



UNIVERSITI TEKNIKAL MALAYSIA MELAKA

DEVELOPMENT OF DATABASE FOR CHECKING FIXTURES FOR AUTOMOTIVE PARTS

This report submitted in accordance with requirement of Universiti Teknikal Malaysia Melaka (UTeM) for Bachelor Degree of Manufacturing Engineering
(Manufacturing Design) (Hons.)

by

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ABSTRAK

Tujuan kajian ini adalah untuk membangunkan pangkalan data untuk Semakan Jadual untuk Bahagian Automotif. Bahagian-bahagian yang digunakan dalam proses semakan seperti “clamper”, “stand” dan “toggle”. Matlamat projek ini adalah untuk melaksanakan pangkalan data memeriksa lekapan bahagian. Projek bermula ialah mengenal pasti masalah semasa yang dihadapi oleh pereka bentuk di jabatan reka bentuk. Masa terbuang telah menjadi masalah utama yang telah pereka untuk dihadapi. Semua data dan maklumat yang berkaitan dengan projek ini telah dicari dan direkodkan dalam kajian literatur. Perisian Catia digunakan sebagai perisian CAD untuk membina model tiga dimensi untuk reka bentuk bahagian-bahagian semua bahagian di perpustakaan bahagian-bahagian yang. Semua bahagian-bahagian yang dianjurkan dalam tiga saiz yang berbeza yang ditentukan oleh saiz panel badan kereta. Merujuk kepada keputusan itu, perpustakaan baru terbentuk atau dibangunkan dengan menggunakan perisian Catia untuk membantu pereka dalam proses reka bentuk lekapan pemeriksaan. Pengesahan perpustakaan telah dijalankan dengan syarikat itu untuk menguji keberkesanan, kebolegunaan dan kesesuaian. Oleh itu, dengan alat ini dan kaedah telah mempercepatkan lekapan proses reka bentuk memeriksa untuk menjadi lebih cepat dan cekap.

ABSTRACT

The purpose of this study is to develop database for Checking Fixtures for Automotive Parts. The parts that used in the checking fixture process such as clamper, stand and toggle. The goal of this project is to implement a database of checking fixtures parts. The project started is identify the current problem that faced by the designer at design department. Idle time has been the major problem that designer have to faced. All the data and information related to this project has been sought and recorded in the literature review. Catia software is used as CAD software to construct three-dimensional models for the design of the parts all the parts in the parts library. All the parts are organized in three different sizes which are determined by the size of car body panel. Referring to the result, new libraries are formed or develop using the Catia software to aid the designers in the checking fixture design process. The validation of the library has been conducted with the company to test the effectiveness, usability and relevancy. Therefore, with this tool and method have accelerate the checking fixtures design process to become more quickly and efficient.

DEDICATION

To my beloved family, my respectful supervisor and examiner, my fellow friends and all the parties involved, thank you so much.

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USED ACRONYMS / ABBREVIATIONS

CF	-	Checking Fixture
BIW	-	Body in White
PQR	-	Part Quality Requirement
SESB	-	Shazu Engineering Sdn. Bhd.

CHAPTER 1

INTRODUCTION

Chapter one describes the overall background of this project research. The scope of this research is focused at Shazu Engineering Sdn. Bhd. The content of this chapter includes background, problem statement, project objectives, scope of project, and potential benefits from the project.

1.1 Background of the Study

This study introduces development of a library or catalogue for Checking Fixtures items like clamper, stand, and toggle to be used in Checking Fixtures process. Shazu Engineering Sdn.Bhd. has been involved in the automotive industry since its establishment in September 2003. The company is owned by 100% Bumiputra and is entrusted to provide the most cost effective, reliable and accurate consultation services to the customers. As of mid-2009, Shazu Engineering has been assigned as quality consultant for the development of Savvy, Satria Neo, Persona, New Saga and Exora. Starting with only four employees, currently Shazu is supported by 27 dedicated employees with high technical expertise and management skills.

Established in the year 2003, Shazu Engineering has been an eminent manufacturer of Checking Fixtures & Assembly fixture for many companies. Shazu Engineering is engaged in manufacturing custom designed as well as standard specification products. Shazu Engineering qualified workforce is able to ensure complete compliance with their clients' requirements and specifications.

The fixtures are manufactured from high quality raw material procured from local vendors with extremely reliable reputations to produce high grade Checking Fixtures and Assembly Fixtures.

Auto-body parts include the stamping parts, subassemblies jointed with stamping parts, the auto-body framework and all kind of trims which are formed into complicated surfaces. The quality of covering these parts considerably affects car performance and airproofing. During the manufacturing process, in order to ensure parts quality, it is important to measure parts with checking fixtures which are used to locate and hold the workpiece in 3D space according to measure planning.

Checking fixtures for auto body parts have different types according to measuring planning and parts features. The main type of such checking fixtures can be described as follows; measuring fixtures, combined checking fixtures, profile modeling casting checking fixtures, and additional checking fixtures. Correctly selecting the checking fixture type for auto body parts is a first step to design a good checking fixture.

In the quality control process of auto-body manufacturing, selecting which type of checking fixture takes into consideration on the features and parameters of the part that would be measured; so the information of the auto body part is important for checking fixtures is not unique since numerous plans are possible. Traditionally, the selection of a checking fixtures type relies heavily on the designer's expertise and experience. Performance evaluation of a checking fixtures type is also very difficult due to high non-linear relationship of the design parameters. Consequently, it is not immediately apparent if a checking fixture type is optimal or near optimal for the given part.

1.2 Problem Statement

As products and processes are becoming more complex, the decision making involved in product design and manufacturing engineering have to consider many variables. Time Loss is some of the major problem experienced in SESB. By reducing time loss, the production output and profitability to the company will increase besides reduce the cost such as salary for overtime work. Design department preparing the concept based on quality integration mode. From the concept, designer will plan the design checking fixtures based on the customer requirements. Designer needs to design the checking fixtures based on the concept, so it will take time to make it, so as a designer, time consuming and accuracy is very important. When it takes too long time and will cause work to be inefficient. It is important to accurately design a checking fixture. It can be time consuming to change the design if the design is not accurate or design changed by the customers. Checking fixtures has many types of size. It depends on the customers which part of the car that they want to develop such as rear floor, front floor, side door, panel roof and many mores. Checking fixtures have many child parts such as toggle clamp, clamper, and stand. It will take time to design all the parts to make a checking fixtures process done.

1.3 Objective of the Study

The purpose of this study is to develop database for (CF) Checking Fixtures for automotive parts. The complexity and detail of a database design is dictated by the complexity and size of the checking fixtures itself. Overall, the study objective involves three main stages which are:

- i. To identify the problem of time constraints in the design process of Checking Fixtures.
- ii. To recommend tools and methods used in Checking Fixture process.
- iii. To develop a library or catalogue for Checking Fixtures processes parts.

1.4 Scope of the Research

This study seeks to solve the problems as SESB located at Shah Alam, Selangor. SESB is a company that manufactures checking fixtures for cars and listed among the automotive industry. This study will focus primarily on the loose panel part and time loss at the design department. Interview and observation methods also include gaining more understanding about some detail processes. The result of the study will then be used to achieve the objectives. This study was limited only for Shazu Engineering Sdn. Bhd.

1.5 Potential Benefits from the Research

Following are the potential benefits that can be obtained from the carried out project. The potential benefits from the project had been classified into two categories:

1.5.1 Benefits to Industry

The benefits of the conducted project to the industry can be summaries as below:

- a) The manufacturing industry and students can exchange knowledge between each other.
- b) Increase the accuracy of designing the important automotive parts.
- c) The improvements of the work efficiency.

1.5.2 Benefits to University

The benefits of the conducted project to the industry can be summaries as follow:

- a) Create the relationship between UTeM and manufacturing industry.
- b) Providing possible subject to be taught in UTeM that is applicable in real industry world.
- c) The mission of UTeM achieved, which is to develop a curriculum that encourages critical thinking, problem solving, teamwork and social skills.