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Effect Of Cycleime On Inventory: A Case Study Of Automobile Manufacturing Industry

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Abstract: In today competitive era, organizations are focusing to reduce the overworking and optimize their process activities. The planning of inventory is a challenge task for any manufacturing industry. In present work, the effect of reduction in cycle time on the inventory has been investigated in the automobile manufacturing industry. A comparison analysis is performed which the reduction in inventory cost of raw material and bought out parts. The average of inventory cost is calculated after and before the reduction of cycle time. The micro level analysis is performed on customer plan to breakdown the requirement on day basis. A case study is demonstrated to validate the findings of present work.

1. INTRODUCTION:

Manufacturing system consist of many activities such as production planning, scheduling, inventory etc. and all are linked together in a supply chain management. Manufacturing industry should try to reduce production cycle time as due to its impact on the productivity of manufacturing system [1]. The availability of machine parts can reduce the level of risk and breakdown time in production line. The optimum inventory is to be achieved to enhance the performance of SCM [2]. An attempt has been made to provide managerial guidelines to improve the inventory policies and presented the optimum, networking of supply chain activities [3]. A framework is provided to control the inventory and suggested to apply MCDM to find the priority of spare parts [4]. It was suggested to classify the parts on the basis of attributes [5]. The inventory reduction index was calculated using multi-attribute modeling. It was recommended to redesign the inventory configuration as per the need of parts [6]]. The importance of inventory is discussed to reduce the any penalty due to breakdown of equipment. The items should be placed according to their requirement in operation. Inventory parts can be required during any stage of supply chain activity such as work in process and final product and therefore, inventory parts should be linked with the stage at which they required [7]. A method is presented to anticipate the failure of equipment which can help to maintain balance between production and inventory. Inventory control should be effective and flexible to fulfill the any variation in the demand of parts. Case examples are discussed to validate the proposed configuration of inventory parts [8]. A new inventory tree method was presented to utilize the inventory items. A framework was provided to classify the inventory items as per their importance in production. The guidelines are provided to place the parts at right location in the inventory tree [9]. The durability of

parts also effects the planning of inventory [10], [11]. Few parts are required to replace after a certain time period and their availability in inventory should be planned accordingly [12], [13].

2. PRESENT WORK:

For current scenario of business, it is a great deal vital for you to have the inventory amount with customer necessity. Because of fluctuation in production line the inventory amount was packed with the group because information was constructed with batch development to compensate the cycle time. As a consequence of the it was pressured to procure the Bought out components (BOP), raw material in advance to operate the lines without any stoppage. By executing cycle time analysis inventory quality of raw content and also BOP pieces have been managed. The table 1 shows the inventory analysis.

Table 1. Inventory analysis before and after

	BEFORE						AFTER			
	Month						**Month**			
	Ist	**2nd**	**3rd**	**4th**	**5th**	**AVG**	**Ist**	**2nd**	**3rd**	**AVG**
INVENTORY (Rs. Lacs)										
Raw Material	120	110	106	121	118	115	116	120	109	115
Components	90	86	90	75	90	86.2	87	84	91	87
Worker in hand Material	50	45	50	45	50	48	27	20	22	23
Total Raw Material	260	241	246	241	258	249.2	230	224	222	226
Total Work in Progress	130	152	135	148	132	139.4	110	97	119	108
Total Finishing Goods	25	45	40	15	20	29	17	24	15	18
Total Inventory (Rs. Lacs)	415	435	421	404	410	417	357	345	356	353

The high cost inventory material is offloaded. By doing this the high cost of steel is reduced. The
job work material is started from supplier for Bought out Parts. Work in Process (WIP) is reduced by single piece flow system in feeding system in feeding shop. Customer plan is made on weekly basis & dispatch ensured on weekly basis. The weekly customer need is presented in Table 2.

Table 2. Weekly demand of customer

S.No	**Customer**	**Monthly Schedule**	**Week**			
			WE1	WE2	WE3	WE4
1	CUS-1	9000	2200	2000	2500	2300

2`	CUS-2	10000	2500	2500	3500	1500
3	CUS-3	12000	3000	2000	5000	2000
4	CUS-4	9500	2500	3000	2000	2000
5	CUS-5	12000	3000	4000	2000	3000

3. FREEZING OF PLAN

Freezing of strategy suggests taking established month plan from the customer. The month program into week application is split by the buyer. Subsequently the written content is dispatched to consumer depending on the necessity. Earlier the content was prepared with undesirable material and no plan is created. This specific substance is needless resting in finished items store without any utilization. Figure one present the established consumer program.

3.1 Impact of Plan freezing

The output is began by taking the confirmed program from the buyer. This confirmed program is sp CUS1 CUS2 CUS3 CUS4 CUS5 he micro preparation is accomplished by carrying out the morning program into shift strategy earlier the buyer granted the one tentative strategy to Production Planning and Control division. However customer began providing the confirmed program with week plan. By performing week strategy the content is processed based on the necessity of the customer. Figure 2 present the week wise schedule of demand.

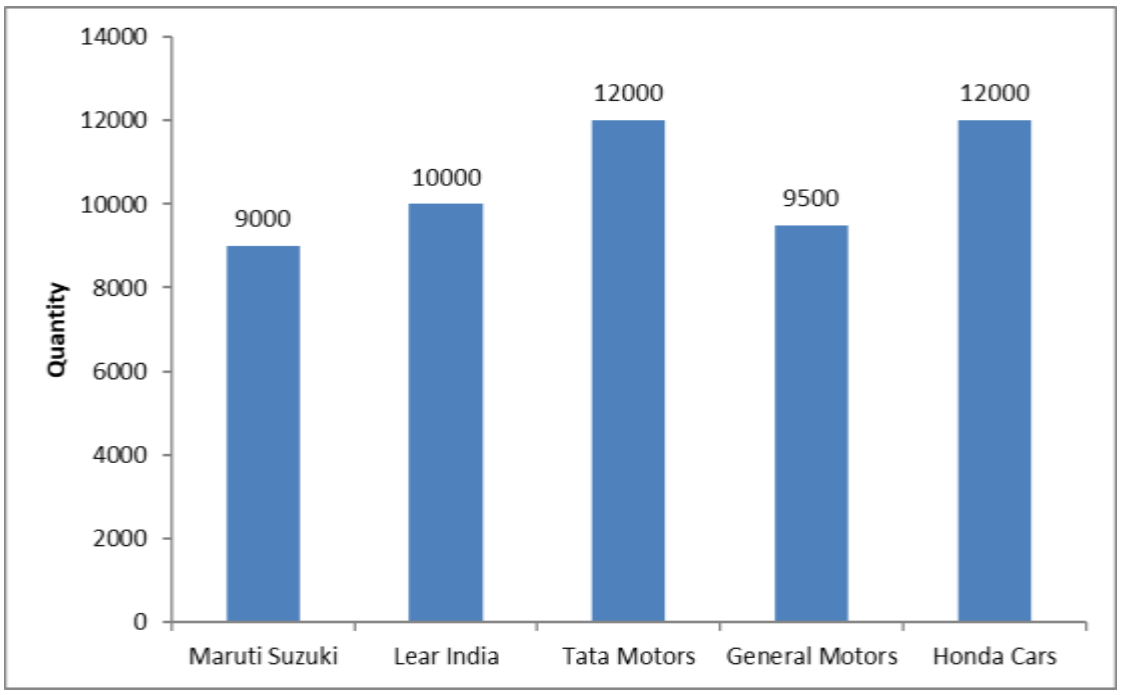

Figure 1: Confirmed customer plan

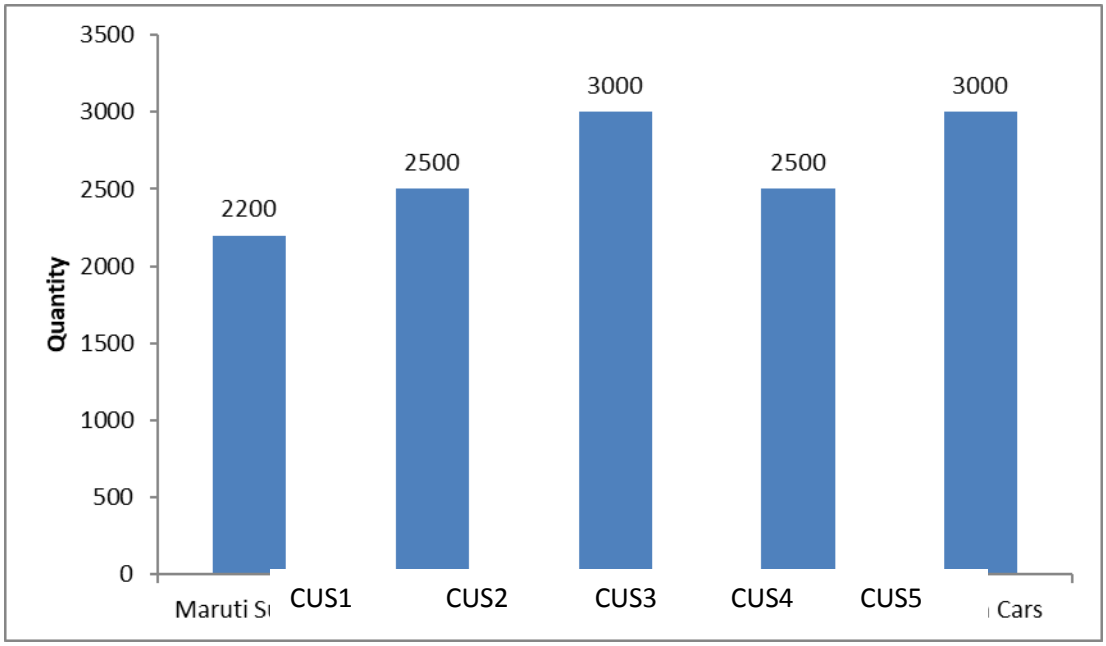

Figure 2 Week Wise Plan of Customer

By shooting established program from client the equipment changeover time is reduced. Earlier often equipment changeover of device reduced the effectiveness of the worker. But with shooting confirmed program the preparation of collections is freezed. The tools are fixed based on shift strategy. The newer trolley of device changing can also be made to decrease the equipment changeover time. Figure three provide the details of client sensible weekly.

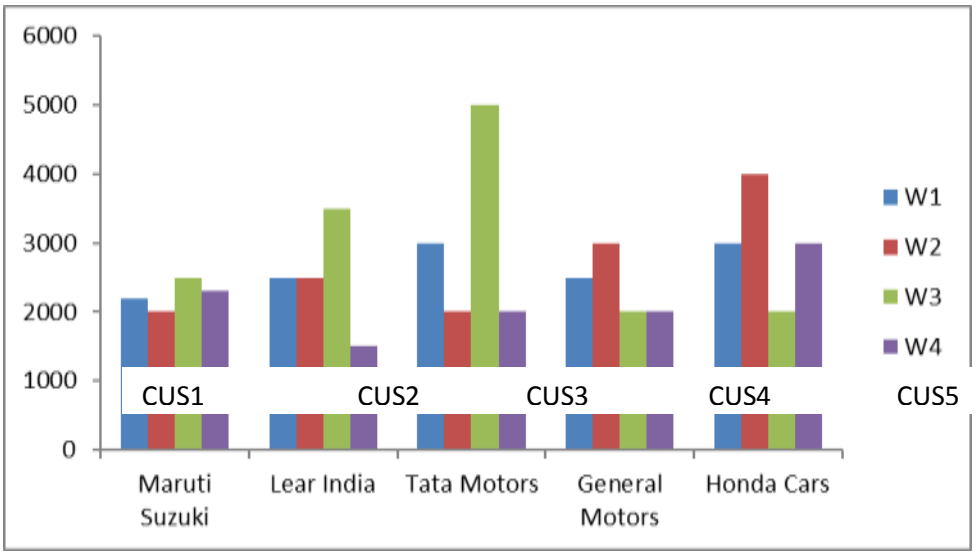

Figure 3 Customer wise weekly plan

4. CONCLUSION:

In present work, the effect of cycle time reduction on inventory system is investigated. The result showed that the inventory of material with job worker is reduced by 52% and followed by inventory of finished goods which is reduced by 37 %. There are no changes suggested in the inventory of raw material and 9% changes are recommended in inventory level of total

raw material. The monthly customer plan is divided into weekly and daily demand of customer plan. The proposed method provides the meaningful implication for the potential researchers who are working in the field of inventory management. The inventory control techniques can be further implemented in other manufacturing and service sectors in addition to military and healthcare industry.

5. REFERENCES:

[1] A. A. Abdallah, "How can lean manufacturing lead the manufacturing sector during health pandemics such as COVID 19: A multi response optimization framework," *Comput. Mater. Contin.*, vol. 66, no. 2, pp. 1397–1410, 2020.

[2] J. Reyes, D. Aldas, K. Alvarez, M. García, and M. Ruíz, "The factory physics for the scheduling: Application to footwear industry," in *SIMULTECH 2017 - Proceedings of the 7th International Conference on Simulation and Modeling Methodologies, Technologies and Applications*, 2017, pp. 248–254.

[3] S. J. de Jong and W. W. A. van Blokland, "Measuring lean implementation for maintenance service companies," *Int. J. Lean Six Sigma*, vol. 7, no. 1, pp. 35–61, 2016.

[4] H. Singh and R. Kumar, "Hybrid methodology for measuring the utilization of advanced manufacturing technologies using AHP and TOPSIS," *Benchmarking An Int. J.*, vol. 20, no. 2, pp. 169–185, Apr. 2013.

[5] H. Singh and R. Kumar, "Measuring the utilization index of advanced manufacturing technologies: A case study," *IFAC Proc. Vol.*, vol. 46, no. 9, pp. 899–904, 2013.

[6] I. Madanhire and C. Mbohwa, "Enterprise Resource Planning (ERP) in Improving Operational Efficiency: Case Study," in *Procedia CIRP*, 2016, vol. 40, pp. 225–229.

[7] A. Haider and J. Mirza, "An implementation of lean scheduling in a job shop environment," *Adv. Prod. Eng. Manag.*, vol. 10, no. 1, pp. 5–17, 2015.

[8] S. S. Gnanavel, V. Balasubramanian, and T. T. Narendran, "Suzhal – An Alternative Layout to Improve Productivity and Worker Well-being in Labor Demanded Lean Environment," *Procedia Manuf.*, vol. 3, pp. 574–580, 2015.

[9] P. Puvanasvaran, Y. S. Teoh, and C. C. Tay, "Consideration of demand rate in Overall Equipment Effectiveness (OEE) on equipment with constant process time," *J. Ind. Eng. Manag.*, vol. 6, no. 2, pp. 507–524, 2013.

[10] C. K. Eng and L. K. Sin, "CONWIP based control of a semiconductor end of line assembly," in *Procedia Engineering*, 2013, vol. 53, pp. 607–615.

[11] K. H. Lau and J. Wang, "Application of lean thinking in supply chain management by the small and medium sized manufacturers in China: A status survey," *Int. J. Inf. Syst. Supply Chain Manag.*, vol. 6, no. 4, pp. 1–17, 2013.

[12] D. Roy and D. Khan, "Integrated model for line balancing with workstation inventory management," *Int. J. Ind. Eng. Comput.*, vol. 1, no. 2, pp. 139–146, 2010.

[13] R. C. Leachman, J. Kang, and V. Lin, "SLIM: Short cycle time and low inventory in manufacturing at Samsung electronics," *Interfaces (Providence).*, vol. 32, no. 1, pp. 61–77, 2002.