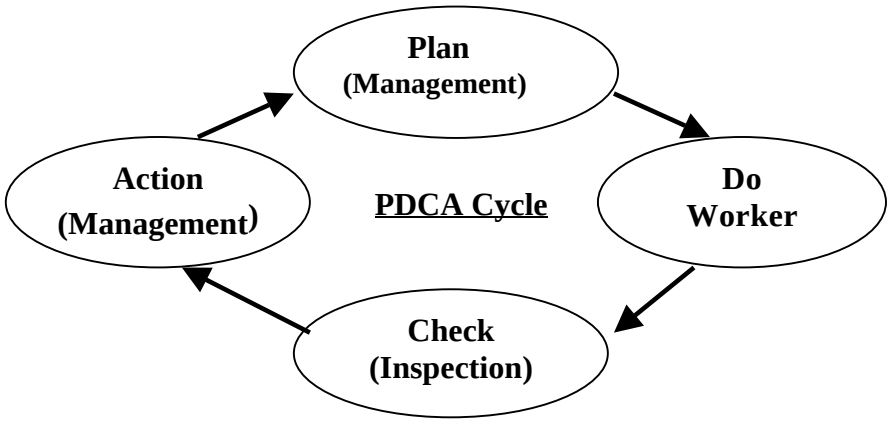
Any kind of implementation, i.e., planning, designing, manufacturing, installation, operation and maintenance, consists of 4M elements (Man, Machine, Material, Method). There must be a precise standard of every manager, every worker, every machine, every material, and every process. Without standards nobody knows the starting point of work improvement exactly. Management has to understand where the company stands and what the work standards are. Management's job is to establish standards and then to introduce discipline so that the standards are maintained.

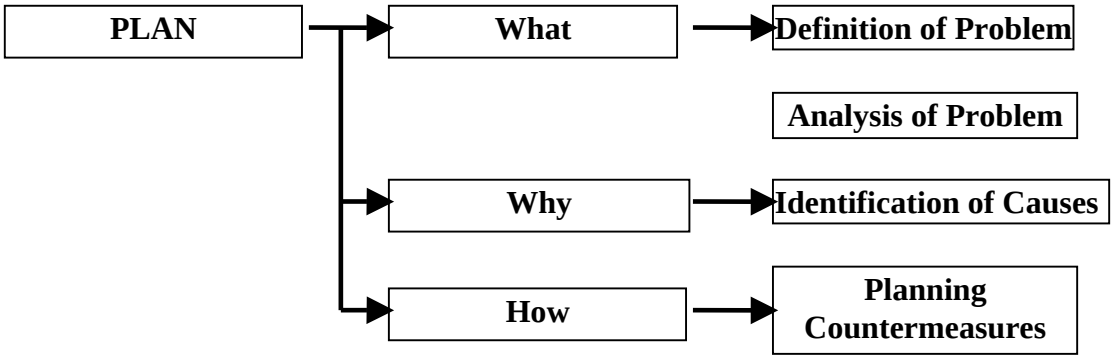
So as to proceed the improvement in an effective way, to take the following 3S actions becomes very important works to be elaborated by managers;

a) Standardization of the elements.

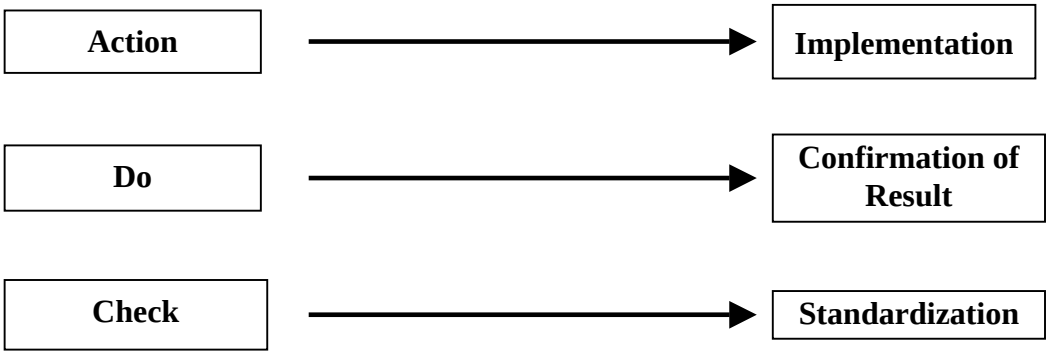
b) Simplification of a series of jobs.

c) Specializations of work fields.





Problem Solving Cycle



The Seven Statistical Tools (Problem Solving Tool

This approach is applied when data are available and the job is to analyses the solve a particular problem.

a) Paretto Diagrams

Those diagrams classify problems according to cause and phenomenon. The problem are diagrammed according to priority, using a bar-graph format, with 100 percent indicating the total amount of value lost.

b) Cause-and-effect Diagrams

These diagrams are used to analyses the characteristics of a process or situation and the factors that contribute to them. Cause-and-effect diagrams are also called “Fishbone Graphs” or “Godzilla-bone Graphs”.

c) Histograms

The frequency data obtained form measurements display a peak around a certain value. The variation of quality characteristics is called “Distribution”, and the figure that illustrates frequency in the from of a pole is referred to as a Histogram. This is used mainly to determine problems by checking the dispersion shape, center, value, and nature of dispersion.

d) Control Charts

There are two types of variations; the inevitable variations that occur under normal conditions and those that can traced to a cause. The latter are referred to as “abnormal”. Control charts serve to detect abnormal trends with the help of graphs. These graphs differ from standard line graphs in that they have control limit lines at the center, top, and bottom levels. Sample data are plotted in dots on the graph to evaluate process situations and trends.

e) Scatter Diagrams

Two pieces of corresponding data are plotted in a scatter diagram. The relation between these plotted dots illustrates the relationship between the corresponding data.

f) Graphs

There are many kinds of graphs employed, depending on the shape desired and the purpose of analysis. Bar graphs compare value via parallel bars, while line graphs are used to illustrate variations over a period of time. Circle graphs indicate the categorical breakdown of values, and radar charts assist in the analysis of previously evaluated items.

g) Check sheets

These are designed to tabulate the results through routine cheking of the situation.

The New Seven QC Tools

In many management situation, the necessary data always available and what data available are in the mind of people concerned and not in the status of quantitative but rather subjective. Therefore, it is necessary to go beyond the analytical approach and to use a design approach to problem solving. The New Seven QC Tools are useful tools to find solutions for these cases.

a) Relations Diagram

This diagrams clarifies the interrelations in a complex situation involving many

interrelated factors and serves to clarify the cause-and-effect relationships among factors.

b) Affinity Diagram

This essentially a brain storming method. It is based on group work in which every participant writes down his ideas and the ideas are then grouped and realigned by subject matter.

c) Tree Diagram

This is an extension of the value-engineering concept of functional analysis. It is applied to show the interrelations among goals and measures.

d) Matrix Diagram

This format is used to clarify the relations between two different factors. The matrix diagram is often used in deploying quality requirements into counterpart (engineering) characteristics and then into production requirements.

e) Matrix Data-analysis Diagram

This diagram is used when the matrix chart does not provide sufficiently detailed information. This is the only method within the New Seven that is based on data analysis and gives numeric results.

f) PDPC (Process Decision Program Chart)

This is an application of the process decision program chart used in operations research. Because implementation program to achieve specific goals does not always go according to plan, and because unexpected developments are likely to have serious consequences. PDPC has been developed not only to arrive at the optimum conclusion but also to avoid surprises.

g) Arrow Diagram

This is often used in PERT (Program Evaluation and Technique) and CPM (Critical Path Method). It used a network representation to show the step necessary to implement a plan.