CERTIFICATION OF APPROVAL

ANALYSIS ON PROCESS PARAMETERS
OF SLS RAPID PROTOTYPING PROCESS
by

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A project dissertation submitted to the
Mechanical Engineering Programme
Universiti Teknologi PETRONAS
in partial fulfilment of the requirement for the
BACHELOR OF ENGINEERING (Hons)
(MECHANICAL ENGINEERING)

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Jan 2012

CERTIFICATION OF ORIGINALITY

This is to certify that I am responsible for the work submitted in this project, that the original work is my own except as specified in the references and acknowledgements, and that the original work contained herein have not been undertaken or done by unspecified sources or persons.

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ACKNOWLEDGEMENTS

First of all, I would like to express my deepest gratitude to ALLAH The Mightiest for His blessing & guidance for me in completing Final Year Project.My honest and highest appreciation goes to my supervisor; Dr Tadimalla Varaha Venkata Lakshmi Narasimha Rao for his effort in supervising & guiding me towards completing my Final Year Project as partial fulfillment of the requirement for the Bachelor of Engineering (Hons) of Mechanical Engineering.Thousands of appreciations are also extended to my family and friends for their full support, kindness, assistance, guidance and criticisms during the whole period of finishing my project.Last but not least, thank you very much to anyone who has assisted me directly or indirectly in making my Final Year Project a success.

ABSTRACT

This paper shows the final year project regarding the Analysis of Process Parameters for SLS Rapid Prototyping Process. Selective laser sintering (SLS) is a layered manufacturing process that builds prototypes by selective sintering of materials in powder form, like thermoplastic polymer powder, using a CO2 laser. Objectives of this project are to analyze the effect of process parameters on the part accuracy and to produce the optimal model of process parameters that result in less shrinkage. Prototypes made by SLS are widely used in product development as they can be used for product testing. However the wider application of SLS has been limited due to their lack of accuracy. SLS prototypes should have high accuracy in order to satisfy functional requirement. Shrinkage is one of the major factors which influence the accuracy of the SLS parts. Therefore, continuous process improvement is necessary. Improved understanding of the parameters effects on the process response is expected to lead to process advances. The relationship between shrinkage and the various process parameters such as laser power, beam speed, hatch spacing, part bed temperature and hatch length have been investigated. Optimum shrinkage condition are obtained by analysis of variance (ANOVA) and linear regression. ANOVA is used to understand the significance of process parameters affecting shrinkage and energy density analysis is study to find its relationship with shrinkage effect. Solidworks simulation is also used to show shrinkage effect for different hatch length.

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