14-Sep-2015

Before defining the quality it is better to have a look on the dimenssions of quality

Dimenssions of Quality:-

Garvin 1987 provides an excellent discussio of 8 components or dimenssions of quality following are the components.

1:- Performance
2:- Reliability
3:- Durability
4:- Servise-ability
5:- Aesthetics
6:- Features
7:- Percived quality
8:- Conformance to Standards

1:- Performance:-
Will the product do the inteded job.

2:- Reliability:-
How often does the product fail.

3:- Durability:-
How long does the product last.

4:- Serviceability:-
How easy is it to repair the product.

5:- Aesthetics:-
What does the product look like.

6:- Features:-
What does the product do.

7. Percieved Quality.
What is the reputation of company or its products.

8. Conformans to Standard.
Is the product made exactly as the designer intended.

15-Sep-2015

Develop a strategy for launching a new brand in your locality or area.

On university road I want to prepare a to open an ice-cream shop where self service is provided. There shop have different flavour of ice-cream & customer make his himself as he desire.

Or in university there may be a bakery "Cakes & Bakes" open.

29-Sep-2015

Definitions of Quality:

From the discussion it is clear that quality is indeed a multi-facet entity. Consequently a simple answer to a question What is quality? or What is quality improvement is not easy.

The traditional definition of quality is based on view point that:

The products & services must need the requirements of those who use them. i.e

"Quality is fitness for use"

Generally there are two aspects of fitness for use

(i) Quality of design
(ii) Quality of conformance

(i) Quality of design:

All goods & services are produced in various grades or levels of quality these variations in grades are intentional & consequently the appropriate technical team is quality of design. e.g: All auto-mobi differ with size appearance, performance etc

(ii) Quality of Conformance:-

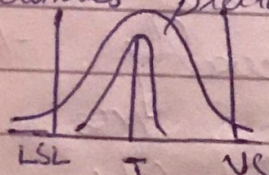
It is how well the product conforms to the specifications required by the design. Quality of conformance is influced by a number of factors e.g: training & supervision of the work force, test & inspection activites etc.

The modern definition is & we will this definition:

"Quality is inversely proportional to its variability"

$$Q \propto \frac{1}{V}$$

e.g Japin's products & other countries products



13-Oct-2015

terminology:-

Quality ~~technology~~ engineering

Every product possess a number of elements that jointly discribed what the user or consumer thinks of as quality. These parameters are often called quality characteristics.

Quality characteristics may be of several types:

- Physical
- Sensory
- Time orientation

1. Physical:
Length, weight, voltage. Things that can be measurable or touchable.
2. Sensory:
Taste, appearance, colour etc
3. Time Orientation:
Things that can be measurable w.r.t time. e.g Realiability, durability, serviceability.
Note:-
Note That the different types of quality characteristic can relate directly or indirectly to the dimensions of quality.

Most organization find it difficult to provide the customer with products that have quality characteristics that are always identical from unit to unit & are at levels that match customer expectations.
A major reason for this is variability. There is a certain amount of variability in every product & consequently no two units of products are ever identical.
If this variation is small then it may have no impact on the consumer. However, if the variation is large then the customer may percieve the unit to be ~~undiffe~~ undistinguishable & unexpectable.

Sources:

Sources of variability include differences in material, differences in performance & operation of the manufacturing equipment & differences in the way the operators perform their tasks.

Statistical Methods:

The variability can only be described in statistical terms. Statistical methods play a central role in quality improvement efforts. To apply statistical methods it is fairly typical to classify data on quality characteristic as either attributes or variables data

Variable data:

Variables data are usually continous measurement such as: length, speed, life, voltage etc

Attribute data:

Attributes data on the other hand are usually discrete data often taking the forms of counts such as: no. of defective fans.

Quality characteristics are often evaluated relative to specifications

Specification:-

Specifications are desired measurement for the Q.C of the components that make up the product as well as the desired values for the Q.C in the final product

Target:-

A value of a measurement that corresponds to the desired value for Q.C is called nominal or target value for that characteristic.

USL:-

The largest allowable value for a Q.C is called upper specification limit. USL

LSL:-

The smallest allowable value for a Q.C is called a lower specification limit LSL

⇒ The specification limit control by engineers.

→ Read about conforming, non-conforming, defective, non-defective, conformity & conformities, defect & defects.

Non-conforming products:- "are those that fail to meet one or of its specification"

Non-conformity:- "A specific type of failure is non-conformity" e.g:- Kam ho raha ha.

⇒ A non-conforming product is considered defective if it has one or more defects.

15-Oct-2015

⇒ What is Statistical process control?
⇒ Chance causes of variation & assignable causes of variation
⇒ Statistical basis of a control chart.

Statiscal process Control:-

Process:-

Process is a sequence of inter-dependent & linked procedures which at every stage consume one or more resources (employes, time, energy, machines, money etc.). to convert inputs (materials, different parts etc.) into outputs

OR

Process is a series of actions or steps taken in order to achieve a particular role or purpose

OR

Process is a machanism to generate outputs by giving inputs. eg:- car machanism, comp
input something to gen
outp

Note:-

Mostly processes are repeatable

Control:-

Control is a way to identify the unusual changes in the process & then elimination of these changes & hence ring the process into normal state.

SPC:-

It is a powerful collection of problem solving tools useful in achieving process stability & improving capability through the reduction of variability.

SPC is one of the greatest technological developments of the 20th century following are the major tools of SPC.

1- Histogram OR Stem & leaf Plot
2- Check Sheet
3- Pareto chart (80-20 distribution e.g in economic view 20% people control 80% things)
4- Cause & effect diagram
5- Defect concentration diagram
6- Scattered diagram (see the direction of two variables)
→7- Control chart

20-Oct-2015

Chance causes & Assign-able causes of variations:-

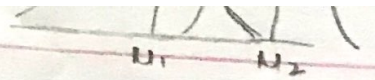
In any production process regardless of how well designed & carefully maintained it is a certain amount of inherent or natural variability will always exist. This natural variability or background noise is the cummilative effect of many small essentially unavoidable causes. In statistical quality control this natural variability is called a stable system of chance causes.

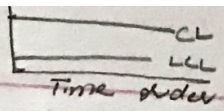
A process that is operating with only chance causes of variation is said to be satisfically in-control. In other words chance causes are an in-herent part of the process.

Other kinds of variability may occianaly be present in the output of process. This variability in quality characteristic usually arises from the following sources

(i) Improper adjusted or controled machines
(ii) Operator error or defective raw materials

Such variability is generally large when compared to the back-ground noise & it usually represents an un-acceptable level of process performance. We refer to these sources of variability that are not part of the chance causes as assign-able causes of variations. A process that is operating in the presence of assign-able causes is said to be an out of control process. A major objective of SPC is to quikly detect the occurance of assign-able causes of process shifts. So that investigation of the process & corrective action may be under-taken before many non-conforming units are manufactured





$\int x f(x) dx$
$= \sum x p(x)$

To monitor location parameter μ & dispersion parameter σ. Walter A Shewhart introduce the concept of control chart

Chance causes / Common causes of variation / in-control
Assignable causes / Special causes of variation / out of control

26-Oct-20

General Model for Shewhart Model chart:-

Let w be a sample statistic that measure some quality characteristic of interest & suppose that mean of w is "μ_w" i.e $E(w) = \mu_w$ & the standard deviation of w is σ_w i.e

$$S.D(w) = \sigma_w = \sqrt{E(w - E(w))^2}$$

Then the central line (CL), the upper control limit (UCL) & the lower control limit (LCL) become

$$UCL = E(w) + k S_d(w) = \mu_w + k\sigma_w$$
$$CL = E(w) = \mu_w$$
$$LCL = E(w) - k S_d(w) = \mu_w - k\sigma_w$$

Where k is the distance of the control limits from the central line expressed in standard deviation units this general theory of control charts was first proposed by Walter-A Shewhart & the control charts developed according to these principles are often called Shewhart control charts.

The most important use of a control chart is to improve the process. Following observation generally have been made

(i) Most processes don't operate in a state of statistical control &

(ii) Consequently the routine & attentive use of control chart will identify assign-able causes if these causes can be eliminated from the process, variability will be reduce & the process will be improved

(iii) The control chart will only detect assign-able causes.

Management, Operator & Engineering action will usually be necessary to eliminate the assign-abled causes.

27-Oct-2015

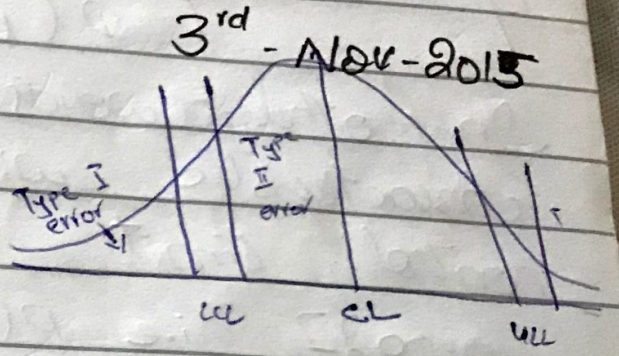
Control Chart

=normsinv(rand())

process.

control or indicate some

3rd - Nov - 2015



If we widen the limits then Type II error increases & Type I error decreases

Choice of Control limits:-

Specifying the control limits is one of the critical decision that must be made in designing a control chart. By moving the control limits farther from the central line we decrease the risk of a Type I error that is the risk of a point falling

falling beyond the control limits indicating an out of control condition when no assign-able cause is present.

However, widening the control limits will also increase the risk of type II error that is the risk of a point falling b/w the control limits when process is really out of control. If we move the control limits close to the central line the opposite effect is obtained.

Consider the quality characteristic say X follows normal distn with mean μ & variance σ^2 then the following properties holds

i) we fix $k = 3$

$$P(\mu - 3\sigma < X < \mu + 3\sigma) = 0.9973$$

In other words we say that the quality characteristic will fall beyond the control limit. fixing $k=3$ we have the prob. 0.0027 i.e $P(X > \mu + 3\sigma \text{ or } X < \mu - 3\sigma)$

$= P(X < \mu - 3\sigma) + P(X > \mu + 3\sigma) = 0.0027 \rightarrow$ level of significance

This prob of 0.0027 is known as prob. of type I error α or false alarm rate (FAR)

Prob of type I error is also known as FAR in quality control prespective.

In other words

$P(X > \mu + 3\sigma) = 0.00135$

$P(X < \mu - 3\sigma) = 0.00135$