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MOHAMMAD YEAKUB ALI

AKM NURUL AMIN

**DESIGN FOR MANUFACTURE**

Towards Improved Manufacturability



**IIUM Press**

# DESIGN FOR MANUFACTURE

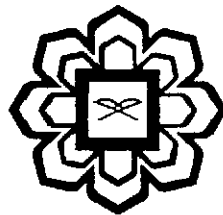
## Towards Improved Manufacturability

### EDITORS

ERRY YULIAN TRIBLAS ADESTA

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**IIUM Press**

Published by:  
IIUM Press  
International Islamic University Malaysia

First Edition, 2011  
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Perpustakaan Negara Malaysia

Cataloguing-in-Publication Data

ISBN: 978-967-418-159-8

Member of Majlis Penerbitan Ilmiah Malaysia – MAPIM  
(Malaysian Scholarly Publishing Council)

Printed by :  
**IIUM PRINTING SDN.BHD.**  
No. 1, Jalan Industri Batu Caves 1/3  
Taman Perindustrian Batu Caves  
Batu Caves Centre Point  
68100 Batu Caves  
Selangor Darul Ehsan  
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## Improvement of Typical Hip-Joint Design for Gripping and Fixing

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### 1. Introduction

Total hip-bone replacement is performed most commonly because of the progressively severe arthritis in the hip joint. The most common type of arthritis leading to total hip-bone replacement is degenerative arthritis (osteoarthritis) of the hip joint. This type of arthritis is generally caused by aging, congenital abnormality of the hip joint, or prior trauma to the hip joint such as fracture of femoral neck, etc. However, in the process of designing the artificial joint, not only the shape of the articulation must be considered but also the means by which the prosthesis will be fixed to the bone. Currently, fixation is accomplished by either bone growing into prosthesis or with bone cement. Different shapes of implants are better adapted to bone in-growth and other shapes to cement (M. Pawlikowski, 2003).

Until now, models developed to predict stresses in total hip replacements have generally been poorly validated (David Hungerford, 2003). Recent development still needs to explore on design for unbounded sizes of human for total hip-bone replacement. Each patient may have different size of bone structures and there are no identical patients that can use similar bone. Specific design for a particular patient causes a critical fabrication of design issue. Thus, an efficient method for die fabrication may improve the practice of investment casting procedure for manufacturing hip bone joint implant. One of the major influences in final dimension investment casting product is the pattern dimensions. The pattern is the primary determinant of the dimensions of the finished casting products.