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PDM SYSTEM FOR AUTOMOBILE ASSEMBLY

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Abstract - *The automotive industry is one of the largest manufacturing industries in terms of scale, revenue as well as processes and is also considered to be one of the largest drivers of economic growth across the globe. This is an industry that has its fulcrum not just on the strength of its manufacturing processes and engineering capabilities, but also on the strength of its parts procurement, assembly lines, supplier and distribution networks, quality testing, etc.*

Present practice of ordering process in passenger car involves selection of sub-assemblies of key elements like engines, transmission systems and other accessories. In current scenario the main problem in service stations is the delay in service .The main reason behind the problem seems to be unavailability of spare parts. Objective of this work is to develop a database system for identifying availability of parts in service stations.

In this research, spare parts management system of three models has been studied. Details of the importance of the spare parts, a fundamental knowledge of maintenance types, spare parts, spare parts management, spare parts classifications were collected and created a database using Microsoft access.

1. INTRODUCTION

An automobile is a wheeled vehicle carrying its own motive power units. Worlds' first three wheeled automobile with auto cycle petrol engine was built by Karl Benz of Germany in 1885 and was granted patent on 29th January 1886.At the same time, another team from Germany, Gattlieb Daimler and Wilhem Maybach built and patent the first motor cycle. Soon thereafter, Benz also invented accelerator for speed regulation, battery ignition system, spark plug, clutch, gear shift and radiator for cooling of the engine. With these improvements started with production of automobile, the first in the world, in the year1888.However, it was in the year 1983 the first four wheeled automobile was introduced by Benz. Large scale production line manufacturing of automobile was started by Ransom Eli Olds in 1902 and the concept vastly expanded by Henry Ford. Since 1920s, all automobiles have been mass production resulting in lower costs. All round development in the fields of design and manufacture of automobiles has resulted in vast improvement in their efficiency, comfort and safety, with consequential tremendous increase in their use worldwide.

The main problem faced automobile industry the availability of spare parts and slow pace of pending this has become a challenge to the assembly team for arranging sub-assemblies and parts. In the assembly the availability of sub-assemblies is to be ensured in order to deliver the car in time. Normally chassis being a structural member is kept as same for all models. The adaptability of chassis for various types of engines and other accessories which are mounted on the chassis is important for the manufacturer.

This work proposes PDM and ERP approaches for automotive assembly for a specific model. In this work we combine both ERP and PDM principles for spare parts management. The work is to be conducted in a service Centre to include study of all the spare parts of selected three vehicles.

2. LITERATURE REVIEW

A. The variety of research in management of maintenance inventories is very broad in scope. To effectively manage inventories, three steps are needed; Spare Parts Classification, Demand Forecasting and Inventory Control. Some authors reviewed previous literature on spare inventory management. The following sections present the review of the literature related to the three requirements of an effective spare part inventory management: Spare Parts Classification, Demand Forecasting and Inventory Control. Two approaches are detectable in the literature: considering each of the three requirements separately and the study of integrating these requirements. Both approaches are covered in the review.

Spare Parts Classification Review Large number of spare parts inventories makes the management of inventory items difficult. As a result, parts are commonly grouped and special stock control policies are applied to each group. The most commonly used approach to classify inventory items is the ABC analysis. Traditionally, the importance of a stock item is evaluated in terms of a single criterion, the annual dollar usage of stock keeping units. However, other criteria may also play a significant role in classifying stock keeping units such as lead time, criticality, stock out consequences, demand rate, etc. In that case multiple criteria ABC analysis for spare parts inventory is used. This has been addressed by different three models to select and to their relationships are to be noted.

B. The spare parts condoling and stock keeping process is difficult any of the organization or a company the company to create our way to achieve target the spare parts sails department in this target is to clear in monthly the spare parts departments concentrating selling our parts in this is the important criteria to that department it will over com the company to sort the spare parts to one of the order them to keep their stock level.

Moreover, an effective spare parts inventory control methodology motivated by a case study at a large oil refinery has been presented. The methodology starts with parts classification based on parts criticality, consumption rate, price, and lead time; followed by, demand forecasting using different forecasting methods. Finally, an inventory model has been used as well as an optimization of the system based on service level. Finally, the integrated approach to spare parts inventory management has also been addressed from a theoretical point of view with no application to a real case study. Again, different methods of parts categorization have been presented and an inventory model has been introduced for optimization of stocking levels. This brief review of literature showed that few studies introduced the integrated approach for managing spare inventories; hence, an integration of spare classification and demand forecasting with stock control policies is needed.

3. FRAMEWORK DEVELOPMENT

The framework for planning and managing spare parts inventory is proposed with an objective of minimizing total inventory to control and maximizing equipment availability and taking into equipment's safety. This framework can be used for spare part inventory management for both manufacturing and service centers. The level of framework presents an inventory control mechanism by integrating the Microsoft access based. It starts with classification of spare parts into groups, followed by spare parts demand and availability for each item class the suitable ordering policy is defined based on the forecasted demand. Each vehicle spares are grouped into cells to the database model for the determination of the stock control method.

Spare Parts Classification: The Microsoft access based classification is to be used in to control the stock and present inventory the controller to easily to classify the spare parts by sections and columns each columns to specify the order to better performance to campier simple ERP software

4. SOFTWARE DEVELOPMENT LIFE CYCLE

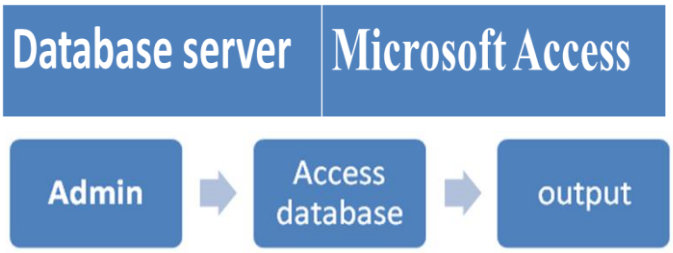

Fig-1: Work model

Using the collected data and the developed computer model, spare classification processes and demand forecasting are carried out consequently, we calculate the stock less point for each stock item. However we still cannot judge the overall effectiveness of the proposed framework. According to decision makers they still do not have a clear picture on which forecasting method is better. Hence, performance measurement is carried out using database query report module. The results are compared to the current inventory value and total stock level is calculated for each spares. Clearly shows that the proposed methods provide better results than the current system. Expect for better performance and savings

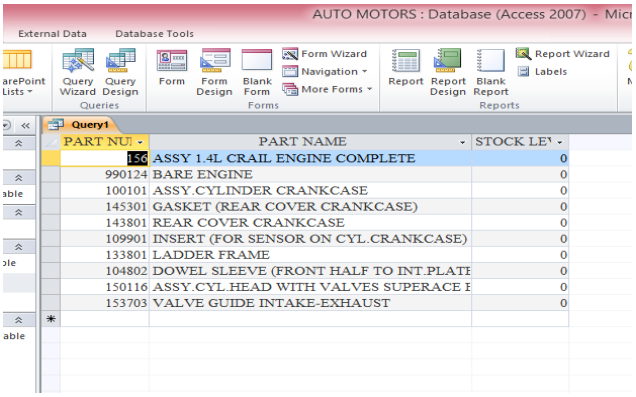

Fig- 2:Query report model

5. COMPUTER MODEL DEVELOPMENT

A Microsoft access based application for spare part inventory management has been developed. It provides an effective and user friendly tool for applying the proposed framework for small sized organizations. The main components of the application are a startup screen for data input and three main modules for basic operations; spare part classification, inventory management, and reporting module. The output of these modules is the ordering policy of each spare part. Furthermore, it can be easily configured by users to match their current business processes and requirements. This section presents a step by step guide through the developed computer model showing its main and special features of its constituting modules.

A. Initial Data Setup Users start using this application by adding the initial data entering required as shown in Fig. 2. & Fig. 3,

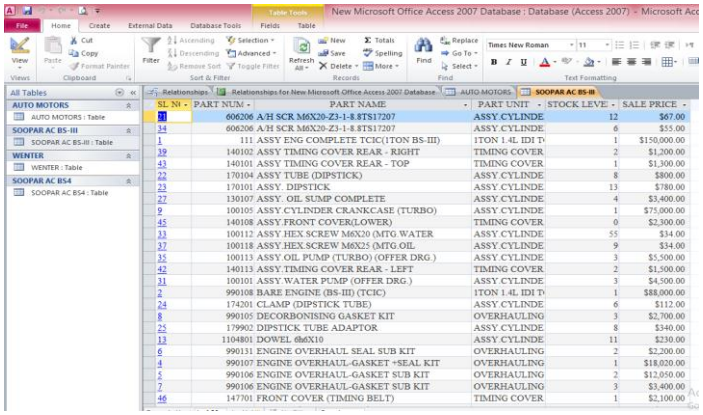

Fig-2: Vehicle Spare parts table in Microsoft access

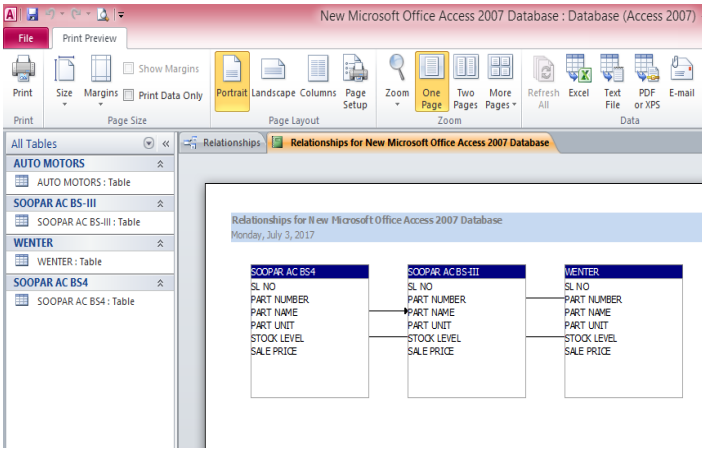

Fig-3: Vehicle relationships table in Microsoft access

6. CONCLUSION

To use the new system software in automotive companies must align their IT strategies with their businesses and to develop their business in better way the managers or company worker to help all the level internal works. This system to solve the final overall effort minimize and to help the internal audits. The environment is complex it will help the company to better in future.

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