



CQE Training & Consultancy Plt (Reg. No. : LLP 0003668 LGN)

Registered Office : No. 46, Lorong Bintang, Taman Tasik Permai, 34000 Taiping, Perak. Malaysia.

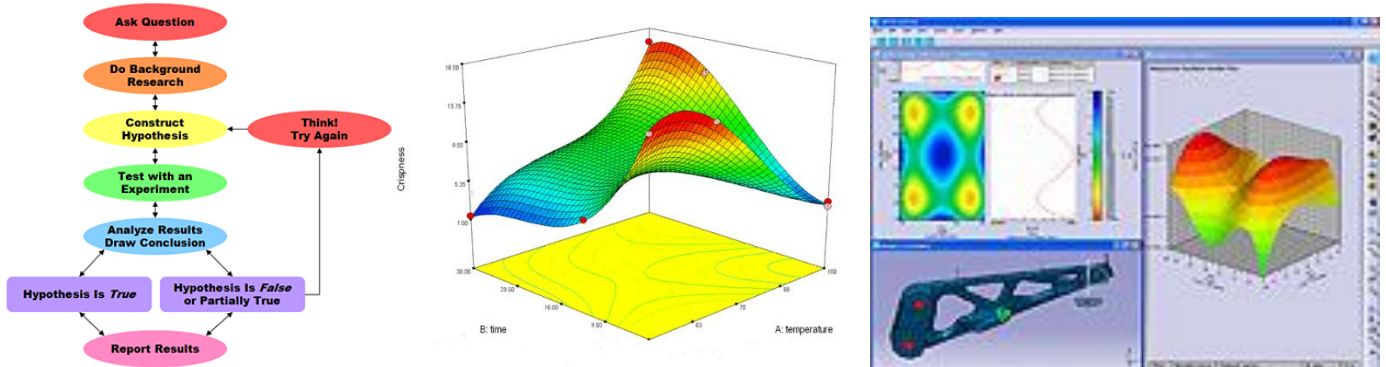
Operating Office : No. 85A (1st. Floor), Jalan Barrack, 34000 Taiping, Perak. Malaysia.

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DESIGN OF EXPERIMENT TOWARDS PRODUCT AND PROCESS OPTIMISATION (IN HOUSE / PUBLIC TRAINING PROGRAMME)

SBL
Scheme



Introduction

Design of Experiment is an “**OFF-LINE**” quality improvement technique that can be used to improve manufacturing products and processes significantly. Experimental design normally used to address quality, cost and performance issues at the earliest stages of the product design and development cycle.

Through its use, it can help us to optimize our products and processes by input many controllable factors (design parameters) and see how do its influence the resulting output (responses) in the presence of the environment factors (noises). Actual industrial examples are used throughout the presentation. Besides in-depth understanding of the basic principle, participants also will be exposed to computer simulation to solve the DOE example exercise.

Learning Outcomes/Objectives

Use of MS Excel or
Minitab Software
for Analysis

At the end of the programme, participants will be able to :-

- ⇒ Understand the fundamentals of Design of Experiment (DOE).
- ⇒ Understand products and processes characterization.
- ⇒ Identify key and critical products and processes for optimization improvement.
- ⇒ Reduce the product development cycle time.
- ⇒ Improve products/processes quality, function, cost, reliability and overall performance and capability.



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Program Contents

Also available as
in-house programme

Day 1

Session #1 - Introduction

- ⇒ What is Design of Experiment (DOE) ?
- ⇒ Term and Definition.
- ⇒ The Need for Design of Experiment in Manufacturing Industry.
- ⇒ Relationship between Statistical Process Control and Design of Experiment.
- ⇒ Two Applied Scientific Methods – Passive and Active Approaches
- ⇒ Active Approach – Absolute Method, One Factor and Multi Factors Methods
- ⇒ Straw Cutting Workshop

Session #2 - Multivariat Analysis

- ⇒ Families of Variation.
- ⇒ Multivariat chart – Construction and Interpretation.
- ⇒ Straw Cutting Workshop

Session #3 - Statistical Inference

- ⇒ Attributes of Statistical Inference.
- ⇒ Hypothesis Testing.
 1. Hypothesis Statements & Test Statistics.
 2. Types of Errors and Experimental Risks.
 3. One Tail Test versus Two Tails Test.
- ⇒ Normal z Test
- ⇒ Student's t Test.
- ⇒ F Test.
- ⇒ Summary of Inference Tests.
- ⇒ Exercises.

Day 2

Session #3 - Statistical Inference (Continue)

- ⇒ Attributes of Statistical Inference.
- ⇒ Hypothesis Testing.
 1. Hypothesis Statements & Test Statistics.
 2. Types of Errors and Experimental Risks.
 3. One Tail Test versus Two Tails Test.
- ⇒ Normal z Test
- ⇒ Student's t Test.
- ⇒ F Test.
- ⇒ Summary of Inference Tests.
- ⇒ Exercises – Recipe I & Recipe II, Pre-Test and Post-Test and Old Model Engine & New Model Engine



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Session #4 - Factorial Design Experiment

- ⇒ The General Factorial Design.
- ⇒ Full Factorial Design.
- ⇒ Design with 2 Factors and 2 Levels (2^2 Design Experiment).
- ⇒ Related Examples.
- ⇒ Design Matrix and Table of Contrast.
- ⇒ Effects Calculation, Effect Graphical Plotting and Interpretation.
- ⇒ Main Effects and Interaction Effects : Analysis and Interpretation.
- ⇒ ANOVA Table Construction and Analysis.
- ⇒ Design with 3 Factors and 2 Levels (2^3 Design Experiment).
- ⇒ Examples and Exercises.

Day 3

Session #5 - Fractional Factorial Design Experiment (Quick Summary)

- ⇒ Fractional Factorial Design.
- ⇒ Confounding Effects
- ⇒ Hierarchy of Terms and Alias (Confounding) Structure.
- ⇒ Resolution III, IV and V Designs.

Session #6 - Design of Experiment through Computer Software

- ⇒ Actual workshop practice through Minitab Software
- ⇒ Others.

Who should attend

Managers, Engineers, Executives, Quality Practitioners and any member of an organisation who is from Research and Development, Quality and Production will find this course relevant and beneficial to their job function.

Methodology

The program would be conducted by using the following materials / aids :-

- ⇒ Course Notes
- ⇒ OHP and LCD
- ⇒ Case Study
- ⇒ Group Activities (Computer Simulation)
- ⇒ Lecturettes



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Duration

3 Days

Facilities Needed

LCD Projector, OHP Projector, Whiteboard, Flip Chart, Normal scientific calculator and 3~4 computers loaded with Minitab Software (optional).

