

2011 年第一屆機械工程國際學術會議出國報告

First International Conference on Mechanical Engineering, ICME2011

(Phuket, Thailand)

報告者：張銘坤

「目的」

第一屆機械工程國際會議 (First International Conference on Mechanical Engineering, ICME2011)在泰國普吉島(Phuket, Thailand) 巴東海濱旅館 (Patong beach hotel)舉行，會議日期 2011 年 4 月 3 日-4 日(April 3-4)。贊助單位是香港國際電子中心 (Sponsored by International Industrial Electronics Center, Hong Kong)。為了在國際研討會上發表自己的研究成果，並與國外學者作學術交流，擴展自己的視野，建立與國外學者交流管道為本次出國之主要目的。

會議投稿論文有機會轉投為期刊 Applied Mechanics and Materials, ISSN: 1660-9336 出版，EI 收錄和 ISTP 收錄。



徵稿通告原文如下。

All ICME 2011 Accepted Papers will be published by Applied Mechanics and Materials, ISSN: 1660-9336, which will be Indexed by Elsevier: SCOPUS www.scopus.com and Ei Compendex (CPX) www.ei.org/. Cambridge Scientific Abstracts (CSA) www.csa.com, Chemical Abstracts (CA) www.cas.org, Google and Google Scholar google.com, ISI (ISTP) www.isinet.com, Institution of Electrical Engineers (IEE) www.iee.org, etc.

「行程」

ICME2011 大會行程 (Conference Schedule) 如下表。

日 期	主要行程 Brief Schedule
<u>April 4 (Monday)</u>	14:00--18:00 Registration, Sequence Hall
<u>April 5 (Tuesday)</u>	09:00~09:30 Open Ceremony Photo 09:30~10:20 Keynote Speech 10:20~10:40 Coffee Break 10:40~11:30 Keynote Speech 12:00~13:00 Buffet Lunch
<u>April 5 (Tuesday)</u>	14:00~18:00 Oral Session 1

ICME2011 徵稿包括下列 20 項研究範圍。

1. Aerodynamics
2. Fluid Dynamics
3. Compressible Flows
4. Computational Mechanics
5. Biomechanics
6. Automotive Engineering
7. Heat and Mass Transfer
8. Nanomaterial Engineering
9. Plasticity Mechanics
10. Fracture Geomechanics
11. Multibody Dynamics
12. Nonlinear Dynamics
13. Structural Dynamics
14. Vibrations
15. Acoustics
16. Noise Control
17. Material Engineering
18. Transport Phenomena
19. Manufacturing Process
20. Mechatronics

ICME2011 之會議主持人為中國深圳大學的鄭教授 (Program Chairs Dehuai Zeng, Shenzhen University, China Biswanath Vokkarane, Society on Social Implications of Technology and Engineering, Maldives)。會議地點為巴東海濱旅館一樓櫃臺右側的的會議室 (Conference room) 舉行 (如下圖)。



會議於 4 月 4 日早上 9：30 開始舉行，先由大會主持人鄭教授舉行開幕式致詞，接著全體與會人員合照，如下圖。



我報告兩篇自己的研究論文，題目與作者如下。

1. 題目「A Study of Thermal Stability and Electromagnetic Shielding Behavior of Polyaniline-PToluene Sulfonic Acid/Montmorillonite Nanocomposites」
作者：M.K. Chang, H.H. Hsieh and S.J. Li .
2. 題目「Hazard of Vibration and Healthy Risk Assessment for Domestic Dump Truck Driver in Taiwan」
作者：M.K. Chang, Y.F. Li and H.W. Huang

我進行報告時如下四張相片。





我對於本次會議比較有興趣的第一篇論文摘錄如下

題目：「Through-Hole Drilling of Glass Plate Using Electroplated Diamond Tool」


作者：A. Mizobuchi and H. Ogawa.

這篇論文是由日本德島大學 Akira Mizobuchi 研究與報告。他主要是針對硬脆材料，例如：工程陶瓷材料與玻璃，因為鑽孔時容易產生在加工件表面裂縫，提出新鑽孔技術提出新的方法，以減少裂縫產生與更高的鑽孔效率。他分別以立方氮化硼 (Cubic Boron Nitride, CBN)與鑽石進行鑽孔實驗比較其優劣。


Abstract:

Hard and brittle materials such as ceramics and glass are not only difficult-to-machine but also occur easily cracks at the exit surface in through-hole drilling. This paper deals with through-hole drilling of glass plate for plasma display panel using an electroplated abrasive grain tool in order to find out drilling conditions for smaller cracks, higher drilling efficiency and longer tool life. In particular, the influence of the crack in two kinds of abrasive grain is examined. The main conclusions obtained in this study are as follows. The crack in diamond grain tool is smaller than that in CBN grain tool. Moreover, the tool life of diamond grain tool is longer than that of CBN grain tool. Adhered volume of chip increases with drilling numbers, so the crack size and the thrust force increases. The washing of tool is required in order to restrain crack and force.

Appearance of Hole Exit (Commercial Tools)



Electroplated Diamond Tool
(A Co., Ltd.)



Diamond Coated Tool
(B Co., Ltd.)

Drilling conditions

- Abrasive grain : Diamond grain
- Mesh size : #600
- Spindle revolution : 15000rpm
- Feed rate : 1mm/min

Through-Hole Drilling of Glass Plate Using Core Drill

加工前

Core drill: A diamond wheel is connected to a metal pipe.

Mesh size

- Glass: #100~#270
- Ceramics: #60~#140

Issues of core drilling method

- 1) Complexity of machine tool
- 2) Positioning of hole entrance and exit

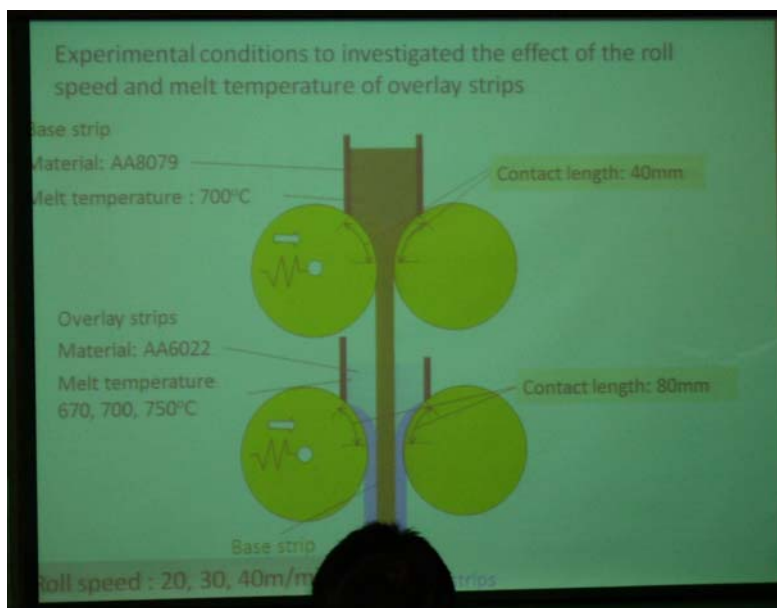
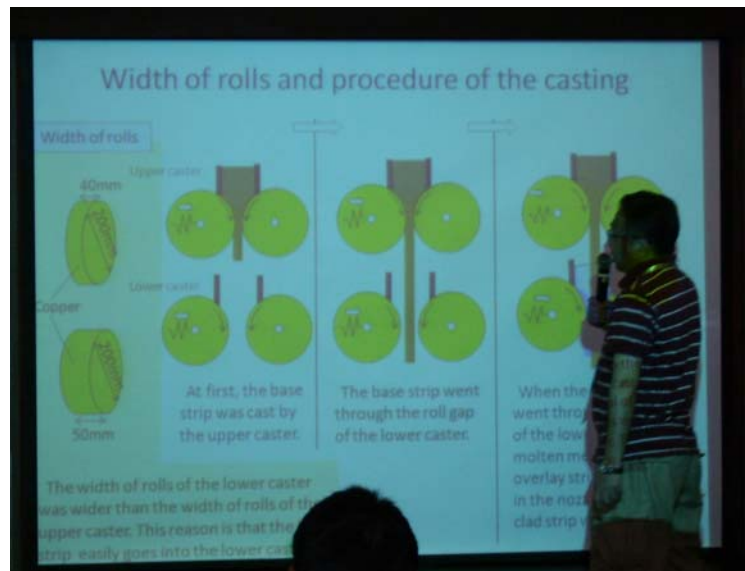
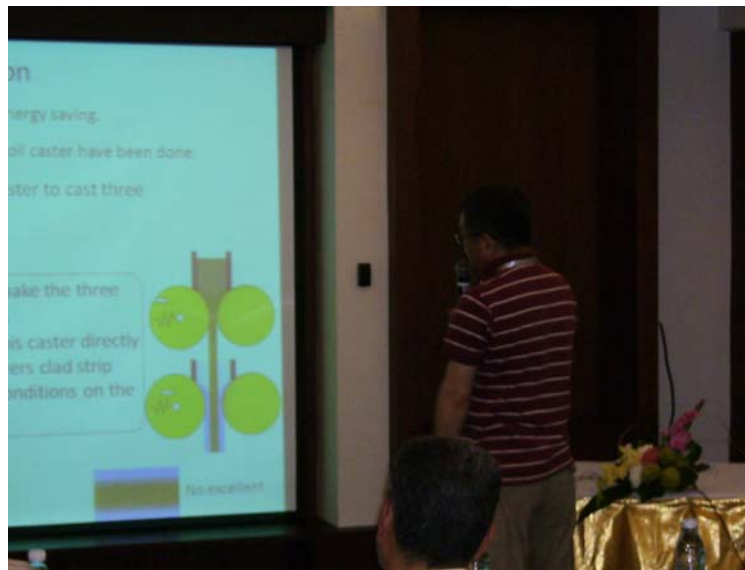
- 1) Complexity of machine tool
- 2) Positioning of hole entrance and exit

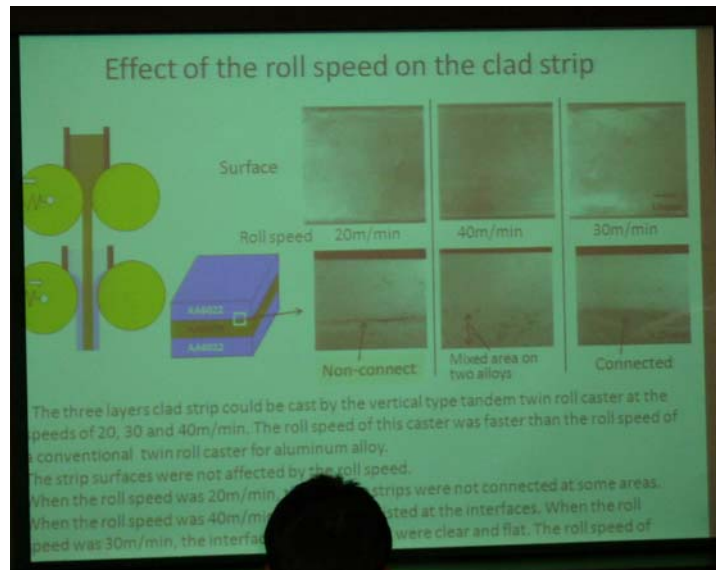
Purpose of Research

Drilling objectives

- (1) Drilling accuracy (crack size at the exit: 0.1mm or less)
- (2) Drilling efficiency (drilling time: 20-30s/hole or less)
- (3) Drilling cost (tool time: 1 min or above for 1 hole)

This presentation deals with through-hole drilling of glass plate using electroplated abrasive grain tool in order to find out drilling conditions for small cracks, higher drilling efficiency and longer tool life.





我對於本次會議比較有興趣的第三篇論文摘錄如下

Influences of Prosthesis Stem Lengths in Cementless Total Hip Arthroplasty

Abdul Halim Abdullah, Emmi Farisa Jaafar, Nursalbiah Nasir, Eli Nadia Abdul Latip
and Giha Tardan

Faculty of Mechanical Engineering, Universiti Teknologi MARA Malaysia, 40450
Shah Alam, Selangor MALAYSIA

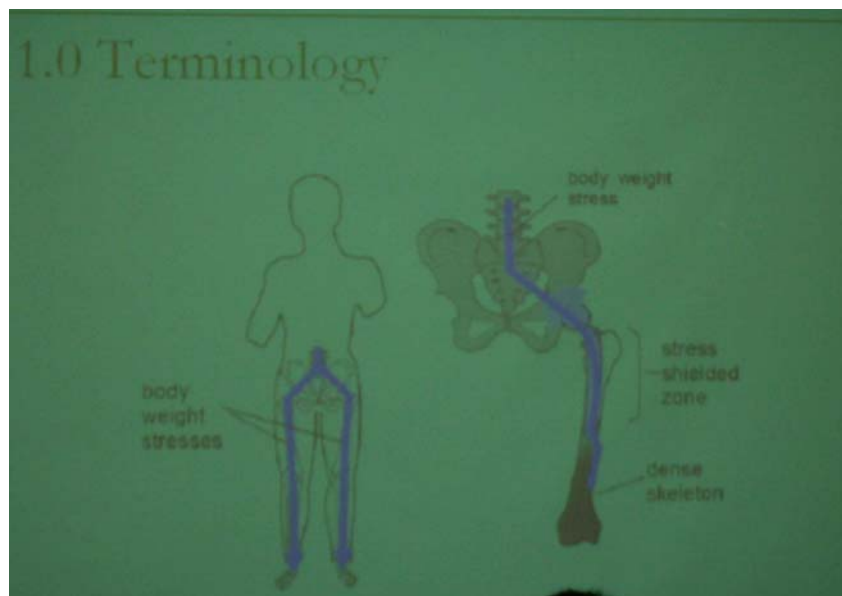
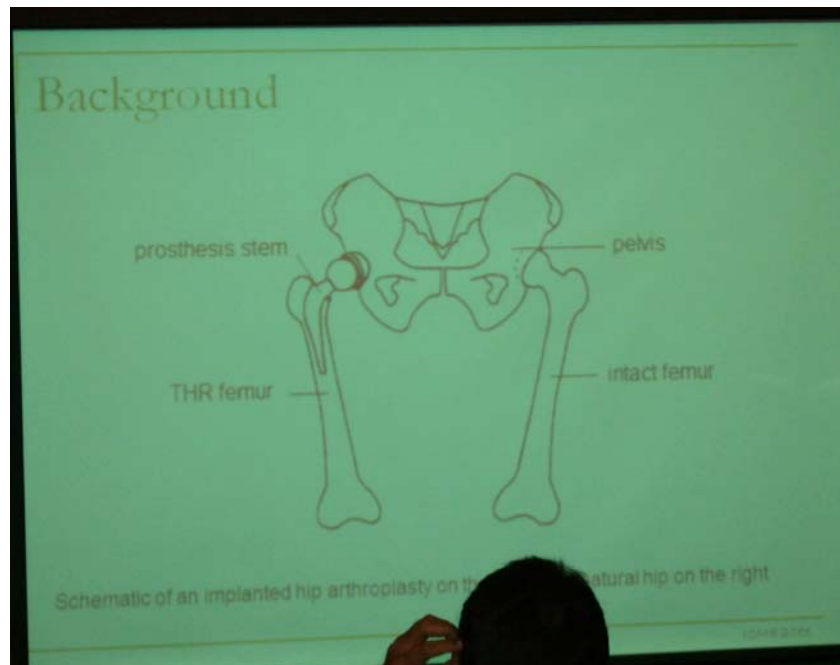
Keywords: Finite Element Analysis, Hip Arthroplasty, Stem Lengths, Stress
Variation

這篇論文是馬來西亞MARA技術大學機械系(Faculty of Mechanical Engineering, Universiti Teknologi MARA Malaysia) Abdullah教授的研究成果。主要是針對無陶瓷材料的人工製造之骨盤與大腿骨銜接關節，以有限元素法軟體ANSYS進行關節外形與應力的相關性分析。

Abstract:

Stress shielding phenomenon is an important issues in considering the primary stability of the cementless hip arthroplasty. Stress shielding occurs when there is a mismatch in the elastic modulus of two materials perfectly bonded to each other, such as the prosthesis stem and the bone. In this study, influences of different prosthesis stem lengths on stress distribution in cementless THA are examined using finite element method. The calculated stress distribution is discussed with respect to stress shielding and primary stability issues in THA femur cases. Results show that similar pattern in stress distribution for intact and THA femur but differs in magnitudes. The stress level increases from the neck to the middle region and peaks at

locations coinciding with the tip of the prosthesis. The maximum stress for intact femur is 55.5 MPa, THA with short stem is defined up to 112 MPa, while with medium and long stem are 204 MPa and 278 MPa, respectively.



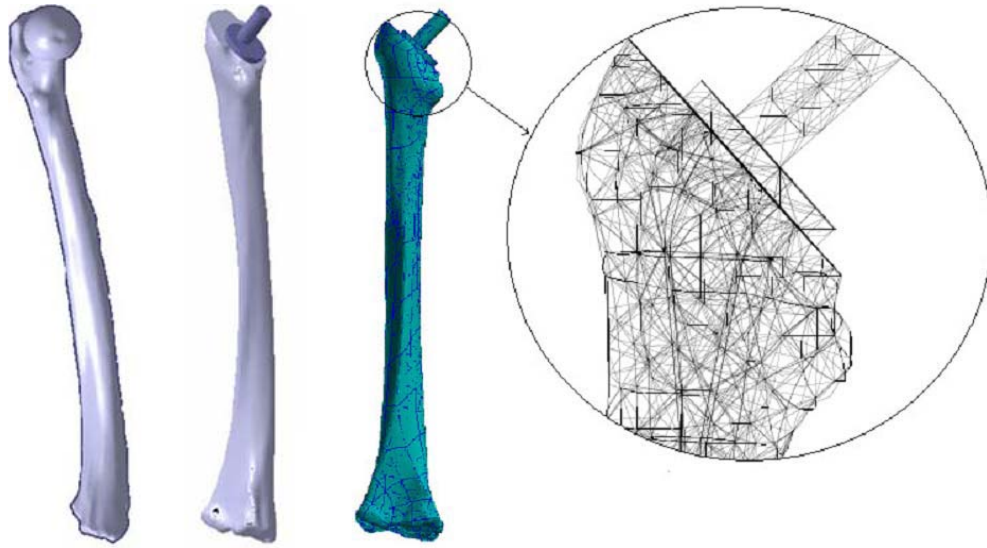


Figure 1. Basic model of (a) Intact and THA femur, (b) Discretized THA model

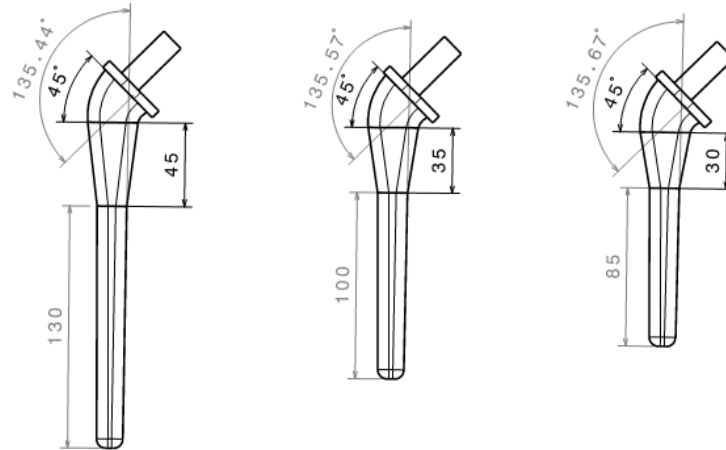


Figure 2. Basic geometry of hip prosthesis stem with different lengths, namely (a) Long (b) Medium and (c) Short

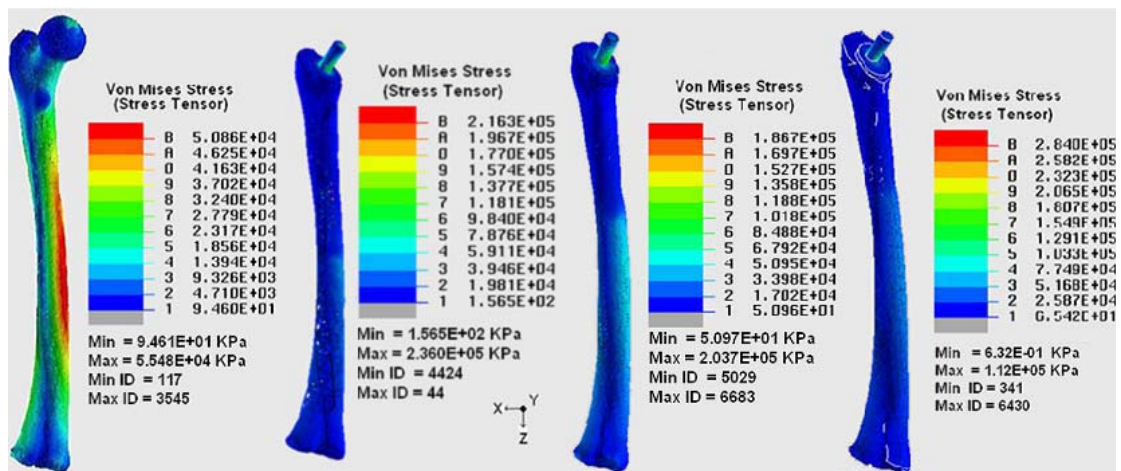


Figure 3. Stress distribution of intact and THA femur with different prosthesis stem lengths (a) intact femur (b) THA femur with long stem (c) THA with medium stem and (d) THA with short stem

「心得」

1. ICME2011 國際研討會在泰國的普吉島舉行，屬於規模比較小的研討會，發表者來自中華民國、中國、韓國、馬來西亞、伊拉克、泰國、日本、越南等國家，每位報告者都很認真準備與發表以英文發表與討論，增加我的英文能力，會後與會人員也互相交換名片或通信方式，對於今後我的研究很有助益。
2. 本次會議中我會選擇與我的研究方向有密切關係的論文報告聆聽，藉此學習他人經驗，了解其他研究者的研究方向，並藉此了解自己研究的缺失與不足點，以作為日後投稿 SCI 期刊之參考，是一個很難得的研討會經驗。
3. 4 月 5 日結束 2 天的會議行程，讓我感覺到大會人員準備的用心，我與其他與會學者、研究生都期待明年能夠在齊聚一堂討論相關研究議題。
4. 普吉島機場距離巴東海濱旅館約 40 公里，出機場後必須搭乘計程車約 50 分鐘才能到達旅館，車費約 1000 泰銖(與新台幣比值約 1:1.011)。普吉島機場一樓是入境大廳，二樓是出境大廳，進入出境大廳必須立即接受行李與身體檢查，方能在該大廳逗留。
5. 泰國普吉島是一個世界知名的度假勝地，普吉島到處可以看到歐美人士攜家帶眷來此度假，我會找機會與他們交談，練習我的英語能力。
6. 下圖分別是我住宿的巴東海濱旅館外觀、巴東海濱旅館的游泳池。

