A.	**Project number**	: 305.PMEKANIK.6011004
	Project Title	: The development Of An Intelligent System for the Design Evaluation and Improvement of Manufacturability and Assembly of Product
	Project Leader	: Prof. Madya Dr. Zaidi Mohd Ripin
	Tel: 04-5941024	**Fax:** 04-5941025

B. Summary for the MPKSN Report

Assembly is one of the most important stages of product development. Design for Manufacturing and assembly (DFMA) is one of the approaches to improve the product designs for easier and least assembly cost with high functionality of the products. The main objective of the research work is to develop an improved DFMA system. The developed system is aiming at supporting new techniques for DFMA and to provide users opportunity to assess and reduce the total production cost by means of reducing assembly time and cost and maximize the product value at the early stage of the design process. The system enable designers not only to minimize the number of components of a product while improving the product value but also set the destinations of the part after it has been analyzed based on DFMA rules and guidelines. In order to achieve this task, Lucas DFA and Value Engineering are reviewed in the current research work towards developing a framework for DFMA analysis. The scope of the work includes systematizing the assemblability analysis for a product through generic sequence of design activities with rational basis. The inherent knowledge of the DFMA rules and principles are used in a systematic way throughout the assemblability analysis. The software 'DO By DEMAIN' has been developed in this research work for the convenience of the designers. The software facilitate quick result with the best accuracy to be obtained and to preserve the design data for future reference. Two case studies have been performed using the software to illustrate the proposed method with a view to determine its effectiveness in actual application.

C. Objectives Achievement

- **Original project objectives**

The research objectives of the project are to:
1. Develop an evaluation system for DFMA base on the proposed method
2. Develop the software based on the developed DFMA evaluation system
3. Test the effectiveness of the developed evaluation system by implementing suitable case studies.
4. Compare the developed method with the established method that is Boothroyd – Dewhurst DFA, Lucas DFA and Value Engineering
5. Identify the weaknesses of the developed method and recommend it for future improvements.

- **Objectives Achieved**

A software known as 'Do by DEMAIN' has been developed using Visual C to assist designer in doing the design work.

- **Objectives not achieved**

A comprehensive testing of the software was not possible within the time since the project need to be finished and students completed the study

D. Technology Transfer/Commercialization Approach

The results of findings were presented in various conferences (copies attached)

E. Benefit of the project

- Output of the project and potential beneficiaries

A software 'Do by DEMAIN' – potential beneficiaries ; industrial designer, design software for engineering students

- Organizational outcomes

Trained 1 graduate students (MSc – En Zakri Ghazali)
4 kertas pembentangan di dalam persidangan dalam negeri dan antarabangsa

- National Impact

To make Malaysia as a known research source for software development in design evaluation for manufacture and assembly

F.   Assessment Of Project Structure

- Project team

The project was initially led by Prof Muhammad Razali and then Dr Zaidi took over the project since Prof Muhammad Razali left for KUTKEM. Research Assistant appointed was Zakri Ghazali

- Collaboration

No formal collaboration was made with local industry. Industry feedback is solicited from published literatures. This is due to the fact that industries in Malaysia does not use the LUCAS or the Boothroyd-Dewhurst softwares since they are prohibitively expensive (in excess of RM 200 000 per seat)

G.   Assessment Of Research Approach

The research approach is sound and good by trying to combine the features of Value Analysis into the decision making within the software, however since it is a stand alone software there is a need to integrate the software within a larger software in the design process. The approach is heavy on the language side and this may be prohibitive to its wider adoption

H.   Assessment Of The Project Schedule

The project was extended by 1 year due to relocation of the initial project leader

I.   Assessment Of Project Cost

The project was carried out well within costs

J.   Additional Project Funding Obtained
No additional funding obtained

K.	**Other Remarks**		
	Date: 27th of July 2005	**Signature:**	

K.   **Other Remarks**

Date:	27th of July 2005	**Signature:**

1. **Technology Transfer/Commercialization Approach**

- **Patent**

- **Publication Pertaining to The Research Finding**

    a. **Report/Conference Paper**

    1. Project Planning Through Functional Modeling Approach, *M. R. Muhamad, F. M. Hashim, B. M. B. Mohamad, Z. Ghazali.* **National Conference on Information Technology Project Management in 21st Century.**(2001)

    2. Computer Based Design For Assembly. *M. R. Muhamad & G. Zakri.* **Seminar Nasional Tahunan Teknik Mesin (SNTTM) II 2003.** Jurusan Teknik Mesin Fakultas Teknik Universitas Andalas Padang.

    b. **Journal Publication**

    1. Evaluation System in Product Design for Assembly. *Mohd Razali Muhamad, Rahmatullah and Zakri Ghazali.* **Investing in Innovation 2003, Vol. 5: Science and Engineering, pp. 109-114. Universiti Putra Malaysia**

    c. **Others**

2. **Post Graduates (who graduated or who are still participating the project)**

Student Name & Year of Registration/Nationality	Thesis Title	PhD./M.Sc.	Year of Completion
ZAKRI BIN GHAZALI	Development of Design Evaluation System For Manufacture and Assembly	M.Sc.	2003

- **Number Of Research Assistant Or Officers funded By The Project:**

    a. **Research Officers: 0**   b. **Research Assistant: 1**

3. **Collaboration**

Institution:
a. Local Institution/s:

b. International Institution/s: