Study and analysis of inventory management practices in small scale industry

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Abstract: **- In this project/research to studied product quantity analysis (p.q. analysis) in this process to collect three month data of the company which is required to complete the task for a different products from a plant are timed classed into runners repeaters and strangers this information help plan the production on a flow line vs. occasional low volume high value produce which can be completed in a job shop the study took place at an automobile company which is facing mostly two types of problems are stock out and overstock occur frequently in this research to use the product quantity analysis to improve their problems and considering change in the inventory management from raw material into finished good materials and efficient flow of supply chain management.**

Keywords: - Product Quantity analysis, Supply chain management, Inventory management, Job- Shop Production

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I.ITRODUCTION

Product quantity analysis the first step in this process is to gather and understand product demand data. This is accomplished by generating a cumulative Pareto percentage by volume of all products stock keeping units. These data items originate at the customer and provide a baseline by which to begin demand behaviour analysis. Annualised product stock keeping unit demand data should be segregated on a monthly/ weekly/ daily, demand basis. The source of this information usually comes from the business plan forecast (in units) and covers a time horizon of 6 to 12 months. By displaying the cumulative percentage, both high and low volume products begin to presents themselves. In addition to the forecast data it is important to consider the actual customer order sales data, doing so account for actual demand volume and mix variation which is important input for the takt time calculation.

The product quantity analysis looks for natural breaks in product groupings by sorting the gathered data and determining a fit for the production cells by: (1) their associated volumes, and (2) product alignment characteristics.
This usually an iterative process and is conducted several times in order to determine a best fit for each cells type. Product alignment characteristics could include the following the criteria:-

1. Align high volume product together.
2. Align to specific customers such as original equipment manufacturers.
3. Align to specific target markets.
4. Align to common manufacturing process.
5. Align to configuration commonality (size, material, functions, etc.).
6. Align to engineering content (standard vs. special).

Inventory management - inventory generally refers to the materials in stock, it is also called the idle resource of an enterprise. Inventory represents those items which are either stocked for sales or they are in the process of manufacturing or they in the form of materials which are yet to be utilised. A manufacturing firm generally carries the following types of inventory-

1. Raw Material - Raw material are those basic un fabricated materials which are have not undergone any operation since they are received from the suppliers e.g.. Bright Bars, Rounded Coils, and Pipes, etc.
2. Bought out Parts - These part refers to those finished parts, subassemblies which are purchased from outside as per the companies specifications.
3. Work in Process - These refer to the items or materials in partially completed condition of manufacture.
4. Finished goods Inventories - These refers to the complete products they are ready for dispatch.

This are the above terms are discuss in this project which is used by the company from raw materials up to finished goods materials to complete the procedure.

II.OBJECTIVES

1. To ensure adequate supply of products to customer & avoid shortages as for as possible.
2. To make sure that the financial investment in inventories is minimum.
3. Efficient purchasing, storing consumption & accounting for materials are an important objective.
4. To ensure timely action for replenishment.
5. Scientifically short term & long term materials planning.

III.PROBLEM DISCUSSION

Effective inventory flow management in supply chains is one of the key factors for success. The challenge in managing inventory is to balance the supply of inventory with demand. A company would ideally want to have enough inventories to satisfy the demands of its customers no lost sales due to inventory stock-outs. On the other hand, the company does carrying inventory. Enough but not too much is the ultimate objective. The inventory investment for a small business takes up a big percentage of the total budget, yet inventory control is one of the most neglected management areas in small firms. Many small firms have an excessive amount of cash tied up to accumulation of inventory sitting for a long period because of the slack inventory management or inability to control the inventory efficiently. Poor inventory management translates directly into strains on a company's cash flow. The studied an Automobile company, works in a small scale market distributing the automobile parts to its customers. The company has difficulty in matching its supply with the customer demand efficiently, which means both stock-out of inventory and excess inventory occur in the business? The management problem has affected negatively their profitability mainly due to the existence of excess stock. It is considered that the problem results from insufficient control over inventory and volatile demand for each product on a monthly base. To get a reliable forecast of the demand is not easy task in the wholesaling industry because of being unable to estimate the right quantity of demand during a specific period for each product. Another reason is that the lead-time of most products is long, about three months at the longest.

IV.METHODS OF PROBLEM SOLVING

With the help of product quantity analysis, took the data's which is provided by a company, the data are only three month it is sufficient to calculate the efficient time regarding p.q. analysis and to manage the inventory control in both cases stock out and overstock. First we has been calculated the machining time of each and every product, in a company manufacturing eight hundred plus product for different specification which is required by the vendor company or those company who are only assembled the parts and finally dispatch into the markets. During the CNC Machine shop and then to know the final problem, that is breakdown because of in between inter relation, communication, and information, and one more important failure is that which is sequencing of operation and machines, this are problems which has been seen in the company. During the project research first we improve the plant layout and achieved the efficient machining time regarding the operation per product, and then to collaborate inter departments to provide right information to the right station after the completion of the basic fundamentals we are analysed the data which is provided by company. First to calculate the percentage of the month that means how much quantity produces and what it should be required in a month, and to know for same process into a year. Than after to find out the cumulative percentage of the product it should gives the information to produce finally how much quantity to produce in a month or a year exactly. This calculation is shown in table 1 below. And also represent in graphically graph no. 1 below, in this graph mainly it categorised the three steps which is required project point of view is very important, (1) Strangers, (2) Runners, (3) Repeaters. This three area symbolically represented in graph with the help of this figure to know quickly which one product is required is high in market.

Table 1Calculation

part no.	TOTAL DISPATCH	RATE	% OF THE MONTH	CUMMULATIVE %
MW029715	2726	23.2	1.46	100
R278327	--	0	0	100
SKE 01	0	0	0	100
TAPPER BUSH	0	0	0	100
TCU-31919	0	19	0	97.91
31920	0	0	0	99.72
31947	0	0		99.72
32060	0	474	0	99.01
32061	0	241	0	98.87
32062	0	363	0	98.24
32063	0	405	0	98.17
32069	0	499	0	98.01
32370	0	310	0	97.92
33137	0	323	0	97.91
33913	0	317	0	97.62
36156	0	0	0	97.2
MH-000816	1100	21.5	5.91	96.8
ME-601289	300	75.3	0.16	96.48
601825	0	0	0	96.22
622136	0	5.5	0	96.14
640860	0	7.73	0	96.04
601190	200	57.2	0.1	95.05
601159	550	53.5	0.29	93.02
601160	0	74.9	0	93
MB-395218	2100	70.7	1.12	91.2
ME-601060	0	0	0	90.89
601066	0	0	0	90.26

MB-395119	2100	70.7	1.12	90.01
391112	200	85.1	0.4	89.88
294784	300	31.7	0.16	89.2
301812	0	93.3	0	88.7
391077	0	98.3	0	88.04
35277	497	103	0.26	87.56
161357	0	67.6	0	87.02
25390	2605	101	1.4	86
25296	1200	66.8	0.64	85.53
25266	1	51.4	0	84.88
IF-300007	4010	13.7	2.15	84.88
300087	0	0	0	83.67
300089	0	0	0	83.27
300146	0	31.5	0	82.89
300584	0	0	0	82.78
300641/PDD	0	227	0	82.67
310766	0	0	0	82.48
11.12K STAR LINE	0	188	0	82.2
IKS-349	0	3.09	0	81.89
JRL-SHAFT	0	0	0	80.8
KC3165VE	0	0	0	80.36
KC3166VE	0	0	0	80.19
KC3177VE	0	0	0	80.06
M168911	0	383	0	79.86
168912	0	383	0	79.86
168913	0	379	0	79.66
168914	0	350	0	79.34
168975	0	383	0	79.28
168991	0	0	0	79.19
168992	0	0	0	79.13
IF000766	310	19	0.16	78.98
869	0	27.8	0	78.96

Note: Up to 800 parts

Product Quantity Analysis

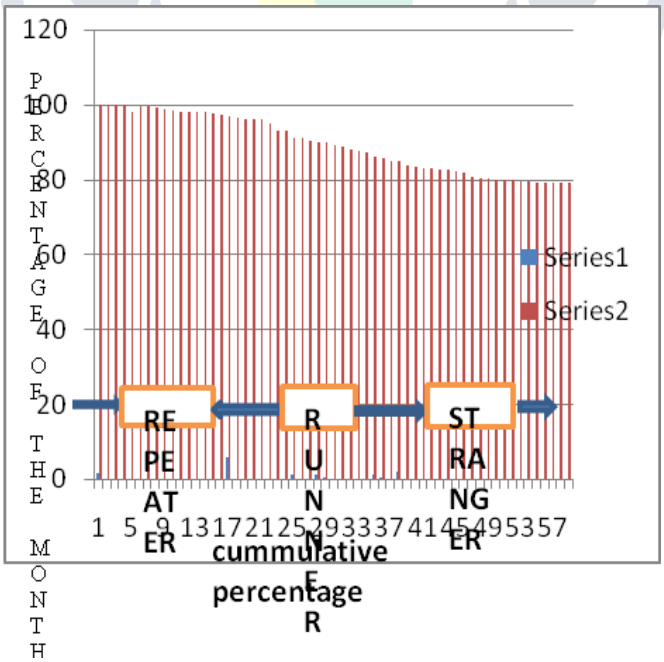

Fig 1 Graph no. 1

V.RESULT AND CONCLUSION

As I have done internship is a small scale Automobile industry. As I worked there I realise that flow of material was not effectively and efficiently working because of that company facing lots of problems, like stoppage of material on shop floor, shortage of material, improper dispatch of material.

The main reason of these problems that they were not following any inventory management, supply chain management improper coordination with vendors, no vendor development programmes were running and no coordination between inter departments and higher level management to lower level management.

So I did the project in this area so first of all I studied the plant lay-out and sequencing of machines. After studding and analysing, I made some improvement in plant lay-out and machine sequencing, that's why time of assembly line improved.

To avoid the improper coordination I advised to higher level staff to discuss with lower level employs, to share their problems and advised to them coordinate with inter departments like design department, should coordinate with production department.

For improper inventory I did P.Q. analysis for inventory and supply chain management and suggested to higher management to run the programmes for vendor development. So the final conclusion is that as I made contributions that were beneficial for the industry.

REFERENCES

[1] Buzacott, J. A., and J. G. shantikumar. 1993. Stochastic models of manufacturing systems. Englewood cliffs, NJ: pretice hall.

[2] Geraghty, J., and C heavy. 2005. A review and comparison of hybrid and pull-type production control strategies. OR Spectrum 27:435-457

[3] Hopp, W., and M. Spearman. 1996. Factory physics: Foundations of factory management. Hill Chicago, IL: Irwin/ Mc Graw.

[4] Karaesmen, F. J. A. Buzacott, and Y. Dallery. 2002. Integrating advance order information in make-to-stock production system. IIE Transactions 34:649-662.

[5] Krishnamurthy, A. and D. Claudio. 2005. Pull system advance demand information. In proceeding of the 2005 winter simulation conference, ed. M. E. kuhl, N. M. steiger, F.B. Armstrong, and J.A. Joines, 1733-1742. Piscataway, New Jersey.

[6] Krishnamurthy, A. R. suri and M. Vernon. 2004. Re-examining the performance of MRP and kanban material control strategiesfor multi-product flexible. Manufacturing systems. International Jouranal of flexible manufacturing system. 16:123-150.

[7] Crawford, K.M., Blackstone, J H and cox J F (1988). " A study of JIT implementation and operating problems". International journal of production research, Vol.26 no. 09, pp. 1561-8.

[8] Deshpande, S.P. and Golhar, D.Y. (1995), "HRM practices in unionized and – nonunionized Canadian JIT manufacturing firms."Production and inventory management. Journal, vol. 36 NO. 01pp. 15-19.

[9] Ebrahimpour, M and schoberger, R.J. (1984), "The Japnese just in time/ total quality control production system: potential for developing countries" , International journal of production research, vol. 22 No. 3 pp.421-30.

[10] Gargeya, V.B. and Thompson, J.P.(1994), "just-in-time productionin small job shop" , Industrial Management, july/ august, pp. 23-6.

[11] Golhar , D.Y. stamm, C.L. and smith, W.P. (1990), "JIT implementation in manufacturing firms", Production and inventory. Management Journal, vol. 81 No. 2, pp. 44-8.