DEVELOPMENT OF A NEW JOINTING SYSTEM
FOR OPEN PLAN OFFICE SYSTEM

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MASTER OF SCIENCE
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DEVELOPMENT OF A NEW JOINTING SYSTEM
FOR OPEN PLAN OFFICE SYSTEM

By

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Thesis Submitted to School of Graduate Studies, Universiti Putra Malaysia, in
Fulfilment of the Requirement for Degree of Master of Science

July 2006
DEDICATION

This thesis is dedicated to my parents

and my family,

my wife Hanim and my daughters  Sarah, Illyah and Aein
Abstract of thesis presented to the Senate of Universiti Putra Malaysia in fulfilment of the requirement for degree of Master of Science

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July 2006

Chairman : Associate Professor Rosnah bt Mohd Yusuff, PhD
Faculty : Engineering

Most modern offices use open plan office system due to the flexibility of the product. The open plan office system (OPS) can be customized from low screen to high screen and can be installed and dismantled according to the office needs. According to MIDA (Malaysian Industrial Development Authority) the total sales for Malaysian office furniture industries was RM 1.6 billion in 2003 of which 7.2% (115 million) comes from sales generated from the open plan office system. The sales report showed the importance of the open plan office system in creating the office environment. Since the demand of OPS is increasing, effective ways of assembling the system is required. Most OPS manufacturer uses bolts and nuts as a jointing system. However, this jointing system requires many parts and the assembly process is time consuming. Based on a survey carried out on 26 OPS manufacturers, the main criteria of the jointing system design identified were those that can increase efficiency and facilitate assembly. One of the important functions of the
jointing systems is to ensure that the system is flexible during the assembly process. Based on these findings, the study looked into various jointing system design concepts and the different materials that can satisfy all the requirements. Two designs of the jointing system have been proposed in this study. The designs were based on the snap fit concept and referred to ‘Design for Assembly’ (DfA) guidelines. Design proposal 1 is based on cylindrical or annular snap fit joint concept and design proposal 2 is based on a cantilever lug snap fit joint concept. The assembly and strength of the joints of the proposed designs were simulated using ‘COSMOSXpress 2003’ software with reference to the tile system model. The simulation showed that the new jointing system complied with all the requirements of the design factor specified by the manufacturers and DfA guidelines. It showed that the new jointing system is better than bolt and nut joint not only in terms of ease of assembly but also efficiency. The simulation results showed that although both design proposal 1 (cylindrical) and 2 (cantilever) were similar in many aspects which are easy to assembly, reduce time, light weight and reduce part, but design proposal 1 failed the strength test. The advantage in strength makes design proposal 2 is a better choice.
I wish to express my gratitude and thank to my supervisor Ass. Prof. Dr. Rosnah bt Mohd Yusuff, for the persistent guidance, assistance, and support throughout the study period.

Gratitude and thank are also to all members of supervisory committee, Ir Mohd Rasid b. Osman and En Ahmad Rizal b. Abdul Rahman for their constructive comments, advice and guidance.

Special thank to all my friend out there in the furniture industries, for their valuable experience and knowledge. Lecturers and friends from Department of Mechanical and Manufacturing, Faculty of Engineering and Department of Industrial Design, Faculty of Design and Architecture (UPM).

Finally, I also wish to express special thank to my family and other individuals for their support and encouragement for making this study possible.

“Advancing the world with logic design”
+ Leonardo da Vinci+
I certify that an Examination Committee has met on 13 July 2006 to conduct the final examination of Mohd Shahrizal B. Hj. Dolah on his Master of Science thesis entitled “Development of a New Jointing System for Open Plan Office System” in accordance with Universiti Pertanian Malaysia (Higher Degree) Act 1980 and Universiti Pertanian Malaysia (Higher Degree) Regulations 1981. The Committee recommends that the candidate be awarded the relevant degree. Member of the Examination Committee are as follow:

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DECLARATION

I hereby declare that the thesis is based on my original work except for quotation and citations which have been duly acknowledged. I also declare that it has not been previously or concurrently submitted for any other degree at UPM or other institutions.

MOHD SHAHRIZAL B. Hj. DOLAH

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PE  Polyethylene
PMMA  Polymethylmethacrylate
POM  Polyoxymethylene
PP  Polypropylene
PS  Polystyrene
PU  Polyurethane
PVC  Polyvinylchloride
R&D  Research and Development
R1.2  Release 1.2
R2.4  Release 2.4
SIL  Silicones
TM  Total assembly time
UV  Ultra Violet
VP  Vertical pole