COURSE OVERVIEW

THE CHALLENGE

The liberal economic policy of globalization has, for the first time, exposed the Malaysian industry to global competition as has never been done before. Large multinationals are purchasing hefty equity stakes in large Malaysian companies, revamping and restructuring them to suit their own product ranges. The liberal economic policy has thus thrown a challenge - to produce world class quality products at globally competitive prices. The Malaysian industry desperately requires Product Design to optimize the thousands of existing products and processes. The industry could be saved by focusing on Product Design and must improve the quality of its products and simultaneously reduce their costs drastically through product (process) design optimization. It must do this quickly!

TAGUCHI METHOD

Taguchi Method is a new engineering design optimization methodology that improves the quality of existing products and processes and simultaneously reduces their costs very rapidly, with minimum engineering resources and development man-hours. The Taguchi Method achieves this by making the product or process performance "insensitive" to variations in factors such as materials, manufacturing equipment, workmanship and operating conditions. Taguchi method makes the product or process robust and therefore is also called as ROBUST DESIGN.

Taguchi Method is an appropriate solution :

It attacks existing products and processes with a high success rate. Competent R&D engineers can easily apply it. Results are achieved quickly - within 4 to 6 weeks. Solutions given by Taguchi Method can be implemented at an affordable cost. It is readily amenable to computerization.

COURSE OBJECTIVE

The course objective is to explain the basic philosophy of Taguchi method, principles of quality engineering, its applications and economic benefits, its relevance to Malaysian industry, its successful application in India through presentation of case studies. Course aims at motivating the industry to learn to apply this important method for improving the product / process quality and reap the economic benefits.

COURSE CO-ORDINATOR

Professor Apte has recently joined Indian Institute of Technology at Mumbai and has 30 years of research experience at the Tata Institute of Fundamental Research, Mumbai. For over 15 years, he has conducted courses on Process Optimization using Taguchi Methods. For the last 10 years he has been studying the new method of Russian origin, called "TRIZ – Innovative problem solving", and its potential in innovative research, problem solving and opportunity creation for R&D in Indian National Labs and in Indian Industries. He has given overview lectures at various academic institutions and R&D laboratories, conducted 2-day courses for Research Scholars at IIT Madras and IIT Kanpur. He has conducted summer/winter camps for students of IIT Bombay in 2003 and 2004. In the past 7 years, he has conducted over 24 CEP 'open' and 'in-house' courses for Indian industry. He has recently completed a 2-year consultancy for Pidilite industries with a successful application of Taguchi Method and TRIZ. Most recent course on Taguchi Method was conducted for Mahindra and Mahindra, Auto industry from Nashik, India.

ENQUIRIES

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WHAT YOU WILL LEARN

1. **Fundamentals of classical statistical methods:** Normal Probability distribution; Statistical analysis of Means and Variance; Evolution of Taguchi Methods.

2. **Fundamentals of Taguchi Methods:** Basic philosophy of Taguchi loss function and robust design; 8-steps in Taguchi Method; P-diagrams of Static and Dynamic problems; Definitions of signal, noise and control factors; Degrees of freedom; Linear graphs and orthogonal arrays and their designs; Definitions of Signal to Noise ratio; Evaluation of sensitivity to noise; Resolution of design; Analysis of Means, Means Plots and Analysis of Variance; Prediction of optimum conditions; Prediction of error variance.

3. **Design of Experiments for Robust Design:** Identification of signal, noise and control variables; Identification and selection interactions; Control factors and their levels; Strategies for experimentation using Taguchi methods, beginner, intermediate and advanced strategies; Selection of design of orthogonal array, Modification of orthogonal arrays and linear graphs; Performing matrix experiments; Methods of analyzing experimental data; Interpretation of results.

4. **Application Examples:** Application of design of experiments for designing robust processes: machining and cutting tool wear analysis, surface quality optimization, metallurgical structure optimization; packaging related wire and die bonding optimization; Application of design of experiments for optimizing product performance and process yield.

Training in Taguchi Method will help engineers in "How To"

1. Evaluate changes in process operations
2. Set up new processes
3. Compare two or more process techniques
4. Select, accept or commission new equipment
5. Compare two or more pieces of equipment
6. Evaluate (new) materials
7. Select vendors (by evaluating their materials)

The quality of materials and chemicals used in manufacturing is very important to making quality products. Therefore, the vendors should be introduced to the on-line and off-line Taguchi methods.