

DESIGN IMPROVEMENT USING LIFE CYCLE COSTING METHODOLOGY

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ABSTRACT

With the increasing world population, pollution becomes more serious too. At the present, pollution is increasing and developed countries had recognised pollution as a severe problem and need legislation to overcome this problem. Ecologic regulations are added to manufacturer to prevent further damage of environment. For example, take back laws such as end of life vehicle directive also forcing the manufacturer to be more concern with their product. Concerns are on the end of life product, where manufacturer think about cost, because cost are needed to recycle end of product. Life cycle costing is a method to help designer in decision making, where cost influence type of design. If life cycle costing is not performed, the cost of product design might be undercosting or overcosting and is out of the typical scope or focus of product selection processes. Life cycle costing play important role in helping manufacturer to choose better design to save cost and reduce waste. In this project, Life cycle costing methodology is used to improve product design with lower cost.

ABSTRAK

Dengan populasi dunia yang semakin meningkat, pencemaran juga bertambah serius, Pencemaran yang teruk di negara yang sedang membangun menyebabkan masalah yang merunsingkan dan peraturan digubal untuk mengatasi masalah ini. Undang-undang alam sekitar ditambah kepada pengilang untuk mengawal situasi ini. Sebagai contoh, undang-undang ambil balik pada jangka hayat akhir kenderaan menyebabkan pengilang lebih bertanggungjawab pada produk mereka. Pengilang akan memikirkan kos untuk penggunaan semula produk mereka. Jangka hayat pengiraan adalah cara untuk membantu pereka produk dalam membuat keputusan. Sekiranya, jangka hayat pengiraan tidak dibuat, kos produk mungkin melebihi ataupun kurang daripada sepatutnya. Jangka hayat pengiraan juga memainkan peranan penting dalam membantu pengilang untuk memilih reka bentuk yang lebih baik dimana boleh mengurangkan kos dan pencemaran. Dalam projek ini, cara jangka hayat pengiraan digunakan untuk membantu reka bentuk pada kos yang lebih rendah.

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CHAPTER 1

INTRODUCTION

1.1 Background of the Project

Sustainable become hot issues on year 2009 since most of the material cost become high and expensive. Seeing sustainable as serious issue, united nation take various step to overcome this problem. And one of the millennium development goals of the united nation is ensure environment sustainability. Because of a rise in forest planting, landscape restoration and the natural expansion of forests, deforestation of about 13 million hectares per year resulted in an estimated net decline of 7.3 million hectares of forest area per year over the period 2000-2005, compared to 8.9 million hectares annually in the previous decade (UNEP; 2008. Ensure Environmental Sustainability).

Most of the manufacturer struggle with the high cost and low sales. Global recession made the manufacturing industry gone worst since the demand is less. The problem such as low demand and high cost made recent manufacturer struggle now days. So manufacturer looking to the new area to invest in which provide profit to company itself. As a result, some of them consider the area of end of life product instead the early stage of manufacturing. Remanufacturing is processes which include repairing and take valuable product and then resemble it into new product. This method enables manufacturing to get material in lower cost compare to buy new one.

Since remanufacturing is the new concept to most of manufacturer, they likely to refuse to invest into it. Besides that, lack of knowledge in this area made difficult for them to start new business. Life cycle assessment (LCA) is powerful tool to measure the environment load of product. (Guinee 2002) So with this tool, manufacturer can know the element of product and start studying of product. Having a lot of information about product itself is useless unless economic affordable is considered.

So the economic is one of the important elements in the manufacturer business. Without proper judgment of economic of the product, manufacturer will face the loss in the business. This idea is same applied the remanufacturer industry itself. Before and while conducting the remanufacturing industry it is important to study costing of product. Somehow it should be indicator to tell investor of the situation itself. Using this life cycle costing, the top management can analyze the element of remanufacturing and plan different strategy. Having overall total cost in industry can help to achieve company business objective.

Life cycle costing (LCC) is similar to tool which concerned with the comparison of life-cycle costs among alternative product. Life cycle costing also similar with total cost assessment which provide identical function. This indicator also helps the top management with decision making. Information of arrival rate and customer demand influences the production planning and control. As a result, this will influence the cost of operation in factory. Finally, higher cost means the more expensive incur of the product itself.

By providing the proper life cycle costing to investor, it will increase the interest in the remanufacturing industry. Besides interest, it also indicates where the money is being used in the factory and improvement can be done in the particular area. Finally, Life cycle costing serve as the multi purposes tool beside than economic analyze itself.

1.2 Problem Statement

In the future, raw material will become more expensive and hardly to available. So manufacturer need better strategic to overcome this problem. Besides that, Manufacturer needs to be responsibility of their product. In the mean time, automotive manufacturer need to recover their product to decrease solid waste and contamination level of ecologic. Moreover, take back laws such as end of life vehicle directive also forcing the manufacturer to more concern to their product. Life cycle costing play important role in helping manufacturer to choose better design to save cost and reduce waste.

1.3 Objective and Scope of Project

The objective of the project is to improve product design using life cycle costing methodology.

The scopes of the project are listed below.

- i) Conduct case studies for wheel spacer
- ii) Develop a web application of life cycle costing analyze

1.4 Significant of Research

Life cycle costing will help decision makers select the product or process that result the least cost to the total cost of manufacturing. This information can be used with other factors, such as performance data to select a product or process. Life cycle costing identifies each cost involved in product design and impacts from one media to another and from one life cycle stage to another.

If life cycle costing was not performed, the cost of product design might be undercosting or overcosting because it is outside of the typical scope or focus of product selection processes.

1.5 Structure of Thesis

The structure of thesis consists of six chapters. The first three chapters were done at master project. The following three chapters were done at master project two.

Chapter 1 describes about the background of the study, project problem statement, and the objective and scope of the life cycle costing project.

Chapter 2 highlights some literature reviews related to the study, which includes descriptions on life cycle costing, Life cycle costing application, development of model. Besides that, it cost analysis used in industry application.

Chapter 3 shows the overall methodology method use to improve design using life cycle costing methodology. Steps by steps of the methodology are presented in the flowchart to give the brief and clear understanding of the project.

Chapter 4 shows illustrate the design and assembly of case study (wheel spacer component). Concept development and system level design of the drawing are included. Sketch of different wheel spacer design is provided in sub section.

Chapter 5 provides explanation types of each design and data which is collected from ABC Company which manufacture automotive part. Besides that, details of each cost are described and calculations are shown in different table. Besides that, the structures of web application of life cycle costing are demonstrated.

Chapter 6 makes a conclusion on the project where the best designs were chosen. Cost and time study were chosen as criteria to select the important element in product design.

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