

State-of-the-Art Optimization Technology of Plastic Injection Molding through DOE (Design of Experiment) Approach

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Course Introduction

In recent years, with the goal of profit maximization, innovation and quality improvement has become a must. There are three key factors to enterprise competitiveness, quality, cost, and delivery (QCD). Design of Experiment (DOE) is one of the most effective approaches to optimize product quality. On the other hand, there are many variables in injection molding process. Product design, mold design, material property and process conditions constitute a very complex system. Adopting full factorial experiments for optimization purpose is very time-consuming. Design of Experiment method, such as orthogonal array of Taguchi method for analysis, can obtain a robust result from a less number of experiments. It indicates DOE is much more feasible than full factorial method under limited time.

Goals

- To understand the theory and background of DOE method.
- To know the limitations on conventional product development and problem diagnosis.
- To experience the procedure of DOE in injection process analysis.
- Understand how to integrate CAE and DOE technology to achieve design and process optimization.

Course Information

Date : Please refer to official website

Organizer : CoreTech System

Contact : mkt@moldex3d.com

Remark : Small class size of 8-10

Time	Topic
60 min	Reception
	Introduction to Design of Experiment (DOE) Background and development of DOE
	Taguchi Methods <i>The most widely applied method of quality engineering</i>
	The integration of Computer Aided Engineering (CAE) and DOE <i>The procedure of DOE in CAE software</i>
	Selected Case: Verifying and Improving the Plastics Deformation of Automotive Interior Parts. <i>Through process condition adjustment to know significant factors.</i>
	Selected Case: A Study of Manufacturing Micro Mold by LIGA and M-EDM and a Novel Micro Molding for the Ink Jet Printer Nozzle Plates. <i>An estimation of micro structure deformation and filling feasibility</i>
20 min	Q & A

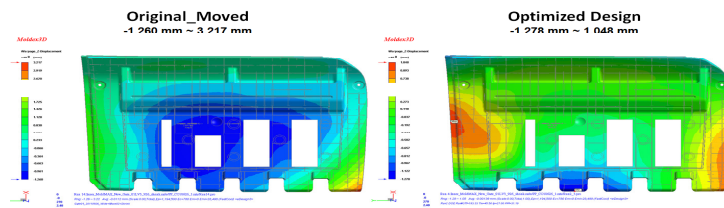
*The agenda is subject to changes.

Course Content

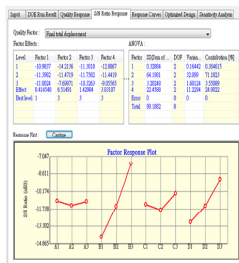
This course begins with an introduction to DOE methods. Then we focus on Taguchi method, covering its background and operation procedure. Afterwards, we explain how to apply DOE method through CAE implementation. In order for participants to have in-depth understanding, two case studies are investigated. The first is related to an automobile interior part with a severe requirement on warpage. For various combinations of molding parameters, how can we optimize process by using nine run experiments instead of full factorial experiments? The second case is a study which focuses on nozzle plates of inkjet printer head using the thermoplastic injection molding technique. The researcher obtained the optimized molding conditions through DOE, making the micro-structure of the relative displacement a minimal, and also observed the filling conditions. These courses will enable all the participants have better understanding of theoretical background and practical applications of DOE.

Participants

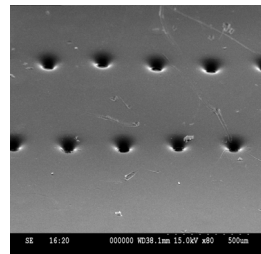
- Business Owner or CEO
- R&D or Production department personnel
- Mold designer
- Product designer
- Process analyze specialist or engineer
- Plastic material supplier
- People interested in plastic and molding Process



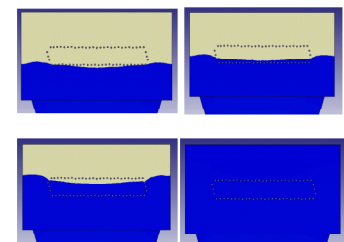
Optimized Design by DOE method



ANOVA
(Analysis of variance)



Micro through hole thin plate
(Source: Dr. Shi-Chang Tseng, NYUST)



The effect of mold temperature to filling
(Source: Dr. Shi-Chang Tseng, NYUST)

Instructor



Marcus Su

Current Position: Technical Research Division at CoreTech System Co., Ltd.

Education: National Taiwan University

Specialization : Injection molding technology and process optimization, integration of CAE and FEA structural analysis, and Design of Experiment research.

Mr. Su graduated with a master degree from National Taiwan University and majored in fluid analysis. Currently, He serves as a lecturer and professional industry consultant, and has been consulting many well-known companies around the world, including Ford, Molex, UTAC, PTI ,etc.