DATABASE MANAGEMENT INVENTORY SYSTEM

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A time to remember family and friends, too;

A time to reminisce, and say "Thank You."

For my beloved parents,

Aripin bin Jasin &

Rokiah binti Ghazali

My husband,

Ahmad Sahiri bin Maasah

My love is no ends.

Appreciation on your supervision,

Dr. Arham Abdullah

En. Mohd Yamri Ramli

Your co-operation,

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For my family,

K/Tie, A/Man, K/Gela, A/Usop, A/Emi, K/Intan

Aqilah, Danish, Dania, Darvish

And also for my friends...

May Allah bless you all...

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ABSTRACT

Inventory control systems in construction industry needs systematic database management system. Inventory involved in construction industry are materials, machineries, spare parts, etc. This study is about to develop the inventory system that can be applied in construction industry. The objectives are to identify the problems involved in the implementation of the current inventory system at the spare parts store, Logistics and Machineries Department (LMD), PROPEL Berhad, to identify the needs of systematic inventory system at the spare parts store and to develop the prototype of the inventory system that can be implemented at the spare parts store. A case study has been carried out at LMD, PROPEL Berhad for the prototype development. The prototype used Microsoft Access and Bar Coding System. The prototype not only benefit to the person who in-charged with the system, but also benefit to all staffs dealing with the spare parts store by making it faster, more accurate and easier.

ABSTRAK

Sistem kawalan inventori dalam industri pembinaan memerlukan sistem pengurusan pengkalan data yang sistematik. Inventori yang terlibat dalam industri pembinaan ialah bahan-bahan, mesin, alat ganti, dan sebagainya. Kajian ini adalah tentang membina sistem inventori yang boleh diaplikasikan dalam industri pembinaan. Objektifnya adalah untuk mengenalpasti masalah yang terlibat dalam perlaksanaan sistem inventori yang sedia ada di stor alat ganti, *Logistics and Machineries Department* (LMD), PROPEL Berhad, untuk mengenalpasti keperluan sistem inventory yang sistematik di stor alat ganti tersebut dan untuk membina prototaip sistem inventory yang boleh dilaksanakan di stor alat ganti tersebut. Kajian kes dijalankan di LMD, PROPEL Berhad untuk pembangunan prototaip. Prototaip tersebut menggunakan Microsoft Access dan system barkod. Prototaip yang dibina bukan sahaja berfaedah kepada orang yang ditugaskan terhadap system tersebut, tetapi juga bermanfaat kepada semua staf yang berurusan dengan stor alat ganti tersebut dengan mempercepatkan, memudahkan dan membuatkan urusan lebih tepat.

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CHAPTER 1

INTRODUCTION

1.1 Background

According to Concise Oxford Dictionary (COD10) on CD-ROM Tenth Edition, *'data'* means 'the quantities, characters, or symbols on which operations are performed by a computer'. Meanwhile, *'database'* means 'a structured set of data held in a computer'. Connolly and Begg said that *'database'* is 'a shared collection of logically related data (and a description of this data), designed to meet the information needs of an organization'. They also said that *'Database Management System (DBMS)'* means a software system that enables users to define, create, and maintain the database and provides controlled access to this database'. According to Concise Oxford Dictionary (COD10) on CD-ROM Tenth Edition, *'inventory'* means 'a complete list of items such as goods in stock or the contents of a building'. Meanwhile, *'system'* means 'a complex whole; a set of things working together as a mechanism or interconnecting network.

Inventory control systems require the frequent identification of things to the computer. For instance, to record the movement of a pallet of material from one point in the facility to another, three identifications must be made: the material being moved, its origin and its destination. In large warehouses and distribution centers, tens of thousands of identifications can be needed each day. Automatic identification is faster than manual identification and keying. It also can save labour cost (Young J.B., 1991).

Nowadays, bar coding is the most widely automatic identification technology applied. Bar code technology is well developed, the equipment required to print and read bar codes is inexpensive, and the resulting reliability and accuracy are extremely high. A bar code is a series of light and dark printed bars. The pattern of the bars is pre-established to represent alphabetic and numeric characters in any of a number of standard schemes. When a laser beam is run across the bars at a constant velocity, light is reflected from the bars and spaces in a series of pulses that can be electronically detected and converted into the appropriate characters.

Because bar code symbols are printed, they are not easily updated. Bar codes, therefore, are most applicable when the information to be encoded does not change rapidly. Things that can be readily identified with bar codes including products (a bar-coded label might be attached to a pallet or preprinted on the product or its carton), storage locations (often labels are attached to the rack or bin), employees (the bar code is usually on an ID badge or card), vehicles, tote pans, etc. in all these cases, the information contained in the bar code is constant and unvarying; it serves to identify one particular item or kind of item among many similar ones without doubt and with only a small chance for error.

Young (1991) said that in early 1950s or late 1940s, the first large-scale application was in railroad car identification. A program was sponsored by the American Association of Railroads in 1960, with Sylvania Manufacturing (now a part of GTE) producing the equipment. The railroad car identification project ultimately failed because the bar codes were not able to withstand the wear and lack of maintenance that railroad equipment is subjected to. The idea, however, was a good one and made a good test bed for bar coding as a concept. Industry has gained a great deal as a result.

In 1970, the Uniform Code Council was formed and the Universal Product Code (UPC) became a reality. It is intended specifically for retail sales applications but has possible uses wherever retail products are handled. Bar code development accelerated in the 1970s and 1980s. In 1974, the Code 39 was developed. In 1982, the Department of Defense adopted bar coding standards. In 1983 the American

National Standards Institute accepted bar coding. And since that time developments have occurred at an ever-accelerating pace (Young J.B., 1991).

1.2 Problem Statement

Most businesses require a continuing flow of materials and supplies. To avoid disruption of that flow, most make an effort to keep track of the amounts of each item on hand. In small businesses with small amounts of inventory, it is often sufficient for a human to remember approximate inventory records. When the human thinks that supplies may be getting low, he or she can walk to the stock room and check. Even a moderately industrious person can effectively control several dozen items this way.

However, as the amount of inventory increases and as the rate of material flow into and out of stock increases, it becomes more and more difficult for a human to remember even approximate inventory balances. Some form of record keeping is needed to supplement the human mind.

In most businesses it is normal for several people to be involved in the keeping of inventory records. Often the clerical job of doing the arithmetic and writing the results on cards is separated from the material handling jobs of placing items on shelves, removing them when they are needed, and performing occasional counts to verify the recorded balance. In a typical manual system, material handlers move material into and out of the warehouse and create written records (called transactions) as they work. Periodically, the transactions are turned over to a clerk for posting to ledger cards. When things go right, manual inventory records can be an efficient way for businesses to assure that they have the materials they need. Unfortunately, this method of keeping inventory records, simple as it may seem, is vulnerable to a long list of possible problems (Young J.B., 1991).

The next step up from clerk and cards system is computerization in a batch environment. Batch inventory systems simply automate the clerical portion of the inventory system. Material handlers still manually record the receipt and shipment of material for central processing. But the written transactions are keyed and electronically posted to records inside a computer. There is little or no change in data gathering and material handling procedures.

Independent data collected usually keyed in by human actions which may cause errors. It is important that the information be removed from the control of humans to the extent possible to eliminate errors. Bar code error rates are very low, and they make it impossible, for all practical purposes, to cheat. Bar coding, therefore, is an effective way of gathering independent data.

Projek Penyelenggaraan Lebuhraya (PROPEL) Berhad currently have 42 machineries to support their highway project over Malaysia which is covers from North to South. All these machineries handled under Logistics and Machineries Department (LMD). They maintain these machineries more than 50 percent by their own. To support the maintenance, they have their own spare parts store which is located at Southbound Dengkil Rest and Service Area (RSA), ELITE Highway. With the current situation at the spare parts store, the department uses the combination of manual file system and file-oriented system for their current inventory system to manage about 260 items of spare parts, it is necessary to develop a new inventory system to eliminate current problems. The problems facing with current inventory system are data redundancy, difficult to update and maintain, inconsistent data, bad security, difficult to impose constraints on various data file and difficult to backup.

1.3 Aim and Objectives of Research

The aim of this research is to develop the inventory system that can be applied in construction industry.

The objectives of this study are:

i. to identify the problems involved in the implementation of the current inventory system at spare parts store, LMD, PROPEL Berhad;
ii. to identify the needs of systematic inventory system at spare parts store, LMD, PROPEL Berhad;
iii. to develop the prototype of the inventory system that can be implemented at spare parts store, LMD, PROPEL Berhad.

1.4 Scope of Research

This research was done to provide Database Management Inventory System for the spare parts store at LMD, PROPEL Berhad. It involved operating data in the spare parts store which are capturing, validation, sorting, classifying, calculation, summarizing, storing, retrieving, reproducing and communicating. The system uses bar code system and Microsoft Access 2002.

1.5 Importance of Research

This research was made to prepare the Database Management Inventory System for the spare parts store at Logistics and Machineries Department (LMD), PROPEL Berhad. This research could provide useful inventory system as the outcome of the research for the spare parts store.

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