QUALITY CONTROL,

STATISTICAL QUALITY CONTROL

AND TOTAL QUALITY MANAGEMRNT

OPERATIONS MANAGEMENT

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WHAT IS QUALITY CONTROL

- Quality control is a process that is used to ensure a certain level of quality in a product or service.

Quality Assurance

An overall
management plan to
guarantee the
integrity of data
(The “system”)

Quality Control

A series of
analytical
measurements used
to assess the
quality of the
analytical data
(The “tools”)

7 Basic Tools Of Quality Control

1. Process flow chart
2. Scatterdiagram
3. Control charts
4. Fishbone
5. Check sheet
6. Histogram
7. Pareto analysis

TQM stands as…….

- Total: made up of the whole
- Quality: degree of excellence of a product or service provides.
- Management: Act / Art , manner of handling , controlling & directing it.
- TQM is an enhancement to the traditional way of doing things.

Definition concept & features of TQM

- TQM is defined as both philosophy & set of guiding principles that represent the foundation of a continuously improving org.

- TQM is a comprehensive, org wide effort to improve the quality of product & service, applicable to all org.

- TQM is an approach of improving the effectiveness & flexibility of business as a whole.

Introduction of TQM in India

In early1990s, floodgate of liberalization and globalization was opened in India and suddenly, a wide gap in quality was visible in Indian products and they struggled to compete with Japanese and other progressive companies following TQM principles.

Gradually, Indian companies started appreciating TQM principles . A new branch of management consultants started talking aboutSQC,Kaizenand quality circles. Then emerged a new group of Industries likeTVS Group, Wipro, Infosys, Reliance industries, PCSetc,whopracticed TQM principles like customer focus, continuous improvements, Employee empowerment, Six sigma, ISO 9000,QMS and other SPC techniques. Existing industries likeL&T,Tatagroup, Birlagroupetcalso joined this TQM movement and gained big success in the competitive world.

TQM Philosophy

- TQM Focuses on identifying root causes of quality problem
- It encompasses the entire organization
- It provides guidance on ways of improving quality
- Relies on seven basic concepts
  - Customer focus
  - Continuous improvement
  - Employee empowerment
  - Use of quality tools
  - Product design
  - Process management (kaizen & PDCA)
  - Managing supplier quality

STATISTICAL QUALITY CONTROL

It Deals with the

collection , analysis, interpretation and presentation of large amount of numerical data.

Statistical Methods

- Acceptance Sampling

It applies to lot inspection where a decision to accept or reject a lot of material is made on the basis of a random sample drawn from a lot.

It is done after production is completed.

- Process Sampling

In this the decision is whether to continue the process or to stop production and look for an assignable cause of defects which may stem from the material, machine or the operator.

It is done during production .

The average (mean) of the observations:

$$\overline{X} = \frac{1}{N}\sum_{i=1}^{N} x_i$$

The standard deviation of the observations:

$$\sigma = \sqrt{\frac{\sum_{i=1}^{N}(x_i - \overline{X})^2}{N}}$$

A family restaurant gives a feedback form to its customers to get the feedback in terms the level of satisfaction on the grounds of ambience, food quality and service quality. The hotel offers the scale of 1 to 7 where in the maximum level of satisfaction reflects 7 and least satisfactionreflects 1. The standard is set to a level wherein the average or mean of feedback of all the customers should be approximately 5. The allowed range of error or the standard deviation is 0.04.

REFER EG. 1

LOWER TOLERENCE LIMIT

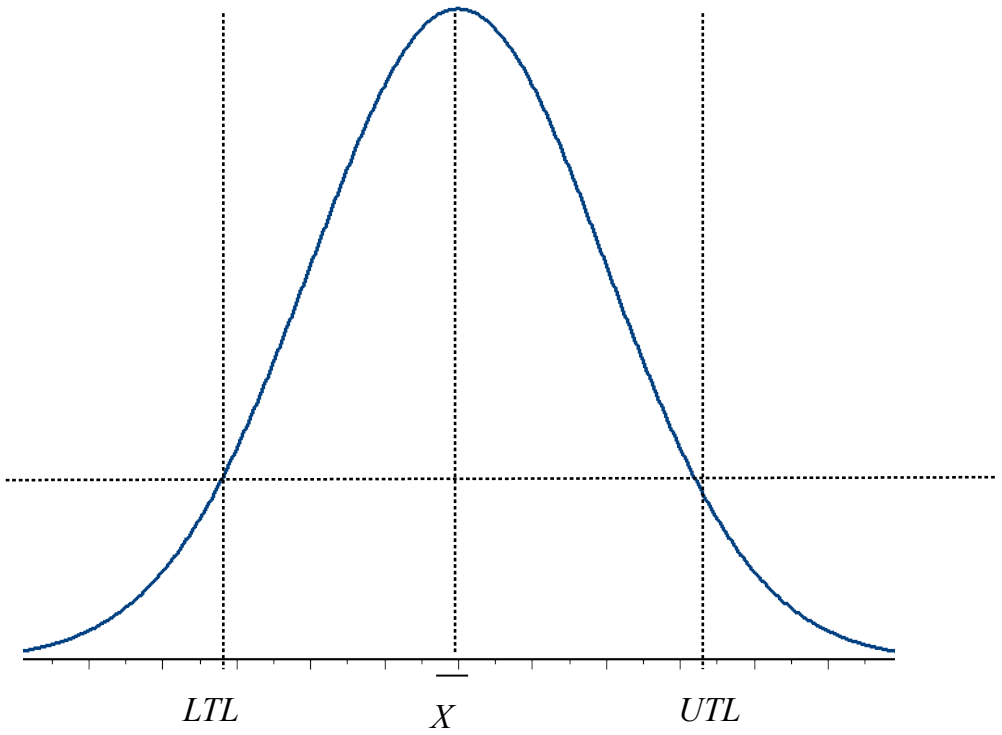
$\bar{X}$

$=X-S.D$

UPPER TOLERENCE LIMIT

$\bar{X}$

$=X+S.D$



Capability Index (C_{pk})

Another way of writing this is to calculate the capability index:

$$C_{pk} = \min\left\{\frac{\bar{X} - LTL}{k\sigma}, \frac{UTL - \bar{X}}{k\sigma}\right\}$$

C_{pk} < 1 means process is not capable at the $k\sigma$ level

C_{pk} >= 1 means process is capable at the $k\sigma$ level

Accuracy and Consistency

We say that a process is accurate if its mean $\bar{X}$ is close the target T.

We say that a process is consistent if its standard deviation is low.

Example

Consider the capability of a process that puts pressurized grease in an aerosol can. The design specs call for an average of 60 pounds per square inch (psi) of pressure in each can with an upper tolerance limit of 65psi and a lower tolerance limit of 55psi. A sample is taken from production and it is found that the cans average 61psi with a standard deviation of 2psi.

1. Is the process capable at the 3σlevel?
2. What is the probability of producing a defect?

Solution

LTL = 55 UTL = $\bar{X} = 61$

$$C_{pk} = \min\left(\frac{\bar{X} - LTL}{3\sigma}, \frac{UTL - \bar{X}}{3\sigma}\right)$$

$$C_{pk} = \min\left(\frac{61 - 55}{6}, \frac{65 - 61}{6}\right) = \min(1, 0.6667) = 0.6667$$

No, the process is not capable at the 3σlevel.

Solution

$P(\text{defect}) = P(X<55) + P(X>65)$

$=P(X<55) + 1 - P(X<65)$

$=P(Z<(55-61)/2) + 1 - P(Z<(65-61)/2)$

$=P(Z<-3) + 1 - P(Z<2)$

$=G(-3)+1-G(2)$

$=0.00135 + 1 - 0.97725$ (from standard normal table)

$= 0.0241$

2.4% of the cans are defective.

conclusion

The main goal of developing TQM (Total Quality Management) culture in the company is to ensure thefulfillmentof customer needs and expectations, even go beyond theexpectations.

Encourage the growth, development and profit of theenterprise

Bring out company’sstrengthsand areas that need theimprovement

Ensureenterprise’s bigger certainty of surviving in changeable competitionconditions