SNS COLLEGE OF ENGINEERING

Kurumbapalayam (Po), Coimbatore – 641 107

An Autonomous Institution

Accredited by NAAC – UGC with 'A' Grade
Approved by AICTE, New Delhi & Affiliated to Anna University, Chennai

DEPARTMENT OF COMPUTER SCIENCE AND TECHNOLOGY

COURSE NAME : 19OE114 –TOTAL QUALITY MANAGEMENT

III YEAR / VI SEMESTER

Unit 4 - TQM TOOLS & TECHNIQUESII

TAGUCHI LOSS FUNCTION

INTRODUCTION

- Taguchi Methods is a statistical methods developed largely by GENICHI TAGUCHI to improve quality of manufactured goods.

- The philosophy of off-line quality control.

- Innovations in the design of experiments.

Taguchi Loss Function Definition

- Taguchi defines Quality as "the loss imparted by the product to society from the time the product is shipped."

- LOSS = Cost to operate, Failure to function, maintenance and repair cost, customer dissatisfaction, poor design, injury to health, accidents etc.

- Product to be produced "being within specification"

Taguchi's Vs Traditional Approach

Taguchi's	Traditional
When a product moves from its Target will cause the loss even if the product lies or not within Limits	There is Good or Bad Products only as per Limits

Taguchi's Quadratic Quality Loss Function

- Quality Loss Occurs when a product's deviates from target or nominal value.

- Deviation Grows, then Loss increases.

- Taguchi's U-shaped loss Function Curve.

Taguchi's U-shaped loss Function Curve.

Taguchi loss Fn

Scrap or Rework Cost.

Loss

Measured
characteristic

LTL   Nominal   UTL
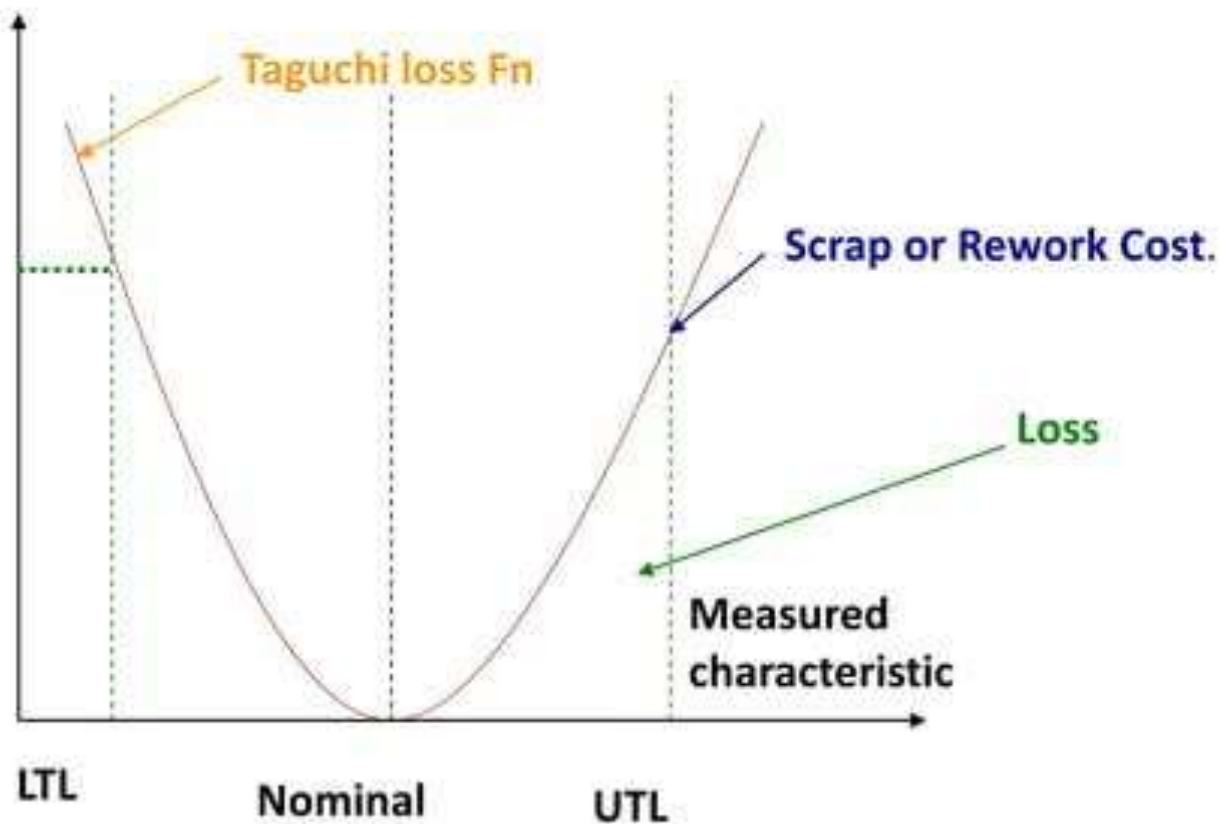
Formula to find Taguchi's Loss Fn

Taguchi uses Quadratic Equation to determine loss Curve

- $L(x) = k(x-N)^2$

Where **L (x)** = Loss Function,

k = C/d² = Constant of proportionality, where **C –** Loss associated with sp limit

d - Deviation of specification from target value

x = Quality Features of selected product,

N = Nominal Value of the product and

(x-N) = Tolerance

Problem

- A part dimension on a power tool is specified as 32.25±0.25.Company records show±0.25 exceeded & 75% of the returned fo replacement. Cost of replacement is Rs.12,500.Determine **k** & QLF.

Solution : Expected Cost of repair

$C = 0.75(12500) = Rs\ 9,375$

$k = C/d^2 = 9375/(.25)^2 = Rs\ 1,50,000$

$QLF = L(x) = 1,50,000(x-N)$

- **L (x) = 4000(x-N)²**

  If N = 200 mm, determine the value of loss function for tolerances of

  (a) ± 0.25 mm

  (b) ± 0.20 mm

- For a tolerance of ± 0.25 mm. The value of the loss function is

  L (x) = 4000(0.25)² =Rs. 250

- For a tolerance of ± 0.20 mm. The value of the loss function is

  L (x) = 4000(0.20)² =Rs. 160

- **L (x) = 7500(x-N)²**

  C=Rs. 400

  Find the tolerance

- **K = C/d²**

  7500 = 400/d²

  d² = 400/7500

  = .053

  d = $\sqrt{.053}$ = ± 0.23 mm

THANK YOU

THANK YOU

THANK YOU