



SNS COLLEGE OF TECHNOLOGY

Coimbatore-35

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DEPARTMENT OF MECHANICAL ENGINEERING

19MEE304 – TOTAL QUALITY MANAGEMENT

III YEAR - V SEM

UNIT 4 – TQM TOOLS

TOPIC – Taguchi Quality Loss Function

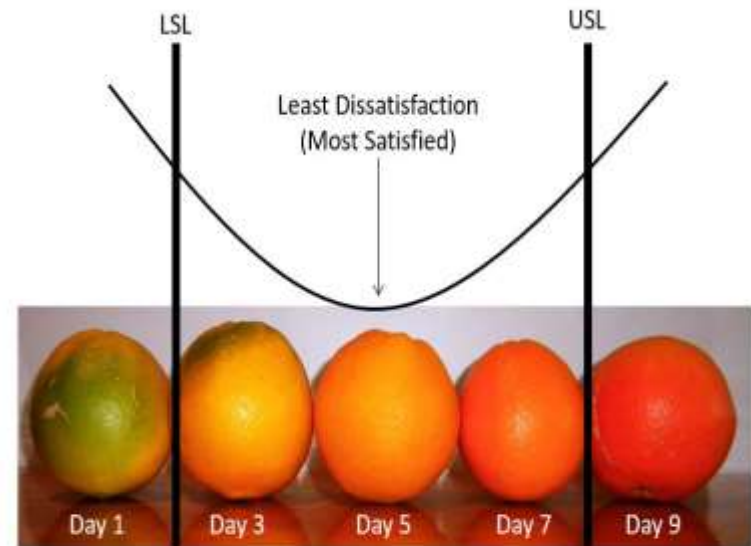


INTRODUCTION

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.



Business Performance Improvement

BIZ-PI.com



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 satisfaction, poor design.

Product to be produced “being within specification”

Taguchi Loss Function Definition

Taguchi methods emphasised quality through robust design, **not quality through inspection. Taguchi breaks the design process into three stages:**

1. System design - involves creating a working prototype.
2. Parameter design - involves experimenting to find which factors influence product performance most.
3. Tolerance design - involves setting tight tolerance limits for the critical factors and looser tolerance limits for less important factors.

Taguchi Loss Function Definition

Taguchi's Robust Design methodologies allow the designer through experiments to determine **which factors most affect product performance** and which factors are unimportant.

The designer can focus on **reducing variation** on the important or critical factors. Unimportant or uncontrollable —noise factors have negligible impact on the product performance and can be ignored.

Taguchi's Vs Traditional Approach

Taguch's

When a product moves from its Target will cause the loss even if the product lies or not within Limits

Traditional

There is Good or Bad Products only as per Limits

Taguchi's Quadratic Quality Loss Function

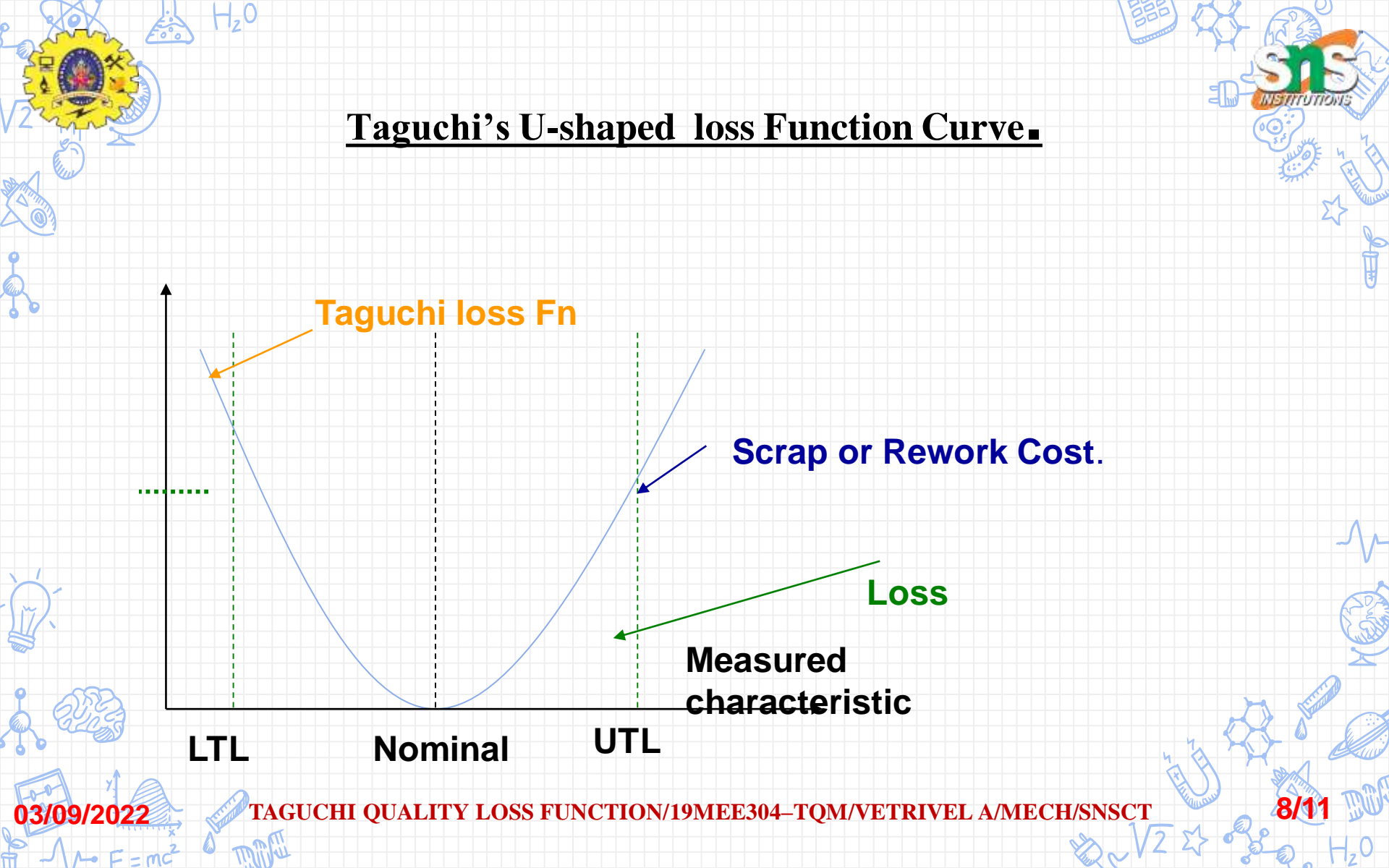
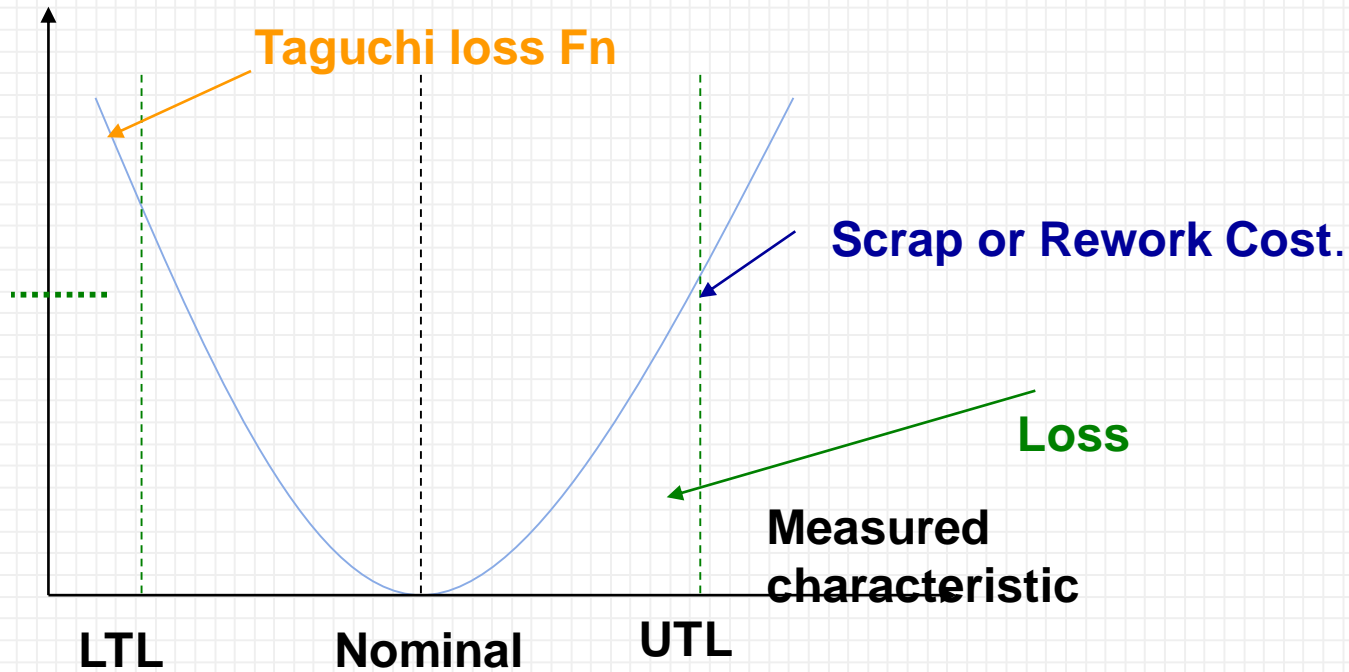
Quality Loss Occurs when a product's deviates from target or nominal value.

Deviation Grows, then Loss increases.

Taguchi's U-shaped loss Function Curve.



Taguchi's U-shaped loss Function Curve.



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,

$k = C/d^2$ = 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

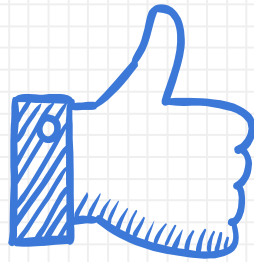
A part dimension on a power tool is specified as 32.25 ± 0.25 . Company records show ± 0.25 exceeded & 75% of the returned for replacement. Cost of replacement is Rs.12,500. Determine k & QLF.

Solution : Expected Cost of repair

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

$$k = C/d^2 = 9375/(0.25)^2 = \text{Rs } 1,50,000$$

$$\text{QLF} = L(x) = 1,50,00(x - N)^2$$



THANKS!



03/09/2022

TAGUCHI QUALITY LOSS FUNCTION/19MEE304-TQM/VETRIVEL A/MECH/SNSCT

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