

PROJEK SARJANA MUDA (PSM)

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JUDUL:

**DEVELOPMENT OF DATABASE SYSTEM FOR METALLIC ALLOY SELECTION USING
MS VISUAL BASIC**

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APPROVAL

This report is submitted to the Faculty of Manufacturing Engineering of UTeM as a partial fulfillment of the requirements for the degree of Bachelor of Manufacturing Engineering (*Manufacturing Design*). The members of the supervisory committee are as follow:

En. Shajahan bin Maidin
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ABSTRACT

The material selection is one of complex of product design and systematic approach must be done in order to make the best material choice. Lack of material selection support tools can lead to incorrect material choice, which may subsequently result in failure and incur unacceptable costs. A computerized material selection system can therefore be of great value in helping product designers to select the most appropriate material for a given set of product requirements. The anticipated outcome includes consideration of other selection model, more alloy records, some multi-media features and internet links. This project reviews the development of the material selection strategy. Ms Visual Basic 6.0 will be used as a tool to develop the programming. Ms Access 2000 will be used as the database.

ABSTRAK

Pemilihan bahan merupakan perkara kompleks mengenai sesebuah rekabentuk produk dan pendekatan sistematik mesti dibuat untuk membuat pilihan paling penting dan terbaik. Kekurangan alat-alat sokongan bagi pemilihan bahan boleh menyebabkan pilihan yang tidak tepat, yang kemudiannya mengakibatkan kegagalan dan kerugian. Sistem pemilihan berkomputer adalah penting dan menjadi nilai hebat dalam membantu pereka produk dalam memilih bahan yang paling sesuai bagi sesuatu produk. Keputusan dari projek ini ialah pengumpulan data –data aloi, ciri-ciri berbilang media dan internet penghubung. Kesimpulannya, projek ini adalah mengenai strategi pemilihan bahan. Misrosoft Visual Basic akan digunakan sebagai perantara bagi membangunkan pengaturcaraan, manakala Microsoft Access pula digunakan sebagai agen pengumpulan data.

DEDICATION

For everybody in my life that had supported me so far, especially my dearest mother, father, lecturers and friends thanks for the memories here in UTeM even you didn't realize it ...

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LIST OF ABBREVIATIONS, SYMBOLS, SPECIALIZED NOMENCLATURE

AISI	-	American Iron and Steel Institute
SAE	-	Society for Automotive Engineering
Mn	-	Manganese
Si	-	Silicon
Cu	-	Cuprum
HSLA	-	High Strength Low Alloy
VB	-	Visual Basic
lbl	-	Label
frm	-	Form
cmd	-	Command
cbo	-	Combo Box
ADODC	-	ActiveX Data Objects Data Connection
AADODB	-	ActiveX Data Objects Database
GUI	-	Graphical User Interface
IPO Table	-	Input Output Table

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CHAPTER 1

INTRODUCTION

1.1 BACKGROUND OF THE PROJECT

Design is the process of translating a new ideas into the detailed information from which a product can be manufactured. Each of its stages requires decision about the material which the product is made and the process of making it. Engineers often face the need to evaluate the best materials that can be used for each type of product.

This project will broadly involve in developing an appreciation of the role and significant of material selection in product design and manufacture and obtaining a detailed understanding of principles of material selection.

Besides that, it is intended to expose and be familiar with the concepts of database systems and conducting a critical review of literature on computerized material selection systems. By learning MS Visual Basic and Microsoft Access software tools and developing the skills needed to implement the system in question.

Identifying and obtaining material data and information for the metallic alloys concerned. The implementation of the material data is added by using the development software such as Microsoft Access and Microsoft Visual Basic.

The project is started with collecting and analyzing data for metallic steel alloy to include in the project database. Next, all the data gathered is arranged in database by using Ms Access before it was linked with Ms Visual Basic. With the usage of visual basic, the user interface is then created before the coding and relation is build.

In addition, the project is then successfully develops with interactive and creative interface and also included the user friendly basis.

1.2 PROBLEM STATEMENT

Material selection is one of the complexes and arduous part of the product design process and it entails a systematic approach in order to make the best material choice. It requires searching through a vast collection of material data and information. Lack of material selection support tools can lead to incorrect material choice, which may subsequently result in failure and incur unacceptable costs.

Steel are the most important engineering materials, and cover a wide range of alloys based on iron and carbon. The strength of iron-carbon alloys, particularly after heat treatment, has been exploited for thousands of years. Modern steels and ferrous alloys have mostly been developed since the Industrial Revolution. Alloy steels are mostly fairly cheap, covering a range of carbon contents (0.1-1.0%). The medium to high carbon content steels respond well to heat treatment (such as "quenching and tempering") to give very high strength and good toughness for gears, driveshaft's, pressure vessels, tools. Alloy steels containing other elements as well as carbon are classified into *low alloy* and *high alloy*, depending on the

amount of additional alloying elements. Heat-treated high alloy steels give very high strengths, but are more expensive. All steels have a high density and a high Young's modulus. The strength and toughness of alloy steels can be varied enormously by alloying, working and heat treatment. Alloy carbon steels rust easily, and must be protected by painting or other coatings.

A computerized material selection system can therefore be of great value in helping product designers to select the most appropriate material for a given set of product requirements. The anticipated outcome includes consideration of other selection model, more alloy records, some multi-media features and internet links.

1.3 OBJECTIVES

- i. To identify and obtain the material data and information for metallic alloys properties.
- ii. To familiar with the concepts of database systems.
- iii. To learn MS Visual Basic and Microsoft Access.
- iv. To implement a computerized metallic alloys selection system by making use MS Visual Basic and Microsoft Access software tools.

1.4 SCOPE

The project will involve ways or procedure to find the best selection of materials. The purpose of the study is to understand principles of material selection in production design and obtain material data for the metallic alloys concerned. Some of the consideration need to be evaluated is the design, the material properties such as physical properties, mechanical properties, thermal properties and optical properties. There are several types of materials to be considered in this project such as AISI 1000 Series Steel, AISI 4000 Series Steel, AISI 6000 Series Steel, AISI 8000 Series Steel and other material. All the related material will be recorded into Microsoft Access before the programming done by Microsoft Visual Basic and read all the data recorded in the table.

1.5 IMPORTANT OF THE PROJECT

There is a vast collection of materials that need to be considered by engineers before making any design. The material selection is one of complex of product design and systematic approach must be done in order to make the best material choice. Lack of material selection support tools can lead to incorrect material choice, which may subsequently result in failure and incur unacceptable costs. A computerized material selection system can therefore be of great value in helping product designers to select the most appropriate material for a given set of product requirements. The anticipated outcome includes consideration of other selection model, more alloy records, some multi-media features and internet links.

1.6 ORGANIZATION OF THE REPORT

Chapter 1: Introduction

This chapter consists of background of the problem, problem statement, objectives, scope and importance of the project.

Chapter 2: Literature Review

This chapter includes the literature of materials types and material properties. The literature about Visual Basic and Microsoft Access also included.

Chapter 3: Methodology

The chapter consists of flow chart and detailed explanation.

Chapter 4: Design of Programming

This chapter consists of material specification of metallic alloys and proposed interface design that will be used in Visual Basic 6.0.

Chapter 5: Result

This chapter consists of result of database of metallic alloys by using Ms Access and interface programming as well as code by using Ms Visual Basic. The result is shown before and after debugging of the programmed.

Chapter 6: Discussion

This chapter will discuss about the error that occur while debugging the programmed and all related discussion regarding the project.

Chapter 7: Conclusion

This chapter consists of the conclusion for the whole project from the starting until the programmed is finish successfully.

CHAPTER 2

LITERATURE REVIEW

2.1 METALLIC ALLOYS

2.1.1 INTRODUCTION

Metallic materials are inorganic substances composed of one or more metallic elements, but may also contain some nonmetallic elements. Metals' tightly packed atomic and orderly crystalline structure result in many of their usual physical properties, including; opaque to and reflective of light, electrically and thermally conductive, ductile (bends before it breaks), the ability to be formed into useful shapes, and strength at room temperature and often remain so even at elevated temperatures. Metals are usually heated to form alloys (combinations of two or more metals) in the liquid state. These alloys then exhibit physical properties different from their individual metal components. Metals and alloys are typically classified as ferrous and nonferrous. Ferrous metals and alloys contain iron as their primary metallic element. Steel is an example of a ferrous alloy. Nonferrous metals and alloys contain metals other than iron as their primary metallic element. Examples of nonferrous metals include aluminum, copper and lead. [17]

An alloy is a metal composed of more than one element in which the major component is a metal. Most pure metals are either too soft, brittle or chemically reactive for practical use. Combining different ratios of metals as alloys modify the properties of pure metals to produce desirable characteristics. The aim of making alloys is generally to make them less brittle, harder, resistant to corrosion, or have a more desirable color and luster. Engineering alloys include the cast-irons and steels, aluminum alloys, magnesium alloys, titanium alloys, nickel alloys, zinc alloys and copper alloys. For example, brass is an alloy of copper and zinc. The example of metallic alloys is shown in Figure 1 below. [18]



Figure 2.1: Example of Metallic Alloy