PREDICTION OF DEFECTS IN NON-CIRCULAR DEEP DRAWN PARTS USING FINITE ELEMENT ANALYSIS AND RESPONSE SURFACE METHODOLOGY

By
Eng.\ Mustafa Mubarak Semman

A Thesis Submitted to the
Faculty of Engineering at Cairo University
In Partial Fulfillment of the
Requirements for the Degree of
MASTER OF SCIENCE
In
MECHANICAL DESIGN
AND PRODUCTION ENGINEERING

FACULTY OF ENGINEERING, CAIRO UNIVERSITY
GIZA-EGYPT
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Under the Supervision of

Prof. Dr. Abdalla S. Wifi
.....
Professor of Material and Manufacturing Engineering
Mechanical Design and Production Department
Faculty of Engineering, Cairo University

Prof. Dr. Mohamed H. Gadullah
.....
Professor of Industrial Engineering
Mechanical Design and Production Department
Faculty of Engineering, Cairo University

Dr. Mostafa H. Shazly
.....
Associate Professor of Mechanical Engineering
Mechanical Engineering Department
Faculty of Engineering, the British University in Egypt

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Approved by the
Examining Committee

Prof. Dr. Abdalla S. Wifi, Thesis Main Advisor

_____

Prof. Dr. Ahmed Ali Al-Zoghby, Internal Examiner

_____

Prof. Dr. Mohamed Naguib Al-Shaikh, External Examiner
Faculty of Industrial Education – Beni-Suef University

FACULTY OF ENGINEERING, CAIRO UNIVERSITY
GIZA-EGYPT
2017

Engineer's Name: Mostafa Mubarak Semman
Date of Birth: 16/06/1980
Nationality: Egyptian
E-Mail: engmosmoba@yahoo.com
Phone: 01060684099
Address: Future City - Building 885-
El Nozha District - Cairo

Registration Date: 1/10/2009
Awarding Date: 2017
Degree: Master of Science
Department: Mechanical design and production engineering

Supervisors: Prof. Dr. Abdalla S. Wifi
Prof. Dr. Mohammed H. Gadullah
Dr. Mostafa H. Shazly
(Associate Professor, Mechanical Engineering Department, BUE)

Examiners: Prof. Dr. Mohamed Naguib Al-Shaikh (External Examiner)
Prof. Dr. Ahmed Ali Al-Zoghby (Internal Examiner)
Prof. Dr. Abdalla S. Wifi (Thesis Main Advisor)

Title of Thesis:

Prediction of defects in non-circular deep drawn parts using finite element analysis and response surface methodology**.**

Key Words:

Earing, Thinning, Finite element analysis, Design of Experiments, Response Surface Methodology.

Summary:

Deep drawing defects such as thinning and earing present challenges to sheet metal forming industry while designers tend to favor the usage of new materials and production processes. the present work introduces an integrated approach using design of experiment approach, FEA experimentation and response surface methodology (RSM) to develop linear regression equation that is capable of predicting earing and thinning defects in deep drawing of non-circular parts (rectangular and elliptical) and determine the optimum process parameters which lead to minimum defects.

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Dedication

To my Father

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