



Supply Chain Insider

Volume 01, Issue 03, 201. 30-10-19

Article Received: 16-09-2019

Accepted: 05-10-2019

Available Online: 05-11-2019

ISSN: 2617-7420 (Print), 2617-7420 (Online)

supplychaininsider.org

Case Study Article: Material management and inventory planning of a manufacturing company

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INTRODUCTION:

Materials management is a core supply chain function and includes supply chain planning and supply chain execution capabilities. Specifically, materials management is the capability firms use to plan total material requirements. The material requirements are communicated to procurement and other functions for sourcing. Materials management is also responsible for determining the amount of material to be deployed at each stocking location across the supply chain, establishing material replenishment plans, determining inventory levels to hold for each type of inventory (raw material, WIP, Finished Goods), and communicating information regarding material needs throughout the extended supply chain. In other word, Material management is a scientific technique, concerned with Planning, Organizing& Control of f low of materials, from their initial purchase to destination.

INVENTORY CONTROL:

Inventory control, also referred to as stock control, is so broad and incorporates so many functions that it is difficult to describe in a limited definition, but we like how this Inc.com entry puts it: Inventory control refers to “all aspects of managing a company’s inventories: purchasing, shipping, receiving, tracking, warehousing and storage, turnover, and reordering.” Inventory control is such a critical piece of an organization’s operations and bottom line that it is too important to leave to human error or antiquated systems. That’s why so many companies opt to invest in inventory control systems, so that all of the components of inventory control are managed by one integrated system.

AIM OF MATERIAL MANAGEMENT :

1. The Right quality 2. Right quantity of supplies 3. At the Right time 4. At the Right place 5. For the Right cost

PURPOSE OF MATERIAL MANAGEMENT:

•To gain economy in purchasing •To satisfy the demand during period of replenishment •To carry reserve stock to avoid stock out •To stabilize fluctuations in consumption •To provide reasonable level of client services

OBJECTIVES OF MATERIAL MANAGEMENT:

Primary: Right price• High turnover• Low procurement •& storage cost• Continuity of supply• Consistency in quality• Good supplier relations• Development of personnel• Good information system.

Secondary: Forecasting• Inter-departmental harmony• Product improvement• Standardization• Make or buy decision• New materials & products• Favorable reciprocal relationships.

MATERIAL MANAGEMET & INVENTORY CONTROL:

It is essential that the necessary materials shall be on hand when required and it is just as essential that no more stores shall be carried as is necessary. The maximum and minimum quantities of all stores should, therefore, be fixed with much care. In most cases, these limits can be set only by experience and careful observation. It is found that this results in a great reduction of inventory. Material management helps to keep inventory in a proper way.

BASIC PRINCIPLE OF MATERIAL MANAGEMENT:

Effective management & supervision It depends on managerial functions of •Planning •Organizing •Staffing• Directing• Controlling •Reporting• Budgeting

2. Sound purchasing methods
3. Skillful & hard poised negotiations
4. Effective purchase system
5. Should be simple
6. Must not increase other costs
7. Simple inventory control program

VED ANALYSIS:

Based on critical value & shortage cost of an item–It is a subjective analysis. •Items are classified into:

Vital: Shortage cannot be tolerated.

Essential: Shortage can be tolerated for a short period.

Desirable: Shortage will not adversely affect, but may be using more resources. These must be strictly scrutinized.

ANALYSIS:

Tropicana is a juice processing company. It has peak demand generally April to September. They try to balance their workforce as much as possible using overtime and outsourced manufacturing.

Assume the followings:

1. there are 4 weeks/40 work hours per week
2. outsource manufacturing work includes material cost
3. can not fire, use overtime more efficient
4. necessary month for give promotion

Now we try to find out best operational planning for this company with material management and inventory control.

SOLUTION: (With all inputs)

		Annual Costs by Category			
Total Annual Cost	\$4,205,550	\$ 1,036,800	Regular Labor Cost		
		\$ -	Overtime Labor Cost		
Avg Cost (\$/unit)	\$ 243.80	\$ -	Cost of Hiring		
		\$ -	Cost of Firing		
		\$ 150,000	Cost of Inventory		
		\$ -	Cost of Stockouts		
		\$ -	Cost of Materials		
		\$ 3,018,750	Cost of Outsourcing		
Input costs and other settings are shown below :					
\$ 75	Material cost (\$/unit)	160	Hours worked by employee per month		
\$ 25	Inventory Holding cost(\$/unit/month)	10	Max Overtime(hours/month/employee)		
\$ 50	Cost of stockouts(\$/unit/month)	500	Starting Inventory		
\$ 1,200	Cost of hiring & training new worker	500	Ending Inventory(min)		
\$ 3,600	Cost of laying off an employee	0	Starting Backlog		
4	Labor hours required per item produced	0	Allowable Ending Backlog(max)		
\$ 2,400	Regular worker cost(\$/month)	36	Starting Workforce		
\$ 25	Overtime cost(\$/hour)	30	Ending Workforce(min)		
\$ 175	Outsourcing cost(\$/item)	36	Ending Workforce(max)		

Figure 1

Item/Description	Transfer to Fund	Transfer from Fund	Reclassification	Reclassification	Reclassification	Reclassification	Reclassification	Reclassification	Reclassification	Reclassification	Reclassification	Reclassification	Reclassification
1	1000	1000	0	0	0	0	0	0	0	0	0	0	0
2	1000	1000	0	0	0	0	0	0	0	0	0	0	0
3	1000	1000	0	0	0	0	0	0	0	0	0	0	0
4	1000	1000	0	0	0	0	0	0	0	0	0	0	0
5	1000	1000	0	0	0	0	0	0	0	0	0	0	0
6	1000	1000	0	0	0	0	0	0	0	0	0	0	0
7	1000	1000	0	0	0	0	0	0	0	0	0	0	0
8	1000	1000	0	0	0	0	0	0	0	0	0	0	0
9	1000	1000	0	0	0	0	0	0	0	0	0	0	0
10	1000	1000	0	0	0	0	0	0	0	0	0	0	0
11	1000	1000	0	0	0	0	0	0	0	0	0	0	0
12	1000	1000	0	0	0	0	0	0	0	0	0	0	0
13	1000	1000	0	0	0	0	0	0	0	0	0	0	0
14	1000	1000	0	0	0	0	0	0	0	0	0	0	0
15	1000	1000	0	0	0	0	0	0	0	0	0	0	0
Total	10000	10000	0	0	0	0	0	0	0	0	0	0	0

Figure 2

Item/Description	Transfer to Fund	Transfer from Fund	Reclassification	Reclassification	Reclassification	Reclassification	Reclassification	Reclassification	Reclassification	Reclassification	Reclassification	Reclassification	Reclassification
1	1000	1000	0	0	0	0	0	0	0	0	0	0	0
2	1000	1000	0	0	0	0	0	0	0	0	0	0	0
3	1000	1000	0	0	0	0	0	0	0	0	0	0	0
4	1000	1000	0	0	0	0	0	0	0	0	0	0	0
5	1000	1000	0	0	0	0	0	0	0	0	0	0	0
6	1000	1000	0	0	0	0	0	0	0	0	0	0	0
7	1000	1000	0	0	0	0	0	0	0	0	0	0	0
8	1000	1000	0	0	0	0	0	0	0	0	0	0	0
9	1000	1000	0	0	0	0	0	0	0	0	0	0	0
10	1000	1000	0	0	0	0	0	0	0	0	0	0	0
11	1000	1000	0	0	0	0	0	0	0	0	0	0	0
12	1000	1000	0	0	0	0	0	0	0	0	0	0	0
13	1000	1000	0	0	0	0	0	0	0	0	0	0	0
14	1000	1000	0	0	0	0	0	0	0	0	0	0	0
15	1000	1000	0	0	0	0	0	0	0	0	0	0	0
Total	10000	10000	0	0	0	0	0	0	0	0	0	0	0

Figure 3

Time Period	January	February	March	April	May	June	July	August	September	October	November	December	Annual Total	Annual Average
Q1	100	120	110	130	140	150	160	170	180	190	200	210	1,550	129.2
Q2	220	240	230	250	260	270	280	290	300	310	320	330	2,450	204.2
Q3	340	360	350	370	380	390	400	410	420	430	440	450	3,350	279.2
Q4	470	490	480	500	510	520	530	540	550	560	570	580	4,250	354.2
YTD	930	990	970	1,050	1,100	1,160	1,220	1,280	1,340	1,400	1,460	1,520	11,600	958.4
Grand Total	930	990	970	1,050	1,100	1,160	1,220	1,280	1,340	1,400	1,460	1,520	11,600	958.4

Figure 4

[illegible]

Material Management				Material Management				Material Management				Material Management			
Material	Quantity	Unit	Value	Material	Quantity	Unit	Value	Material	Quantity	Unit	Value	Material	Quantity	Unit	Value
Material 1	100	kg	1000	Material 2	200	kg	2000	Material 3	300	kg	3000	Material 4	400	kg	4000
Material 5	500	kg	5000	Material 6	600	kg	6000	Material 7	700	kg	7000	Material 8	800	kg	8000
Material 9	900	kg	9000	Material 10	1000	kg	10000	Material 11	1100	kg	11000	Material 12	1200	kg	12000
Material 13	1300	kg	13000	Material 14	1400	kg	14000	Material 15	1500	kg	15000	Material 16	1600	kg	16000
Material 17	1700	kg	17000	Material 18	1800	kg	18000	Material 19	1900	kg	19000	Material 20	2000	kg	20000
Material 21	2100	kg	21000	Material 22	2200	kg	22000	Material 23	2300	kg	23000	Material 24	2400	kg	24000
Material 25	2500	kg	25000	Material 26	2600	kg	26000	Material 27	2700	kg	27000	Material 28	2800	kg	28000
Material 29	2900	kg	29000	Material 30	3000	kg	30000	Material 31	3100	kg	31000	Material 32	3200	kg	32000
Material 33	3300	kg	33000	Material 34	3400	kg	34000	Material 35	3500	kg	35000	Material 36	3600	kg	36000
Material 37	3700	kg	37000	Material 38	3800	kg	38000	Material 39	3900	kg	39000	Material 40	4000	kg	40000
Material 41	4100	kg	41000	Material 42	4200	kg	42000	Material 43	4300	kg	43000	Material 44	4400	kg	44000
Material 45	4500	kg	45000	Material 46	4600	kg	46000	Material 47	4700	kg	47000	Material 48	4800	kg	48000
Material 49	4900	kg	49000	Material 50	5000	kg	50000	Material 51	5100	kg	51000	Material 52	5200	kg	52000
Material 53	5300	kg	53000	Material 54	5400	kg	54000	Material 55	5500	kg	55000	Material 56	5600	kg	56000
Material 57	5700	kg	57000	Material 58	5800	kg	58000	Material 59	5900	kg	59000	Material 60	6000	kg	60000
Material 61	6100	kg	61000	Material 62	6200	kg	62000	Material 63	6300	kg	63000	Material 64	6400	kg	64000
Material 65	6500	kg	65000	Material 66	6600	kg	66000	Material 67	6700	kg	67000	Material 68	6800	kg	68000
Material 69	6900	kg	69000	Material 70	7000	kg	70000	Material 71	7100	kg	71000	Material 72	7200	kg	72000
Material 73	7300	kg	73000	Material 74	7400	kg	74000	Material 75	7500	kg	75000	Material 76	7600	kg	76000
Material 77	7700	kg	77000	Material 78	7800	kg	78000	Material 79	7900	kg	79000	Material 80	8000	kg	80000
Material 81	8100	kg	81000	Material 82	8200	kg	82000	Material 83	8300	kg	83000	Material 84	8400	kg	84000
Material 85	8500	kg	85000	Material 86	8600	kg	86000	Material 87	8700	kg	87000	Material 88	8800	kg	88000
Material 89	8900	kg	89000	Material 90	9000	kg	90000	Material 91	9100	kg	91000	Material 92	9200	kg	92000
Material 93	9300	kg	93000	Material 94	9400	kg	94000	Material 95	9500	kg	95000	Material 96	9600	kg	96000
Material 97	9700	kg	97000	Material 98	9800	kg	98000	Material 99	9900	kg	99000	Material 100	10000	kg	100000

Figure 9

Material	Quantity	Unit	Value	Material	Quantity	Unit	Value	Material	Quantity	Unit	Value	Material	Quantity	Unit	Value
Material 1	100	kg	1000	Material 2	200	kg	2000	Material 3	300	kg	3000	Material 4	400	kg	4000
Material 5	500	kg	5000	Material 6	600	kg	6000	Material 7	700	kg	7000	Material 8	800	kg	8000
Material 9	900	kg	9000	Material 10	1000	kg	10000	Material 11	1100	kg	11000	Material 12	1200	kg	12000
Material 13	1300	kg	13000	Material 14	1400	kg	14000	Material 15	1500	kg	15000	Material 16	1600	kg	16000
Material 17	1700	kg	17000	Material 18	1800	kg	18000	Material 19	1900	kg	19000	Material 20	2000	kg	20000
Material 21	2100	kg	21000	Material 22	2200	kg	22000	Material 23	2300	kg	23000	Material 24	2400	kg	24000
Material 25	2500	kg	25000	Material 26	2600	kg	26000	Material 27	2700	kg	27000	Material 28	2800	kg	28000
Material 29	2900	kg	29000	Material 30	3000	kg	30000	Material 31	3100	kg	31000	Material 32	3200	kg	32000
Material 33	3300	kg	33000	Material 34	3400	kg	34000	Material 35	3500	kg	35000	Material 36	3600	kg	36000
Material 37	3700	kg	37000	Material 38	3800	kg	38000	Material 39	3900	kg	39000	Material 40	4000	kg	40000
Material 41	4100	kg	41000	Material 42	4200	kg	42000	Material 43	4300	kg	43000	Material 44	4400	kg	44000
Material 45	4500	kg	45000	Material 46	4600	kg	46000	Material 47	4700	kg	47000	Material 48	4800	kg	48000
Material 49	4900	kg	49000	Material 50	5000	kg	50000	Material 51	5100	kg	51000	Material 52	5200	kg	52000
Material 53	5300	kg	53000	Material 54	5400	kg	54000	Material 55	5500	kg	55000	Material 56	5600	kg	56000
Material 57	5700	kg	57000	Material 58	5800	kg	58000	Material 59	5900	kg	59000	Material 60	6000	kg	60000
Material 61	6100	kg	61000	Material 62	6200	kg	62000	Material 63	6300	kg	63000	Material 64	6400	kg	64000
Material 65	6500	kg	65000	Material 66	6600	kg	66000	Material 67	6700	kg	67000	Material 68	6800	kg	68000
Material 69	6900	kg	69000	Material 70	7000	kg	70000	Material 71	7100	kg	71000	Material 72	7200	kg	72000
Material 73	7300	kg	73000	Material 74	7400	kg	74000	Material 75	7500	kg	75000	Material 76	7600	kg	76000
Material 77	7700	kg	77000	Material 78	7800	kg	78000	Material 79	7900	kg	79000	Material 80	8000	kg	80000
Material 81	8100	kg	81000	Material 82	8200	kg	82000	Material 83	8300	kg	83000	Material 84	8400	kg	84000
Material 85	8500	kg	85000	Material 86	8600	kg	86000	Material 87	8700	kg	87000	Material 88	8800	kg	88000
Material 89	8900	kg	89000	Material 90	9000	kg	90000	Material 91	9100	kg	91000	Material 92	9200	kg	92000
Material 93	9300	kg	93000	Material 94	9400	kg	94000	Material 95	9500	kg	95000	Material 96	9600	kg	96000
Material 97	9700	kg	97000	Material 98	9800	kg	98000	Material 99	9900	kg	99000	Material 100	10000	kg	100000

Figure 10

CONCLUSION:

Material management is directly associated with the operational efficiency of an organization. A good material management system ensures the availability right materials in the production process with minimum wastage so as to cut losses. A company can maximize its profit by ensuring inventory control with proper material management.

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