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Processes of Warehouse Management In Automotive Industry – A Study

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ABSTRACT

Background: Warehouse is very important for achievement or failure of businesses. Warehouses play a serious intermediate part between supply chain followers, affecting supply chain costs and service to justify supply chain procedures and to manage them more efficiently, many corporations have set up centralized production and warehouse services over the previous periods. This has caused in greater warehouses responsible for the delivery to a better variety of additional demanding consumers in a massive area and, therefore, with more multifaceted inside logistic processes. Warehouse processes that need to be prearranged and organized include inbound flow handling, product-to-location assignment, product storage, order-to-stock location allocation, order batching and release, order picking, packing, value-added logistics activities, and shipment. The complexity of warehouse processes has increased intensely in the past decade. Warehouse processes have been affected by consumers, demands for quick reply and automation, with its subsequent decrease in enrolment and paperwork. **Objective:** A study has been conducted to analyze the processes of total output of models of car per day and also per week in warehouse management. **Results:** Findings of the research reveals that Total output of these three models of car per day and per week reached the target of output, but there is no sufficient place to accommodate different models of car in warehouse of automotive industry. Consequently warehouse department have look after a substitute solutions to the problems of warehouse of automotive industry. **Conclusion:** automotive industries emerging from the period of massive change of transaction as healthy, vibrant businesses depends in large part on how their warehouse management adapt changes. Greater speed and efficiency will help to predict the future scenarios which are the most likely to occur and nearly everything about their businesses is changing their auto parts products and services, the degree of governmental involvement

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INTRODUCTION

In its simplest form, "warehousing" is the storing of properties until they are desirable. The objective of warehouse processes is to please consumers' wants and desires while operating space, equipment, and labour efficiently. The properties must be reachable and protected. Meeting this goal necessitates continuous arrangement and constant change. Warehouse is very important for achievement or failure of businesses. Warehouses play a serious intermediate part between supply chain followers, affecting supply chain costs and service to justify supply chain procedures and to manage them more efficiently, many corporations have set up centralized production and warehouse services over the previous periods. This has caused in greater warehouses responsible for the delivery to a better variety of additional demanding consumers in a massive area and, therefore, with more multifaceted inside logistic processes. Warehouse processes that need to be prearranged and organized include inbound flow handling, product-to-location assignment, product storage, order-to-stock location allocation, order batching and release, order picking, packing, value-added logistics activities, and shipment. Storing and order picking are complex, often labor-intensive processes that determine warehouse presentation to a large part. They suggest and describe the constructs essential to do this, concentrating on both planning and control activities within the warehouse and on the decision rules used to list and enhance the inbound, storage, and retrieval processes in the warehouse. In general, expect that a more complex warehouse task results in more complex decision rules for scheduling and optimizing inbound, storage, and outbound activities. Warehouse planning and control depends both on the

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complexity of the warehouse task and on the dynamics of the market.

Warehouse processes are often incorrectly thought to exist in a static atmosphere, where situations and desires rarely change and where warehouse planning involves the previous activities of building a structure and providing equipment. Similarly, warehouse management is assumed to be only the supervision of a few simple, highly repetitive tasks. On the contrary, warehouse processes occur in a dynamic environment.

The complexity of warehouse processes has increased intensely in the past decade. Warehouse processes have been affected by consumers, demands for quick reply and automation, with its subsequent decrease in enrolment and paperwork. With many wholesale, retail, and industrial firms assuming technologies such as automatic identification, just-in-time inventory control (JIT), and computer measured buying systems, many warehouses have had to regulate to equal the fluctuating requirements of their consumers and the altering competition. The continual demands for superior product production and enhanced consumer service have shared to generate warehousing situations and desires that hardly continue for very extended periods of time. Consequently, warehouse planning is, in fact, a constant activity and warehouse management is a sequence of critical contact among the warehouses' managers, workers, and users. In addition to being a active profession, warehousing is a challenging one and perhaps the utmost task challenging the warehouse professional. In fact, over the past few periods, the warehousing function has certainly been the "whipping boy" for the manufacturing and marketing functions of most firms simply because few managers have identified the impact that more efficient and effective warehouse processes can have on the entire scheme. A manager who does recognize and identify the true value of warehousing in meeting the growing demands of product proliferation and better customer service and who is able to convince others of its importance will be the manager who finds way to the boardrooms of firm. Although this progress does not address private and public warehousing as two separate and distinct topics, references will be made to several of the unique features associated with each of these warehousing processes at the proper times. Private warehouses will be referenced as those facilities that are owned or leased for the purpose of satisfying the warehousing requirements of the corporation that maintains them. A public warehouse, on the other hand, will be thought of as a firm that is in the business of offering warehousing services to other companies for a fee. The objective of most public warehouse firms is to enter into a contract with one or more firms to handle their warehousing needs. Most contract warehouses charge their clients for shipping and receiving merchandise, storing units, and processing the associated paperwork. A benefit of utilizing the services of a public warehouse is that a firm can often place its products close to customer demand points without having to secure land or construct a building. Utilization of a public warehouse provides flexibility in locating inventories and a low level of commitment of people and equipment.

DRB-HICOM Berhad is one of Malaysia's leading corporations, involved in the automotive manufacturing, assembly and distribution industry through its involvement in the passenger car and four wheel drive vehicle market segment, the national truck project and the national motorcycle project. DRB-HICOM assembles cars in Malaysia for TATA Motors, Honda, Isuzu, Suzuki, Mercedes-Benz and Volkswagen, with plans for expansion. Besides automotive concerns, the group's core business focuses are in the services and property & infrastructure sectors.

Originally, it was incorporated in 1980 as the The Heavy Industries Corporation of Malaysia Berhad (HICOM). It experienced rapid growth and in 1996 merged with Diversified Resources Berhad (DRB) to form the biggest conglomerate in Malaysia.

Subsidiary:

- HICOM Automotive Manufacturers Malaysia Sdn Bhd (formerly known as Automotive Manufacturers (Malaysia) Sdn Bhd)- assemblies of Volkswagen Passenger Vehicle, Suzuki Passenger Vehicle and DEFTECH military vehicle.
- PROTON Holdings Berhad - Major shareholder of Proton
- DRB-HICOM Defense Technologies Sdn Bhd - DEFENCE VEHICLES
- Automotive Corporation Malaysia Sdn Bhd (ACM) - Authorised dealer for Isuzu Malaysia Sdn Bhd
- DRB-HICOM Auto Solutions Sdn Bhd
- HICOM Diecastings Sdn Bhd incorporated 1985 - Casting and Machining
- Scott & English Malaysia Sdn Bhd
- POS Malaysia - Malaysia's national post services provider
- Puspakom Sdn Bhd - Vehicle inspection center
- International College of Automotive Malaysia (ICAM) - Automotive College
- DRB-HICOM Environmental Services Sdn Bhd
- Glenmarie Cove Development Sdn Bhd
- Comtrac Sdn Bhd

Associated Company:

- Proton Edar Sdn Bhd - wholly owned subsidiary of PROTON Holdings Bhd
- Motosikal Dan Enjin Nasional Sdn Bhd (MODENAS) equity of 81% - Motorcycle Manufacture and related components

- Edaran Modenas Sdn Bhd (EMOS)- Distribution of MODENAS motorcycle
- Edaran Otomobil Nasional Bhd - equity of 79.05%
- EON Automart Sdn Bhd - Authorised dealer for Mitsubishi Motors Malaysia Sdn Bhd
- Euromobil Sdn Bhd - wholly owned subsidiary of EON Bhd - importer and distributor of Audi
- HICOM AUTO Sdn Bhd - Direct subsidiary of EON Bhd - Authorised dealer for Volkswagen Group Malaysia Sdn Bhd
- Honda (Malaysia) Sdn Bhd - equity of 34%
- Mitsubishi Motors Malaysia Sdn Bhd - equity of 48%, EON Bhd
- Isuzu HICOM Malaysia - Assembly of lights/heavy duty trucks, bus and passenger cars - equity of 49%
- Suzuki Malaysia Automobile Sdn Bhd - equity of 40%
- Suzuki Motorcycle Malaysia Sdn Bhd - Motorcycle Engines & Components
- HICOM-HONDA Manufacturing Malaysia Sdn Bhd - equity of 48% - Manufacturer of HONDA motorcycle engines and components in Malaysia since 1985
- HICOM-Potenza Sport Cars Sdn Bhd - direct subsidiary of PROTON
- Uniasia General Insurance - Strategic partnership with United Overseas Bank Group
- Alam Flora Sdn Bhd - Waste Management & Public Areas Cleansing - 97.37

While most of the attention is focused on sales and production, a great deal of potential savings is usually overlooked in the management of warehouse. Although warehouses vary greatly in size and type, most of them share the same type of problems and solutions. To get an overview, managers should review the following common warehouse and inventory issues

Some distributors blame the recession for decreased warehouse productivity and accuracy, but some problems existed even during good times. Here are three stories of warehouse problems that were easily and inexpensively solved.

Running Out of Space During the Recession:

Not every distributor reduced inventory as the recession resulted in decreased sales. One distributor actually increased inventory in the face of slowing sales, and planned to add lines. But there were two problems. First, almost all the slots in the warehouse were occupied; a warehouse arranged by velocity. Second, picking productivity was lower than it had been before warehouse head count had been reduced. The owner thought about putting on an addition to get extra space, but a call to contractors revealed that it would cost a lot, and divert money needed to add lines and worried that another building would require pickers to walk longer distances, thereby decreasing productivity and needed someone to objectively determine if there were ways to store new lines in the existing space, and currently ways to increase productivity.

So the first order of business while on site was to confirm the extent of slow moving and "dead" inventory; an ABC report showed that it was huge. Then it was necessary to determine if the dead and slow moving items were stored far away from the head end of aisles. A list of several fast moving and several dead items was created, and used it to determine if they were stored in velocity-appropriate locations. Most of the dead items in the sample were stored near the head of aisles, at eye or chest-level.

Too Much Space Reduced Productivity:

Almost all distributors who provide construction-related items reduced inventory as the recession deepened, including a west coast distributor with a 200,000 sq. ft. warehouse. The facility is divided into a fast-pick section, with small items and small boxes of items, and a (wide-aisle) section where pallet loads and large boxes are stored. All the aisles are long, and within each section, items are stored based on velocity.

The distributor had reduced head count, which he thought was the reason for low picking productivity in the fast-pick area. But he wasn't sure, and wanted an unbiased evaluation. One of the answers to the standard pre-visit questionnaire indicated a source of the problem, but one that could account for only a small portion of the problem.

Using a unique, proprietary checklist, an inspection of the fast-pick section revealed the main source of the problem, and confirmed the minor source. About 15% of the slots were never used, uniformly along the aisles and top to bottom of the bays. Yet the slower moving items were stored at the tail end of the aisles. And even though inventory had been reduced, there was still too much. When the warehouse manager was asked why there was so much open space, it stated that had been to save space for growth. No one could explain why there was too much inventory. With sales down some 30%, any growth was now many years away.

Very High Productivity Caused Errors:

A distributor of "soft" items was experiencing a high rate of mis-picks, all of which were being reported by angry customers who received the wrong items and/or quantities of correct items. Sales were down slightly, but head count was not. The warehouse was arranged by velocity, with any overflow stored directly above the slots used for picking. Productivity was very high – if no one counted the time spent putting away the wrong items that were returned, and the time spent picking the right items to replace the returns. Management believed that the pickers were the cause of the mistakes, but wanted an unbiased, objective 3rd party

to verify their belief. Answers to the standard pre-visit questionnaire explained why mistakes were not being detected before items were delivered or shipped, but did not explain why the mistakes were occurring.

Using my checklist, it is determined that about 10% of the products being put away were not being put in the slots designated for them. They were being put in adjacent slots meant for very similar items. Most pickers assumed that all items in a slot belonged in that slot, and so did not verify that all boxes were the right ones. Some pickers spot checked while picking, and made sure to get the right boxes but did not inform the warehouse manager of the problems they were finding and correcting.

The people doing the packing compared the number of boxes picked to the data on the pick list, but did not verify that all boxes were the right ones; boxes of very similar items looked the same.

Need and Significance of the Study:

Warehousing services play a vigorous part in the complete supply chain process. The automotive industry has a diversity of portions which rest on on the administration of the warehouse in order to reach at its termination purpose. To arrange and achieve the innumerable lists in automotive industry, innovative warehouse association software delivers to take of automotive warehouse to a totally vigorous and classified level to track and trace all movements of the auto parts in and out of the warehouse including the capacity to track small important part details like part weight, part group and more.

Objectives of the Study:

i) To analyse the processes of total output of models of car per day in warehouse management
ii) To examine the processes of total output of models of car per weeks in warehouse management

Period of the Study*:*

Period of the study is from 2010 to 2014 year.

Scope of the Study:

The study covers the output of three models of car to the extent of processes of warehouse management of automotive industry only.

Limitations of the Study:

Only two components variables of total output have been taken for the study and as the study is based on the primary data, collected through oral interview method, the reliability depends on the true response of the warehouse management of the automotive industry.

Review of Literature:

1. According to Van Hoek (2001) stated that, in order to be extra approachable to consumers, various corporations have approved a delay approach foremost to numerous value-adding accomplishments (like kitting, labelling, product or order assembly, customised packaging or palletisation) that yield dwelling in the delivery inside and which have to be arranged and combined in the order-picking procedure.
2. De Koster *et al*., (2002) specified that, warehouses are also elaborate in improving produces, resources, and produce movers from consumers in order to reallocate them to extra consumers, recyclers, and original-equipment industrialists.
3. According to ELA/AT Kearney (2004), warehousing subsidised to about 20% of the measured corporations' logistics costs in 2003 (other events distinguished are value added services, organization, inventory costs, transportation and transport packaging). Warehouses seemingly process an important portion of a firm's logistics system. They are usually used for storage or safeguarding produces (raw materials, goods-in-process, finished products) at and between points of foundation and points of consumption.
4. According to De Koster (2004), the popular of warehouses hire humans for order gathering. Among these, the *picker-to-parts* systems, where the order picker treads or drives along the aisles to pick items, are the greatest shared.
5. Recently, Roodbergen (2001) proposed a non-linear objective function (i.e. average travel time in terms of number of picks per route and pick aisles) for defining the aisle formation for chance storing warehouses (including single and multiple blocks) that diminishes the average expedition size.
6. According to Petersen *et al*. (2004) shows that, with concerns to the transferable remoteness in a labour-intensive order-picking system, full-turnover storage overtakes class-based storage. The break between the two depends on the class panel approach (i.e. number of classes, percentage of the total volume per class) and the overwhelming system used. However, they propose using the class-based method with 2 to 4 lessons in preparation as it is easier to implement than the volume-based method; it does not necessitate a whole list of the substances graded by capacity and it necessitates less time to manage than the other devoted approaches do.
7. Petersen (2002) shows that the zone shape (number of aisles per zone, the aisle lengths), the number of objects on the pick-list and the storing strategy have a substantial consequence on the regular travel distance within the area.
8. Jane and Laih (2005) deliberate the difficult of heuristically conveying produces to areas in a coordinated arrangement. The process is created on co-appearance of objects in the same order (i.e. items appear in the same order are stored in the same zone).

9. Gademann and Van de Velde (2005) measured the order-batching problem with a extra overall objective: reducing the entire portable time. They display that the difficult is still NP-hard in the durable intellect when the number of orders per batch is better than 2. A branch-and-price algorithm is calculated to resolve occurrences of diffident extent to optimality.
10. Chen and Wu (2005) measure the closeness of guidelines by captivating into interpretation the equal of "association" amongst guidelines (instructions having extra related objects have a tall association and may practice a group). They progress a gathering ideal based on 0-1 integer programming to exploit the entire link of consignments.

Research Methodology:

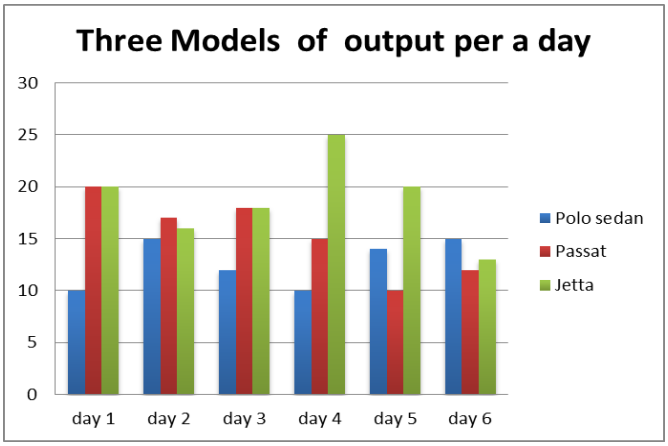
Sources of Data: - the study is prepared based on primary data as well as secondary data. The primary data has been collected from the observation and also oral interview of warehouse management of automotive industry.

The Secondary data has been collected from the records of the warehouse management department of automotive industry and all possible existing literature is obtained by covering journals, books, online magazines, and publications.

RESULTS AND DISCUSSIONS

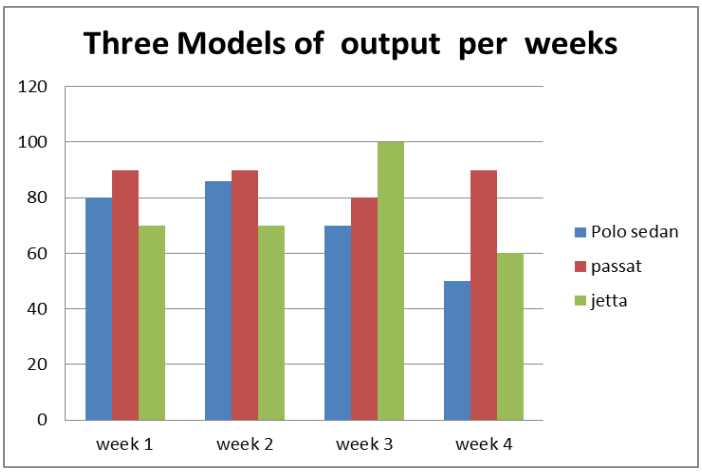
Table 1: Total output of models of car per day as per target.

Model	Day 1	Day 2	Day 3	Day 4	Day 5	Day 6
Polo sedan	10	15	12	10	14	15
Passat	20	17	18	15	10	12
Jetta	20	16	18	25	20	13
Target	50	48	48	50	44	40



Source: primary data

Fig. 1: Total output of models of car per day in warehouse management.



Source: primary data

Fig. 2: Total Output of Models of Car per Weeks in Warehouse Management.

Table 2: Total output of Models of car per week as per target.

Model	Week 1	Week 2	Week 3	Week 4
Polo Sedan	80	86	70	50
Passat	90	90	80	90
Jetta	70	70	100	60
Target	240	246	250	200

Above Tables and also Figures 1 and 2 dealt according to total out of models of car per day and also per week in warehouse management of automotive industry. There are three models of car i.e. polo sedan, Passat, and Jetta. Total output of these three models of car per day and per week reached the target of output, but there is no sufficient place to accommodate different models of car in warehouse of automotive industry. Consequently warehouse department have look after a substitute solutions to the problems of warehouse of automotive industry.

Suggestions:

1. The following are the suggestions for the study of processes of warehouse management in automotive industry such as:

*Profile orders. The most popular SKUs (stock keeping units) likely change with the seasons, so re-slot warehouse to accommodate business model, and review the setup at least once a year. This ensures that the "A" SKUs are in the correct storage media and physical location, reducing unnecessary travel for order pickers. The warehouse operations should have a dynamic "slotting" module.

*Analyse current picking methodology. Make sure a picking methodology suits organization. Whether choose single order, multi-order, batch picking with a single picker, or zone picking, the correct picking methodology is critical for optimizing productivity. Hey, it can always ask a 3PL(Third Party Logistics) to analyse it!

*Use software to sequence orders. Sequencing orders by pick path, and batching together single lines, same-zone orders, and difficult picks, such as non-conveyable items saves tremendous time on the distribution centre floor. Again, the warehouse software should be able to organize the workflow and optimize sequence performance.

*Create a warehouse within a warehouse. On the one hand, this ways can gain tremendous efficiency by grouping together the 20 percent of SKUs that complete 80 percent of orders. This cuts travel time for pickers. Surely, however, that the 80-20 area or zone is properly designed to accommodate high-volume activity. On the other hand, this is kind of old-fashioned thinking; in this day and age of the Long Tail, may not have the ability to utilize the 80-20 rule because of may be selling "few of many," instead of "many of the few!"

*Evaluate storage equipment to ensure proper application. Placing slow moving, low-cube items in shelving and fast moving items in carton/pallet flow or other appropriate storage options, improves storage density and picker productivity. This also allows to better utilized the DC's (Distribution Centres) cube. Seasonal and other promotions can mess with this idea, so beware.

*Create "wheelhouse" zones in picking area. This way can increase picking productivity and improve order picker ergonomics by slotting fastest-moving SKUs in the waist-to-shoulder or "wheelhouse" area of storage media.

*Designate only two or three standard shipping cartons. With only two or three boxes to choose from plus a few custom sizes, if necessary pickers will put orders together faster. Cutting down on sizes optimizes freight expenses and reduces corrugated spend. It also makes it easier to support a pick-path methodology.

*Consider automation. Order pickers spend about 60 percent of their time walking product or moving product around. Consider an automated solution, such as conveyance, to reduce their extensive travel time. Multi-level pick towers also save travel time and are quite innovative.

*Understand technology options. Plenty of options are available to increase efficiency – including bar codes, radio frequency, pick-to-label, pick-to-light, and voice-activated technologies. These technologies are designed to provide different levels of increased picking productivity and improved accuracy.

*Implement an incentive program for pickers. Incentive programs can be extremely valuable to an organization. To ensure program is effective, it must guarantee that productivity measurements are accurate, fair and equitable. Use key performance indicators (KPIs) to drive productivity.

Conclusion:

Hence, automotive industries emerging from the period of massive change of transaction as healthy, vibrant businesses depends in large part on how their warehouse management adapt changes. Greater speed and efficiency will help to predict the future scenarios which are the most likely to occur and nearly everything about their businesses is changing their auto parts products and services, the degree of governmental involvement, even the fundamental business models of the automotive industry.

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