DEVELOPMENT OF SPREADSHEET ANALYSIS (SAS) FOR DFA HOUSE METHODOLOGY

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Syukur Alhamdulillah.....

" Ya Allah ....terlalu banyak yang engkau berikan , dan terlalu sedikit yang dapat aku balas...."

Perjuangan Ku,
Setiap detik dan saat , ku anyam usaha bersama redha dan tawakkal
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Akhirnya kini, terasa nikmat kejayaan ,
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"KepadaNyalah kita datang dan kepadaNyalah kita kembali"

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ABSTRACT

Today, the world wide manufacturing companies are increasingly being forced by the market demand to increase the competitiveness of their product in price, quality and delivery time. As a result, the new coherent DFA House Methodology is intended as a design tool to aid the designer in the first step analysis of the system design process. The DFA house Methodology method is minimizing the total number of parts, easy assemblability and improving design quality. This thesis is mainly concerned on the developing the prototype system based on the DFA House Methodology by using the EXCEL programming and VISUAL BASIC as a communication language. This prototype needs to have user friendly characteristic interactive, efficient and also runs effectively.

ABSTRAK

Dunia syarikat pembuatan global pada hari ini semakin meningkat naik disebabkan oleh permintaan yang semakin meningkat dalam saingan menentukan harga, pengeluarkan barangan yang bermutu dan penghantaraan yang berkesan. Kesan daripada itu, DFA House Methodology telah menyediakan satu kaedah yang boleh membantu perekabentuk semasa di awal rekabentuk barangan di buat. Konsep ini adalah mengurangkan jumlah keseluruhan barangan , mudah untuk di pasang, pembaikan dalam rekabentuk kualiti. Maka dengan itu projek tesis ini adalah untuk membangunkan satu sistem program yang boleh di buat analisa dengan menggunakan EXCEL dan Visual Basic sebagai bahasa penghantaraan . Program ini dikehendaki memenuhi kriteria yang memudahkan pengguna, kecekapan yang baik dan boleh beroperasi dengan lancar.

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LIST OF SYMBOLS

α	Axis perpendicular
ß	Axis of insertion
E	An assemblability evaluation score
K	An assemblability evaluation score

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CHAPTER I

INTRODUCTION

1.1 Introduction to the problem

The past decade has seen a large amount of effort devoted to the integration of design and manufacture, with the goals of reducing manufacturing cost and improved product quality. The processes and procedures that have been developed have become known as a design for manufacturing and design for manufacture (DFM). Associated with this is the closely related area of design for assembly (DFA). The field is often simply described by DFM/DFA (George, 2000). A manufacturing system is composed of a large number of distinct processes which all influence product cost, product quality and productivity of the system. The interactions between these various facets at a manufacturing system are complex, and decisions made concerning one aspect have ramification which extend to the other (Chargchien and Li Lin, 1996)

The design process is an iterative, complex, decision making engineering activity by which identical products is economically manufactured and sold. The three main phrase of the design process are the feasibility study, the preliminary design and the detail design. During design process, the design team may need to factor many variables into consideration and make numerous trade-off with respect to performance, cost, reliability, service and other attribute. With these concerns, manufacturing and assembly

cost tends to be difficult for design engineers to quantity. Design for assembly (DFA) should be considered at all stage of the design processes.

The design for assembly (DFA) analysis is first conducted leading to a simplification of the product structure. Then early cost estimates for the parts are obtained for both the original design and the new design in order to make trade-off decision. In the DFA new coherent DFA house methodology were introduce by Hubert K.Rampersad. It is a systematic methodology where matrix is used to determine inter-relation among product, process and assembly properties.

The present work is concerned with using the EXCEL system programming technology to develop the prototype in Design for Assembly (DFA) for DFA House Methodology. The prototype system will be performing with the interface to make user easier and comfortable to use it. Besides, system provides the methodology guideline information during the research. Therefore, the prototype system will be very user friendly and enhance design assemblability evaluation more effectively.

1.2 Objective

The objective of this project is to develop a prototype analysis system for evaluating the product and the related assembly processes using a new coherent DFA procedure called DFA house.

1.3 Scope

The scopes of the project are as follow;

i) Study on the Design for Assembly (DFA) together with House Methodology.

ii) Study on the EXCEL programming and Visual Basic language.

iii) Develop a Computer Programming System with Graphical User-Interface using DFA House Methodology.

iv) Evaluate a product as a case study. Analyze the evaluation result and redesign the product.

v) Verification and validation of the system.

1.4 Project Methodology

Implementations of this project are distributed in two continuous semesters. Arrangement of time and follow schedule are very important to reach target and the project objective. Furthermore, literature review on a few types of DFA methodology will be reviewed in the first stage. The DFA methodology includes the Boothroyd-Dewhurst, Lucas and Hitachi Assemblability Evaluation Method (AEM). After that, the DFA house methodology will be explained further.

Nowadays, in the manufacturing sectors, government sectors and banking sectors are practically using the spreadsheets. This prototype system project depends on the DFA house methodology. The prototype system is performing with effectiveness,

efficient and user-friendly. Besides it also makes the user easier to make analysis and reduce time to calculate with the DFA House.

At the first stage, learning about the EXCEL programming will for example to make the spreadsheet fully understood and to develop the program itself. Make it the EXCEL language visual basic it clearly. The understanding about DFA house methodology is also important to learn. The understanding and combination of information for this project will able to perform better.

By developing the prototype system, it is also able to show the result values before and after analysis. Another important thing, it is able to show the priority of the critical part to improve. Figure 1.1 shows the activity planning for thesis in semester 1 and semester 2. Meanwhile in the Appendix A1 and A2 is the Gantt chart for schedule planning to complete this project.

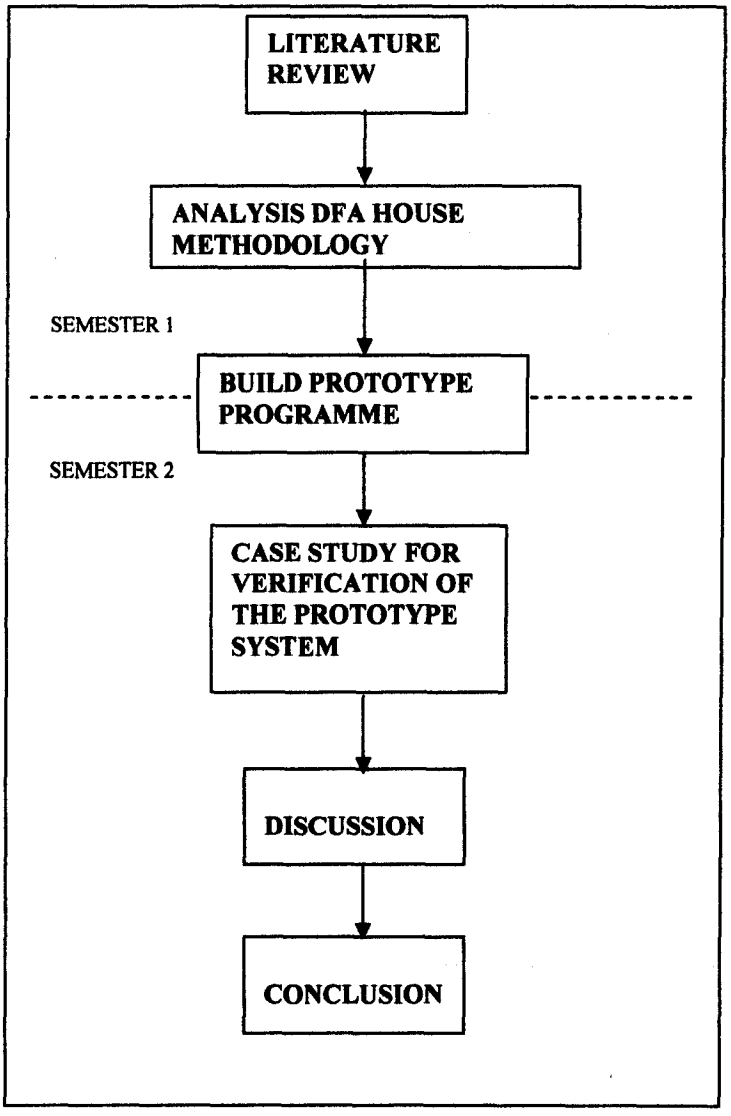

Figure 1.1: Activity Planning Flow Chart of Thesis Semester 1 and Semester 2

1.5 Significance of Finding

The significances of this prototype programming system DFA House Methodology are:-

i) The DFA House evaluation operation is simplified and improved by using computer programming instead of manual evaluation process.

ii) The prototype system allows the user to use the system comfortability and easily.

iii) The prototype system reacts as a facilitator which gives more information and knowledge about the DFA House to consumer.

iv) The evaluation score that has been gained and further improvement can be done efficiently.

v) The prototype system recommends for component and fine reductions.

1.6 Report Structure

This report consists of seven chapters. It is hoped to give better understanding and knowledge about the DFA House and the initial stage of the prototype programming.

Chapter 1: Introduction. This chapter explains the propose title together with the objective, scope and the project methodology.

Chapter 2: Literature Reviews. Briefly review about the DFA methodology and significance DFA in the manufacturing. The main focus of this thesis is on the DFA methodologies on the subject of several popular methodologies that have been

established including the DFA House methodology. Further more about the DFA House methodology will be explained detail application, procedures and concept of the DFA House in next chapter.

Chapter 3: DFA House Methodology. This chapter continues the detail walkthrough of more research about the DFA House methodology. Chapter 3 is very important to understand because this development program was followed the concept of the DFA House.

Chapter 4: Development of the Prototype System. This chapter presents the prototype system flow chart with detail programming flow and prototype system. Chapter 4 also provides the detail how to implement the system and explanations about the sequence of evaluation.

Chapter 5: Evaluation of the System. Chapter 5 is about the case study. A product will be analyzed and evaluated by using the prototype system. The redesign product also needs to analyze with the prototype system.

Chapter 6: Discussion. The discussion is about the prototype system, evaluation of the product that is original design and redesign. The advantages of the DFA house and prototype system are also explained.

Chapter 7: Conclusion and Recommendations. Chapter 7 concludes all about the prototype system and product the original design and the redesign. This chapter also gives idea for future improvement the prototype system.

1.7 Summary

This chapter brought more exciting with analysis design in the Design for Assembly methodology especially in DFA House. It is hoped to bring more efficiency and time reduction time for designer to make analysis and allow designer to think comprehensively about the product and process design before proceeding to the development of the assembly system. The prototype system will be organized with the appropriate spreadsheet and forms for easy access of the user. Moreover it will also include the evaluations of the improvement exist design before and after redesign, calculate with prototype system.