

RESEARCH ARTICLE

Inventory Management of Raw Material in Indian Jute Industry – A Study: Part 1

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Abstract

Statistically significant positive correlation exists between Raw Jute requirement at production process and the Raw Jute issued from the warehouse. Quantities of purchased Jute are positively correlated with Jute Requirement at process, Jute issue from warehouse and Raw Jute Stock at Warehouse. Only Jute issued is statistically Significant positive moderate correlated with quantity of purchased Jute. Multiple Regression model also proves such hypothesis. At any point of time future Jute purchased quantity for manufacturing process will depend on quantity of Jute issue from warehouse.

Keywords: *Requirement, Issue, Stock, Purchase, production, Regression.*

Introduction

Jute Industry occupies an important position in Indian economy. A large number of people are involved from Raw Jute Cultivation to jute products manufacturing process. Jute is biodegradable fiber. Due to bio-degradable nature, this fiber are now gradually increasing in use from conventional packaging material to fancy decorative fabrics, carpets, and finally in Technical textiles areas. The fiber grows in nature. Its golden yellow color gives a special appeal to the jute products. The production of Raw Jute varies year after year, due to variation of Rain falls in eastern India, Nepal, Bhutan, Bangladesh. Regarding this proper utilization of fiber in manufacturing process are now important due to gradually increasing economic value of such fiber and its products. Inventory management system of Jute Industry must be efficient for controlling this seasonal crop purchasing programmed and day to day requirement, issue and stock position of various grades of Jute Fiber. As per production planning, requirement of raw Jute at department, jute department issue, raw jute deliveries from warehouse to the production process are should be properly controlled to minimize the Jute waste. Due to seasonal production nature of jute crop, the jute department of each mill has to maintain stock for future requirement. Purchasing process of jute are now entirely dependent on three factors. Jute Issues, Jute requirement and Jute stock position at the warehouse.

Literature Review

Tom Jose V et al [1] explained in their study that every organization needs inventory for smooth running of its activities. It serves as a link between production and distribution processes. The investment in inventories constitutes the most significant part of current assets and working capital in most of the undertakings. Thus, it is very essential to have proper control and management of inventories. The purpose of inventory management is to ensure availability of materials in sufficient quantity as and when required and also to minimize investment in inventories.

Panigrahi A K [2] concluded in his research study that the importance of efficient working capital management (WCM) is indisputable. Moreover, the adequate and timely flow of inventory is imperative for the success and growth of any company. The paper is an attempt to study in depth the inventory management practices of Indian cement companies and its impact on working capital efficiency. The purpose of this paper is to examine the relationship between inventory conversion period and firms' profitability.

The dependent variable, gross operating profit is used as a measure of profitability and the relation between inventory management and profitability is investigated for a sample of five top Indian cement companies over a period of ten years from 2001-2010. This study employs Regression analysis to determine the impact of inventory conversion period over gross operating profit taking current ratio, size of the firm, financial debt ratio as control variables. The results indicate that there is a significant negative linear relationship between inventory conversion period and profitability.

Shafi Mohammad [3] disclosed in his research findings that Inventory constitutes a major component of working capital. To a large extent, the success and failure of a business depends upon its inventory management performance. The basic objective of inventory management is to optimize the size of inventory in a firm so that smooth performance of production and sales function may be possible at minimum cost. The study was aimed how inventories in textile sector are managed across the globe.. As Textile industries have been playing an important role for the socio-economic development of any country. The paper was attempted to unravel the research findings on management of Inventories in textile industry across the world. Studying inventory management becomes all the more important in view of the fact that it is the largest employer with a total workforce of 35 million. Moreover, the share of textiles in total exports was 11.04 % during 2010.

Mahammad Ali [4] said in his research findings that the textile industry, an important segment in Bangladesh's manufacturing industry, play a critical role in its economic development. The textile sector fulfills almost cent percent domestic demand apart from the fulfilling the external demand of clothing and apparels to a large extent in Bangladesh. The Textile industry is a long chain including raw materials production, complement production, clothing production and so on.

SCM concept is made possible as a

conventional management tool for all manufactures are to strive to improve their product quality, to reduce their product and service cost and to shorten their product delivery and response time in a highly competitive market. The effective SCM of textile industry include lower inventories, lower costs, higher productivity, greater productivity, greater agility shorter lead times, higher profits and greater customer loyalty.

Research Methodology

Study has been conducted at Bally Jute Company Ltd, Bally, Howrah, and West Bengal, India. Data had been collected of Raw Jute issues, requirement, Purchasing and Stock from jute Department of the unit for two years. This data are then analyzed and interpret with statistical calculator regarding relationship between purchasing quantities of Raw Jute and other three parameters, Raw Jute Issue, requirement and Stock position monthly basis. This analysis gives an idea regarding Raw Jute Inventory management system in Jute Industry.

Study Area

Bally Jute Company Ltd, bally, Howrah is a pioneer Jute Industry in India. This unit produces several 100 % biodegradable Jute product seg, A Twill, B Twill, Hessian Cloth, Sacking cloth, Carpet backing cloth, Jute Geotextile cloth, Tea bag and Hydrocarbon free Jute bag . It is a largest Jute industry in west Bengal. Daily production of this unit is 100MT of Jute goods. Around 3000 employees are directly related to this unit and several other 2000 are indirectly related to this industry.

Results and Discussion

Table 01 shows the monthly data of Raw Jute requirement, issue, stock and purchased pattern. The data are collected from Jute department of the unit from the year September 2014 to September 2016. In April 2016, there was no Jute purchased program. Mean value of Jute requirement is 2324.9 MT /month and standard deviation is 279.3 MT. It is cleared that

Table 1: Jute requirement. Purchased, Jute Stock and Issued at various Months (Figures in Metrictonnes)

Month	Jute requirement	Jute issue	Jute stock	Jute Purchased
Sep-14	1892.87	1795.94	3592.034	2275.31
14-Oct	1625.6	1710.53	3692.44	2345.78
14-Nov	1868.52	1920.12	3783.21	2738.15
14-Dec	2496.77	2516.77	4231.11	4021.56
15-Jan	2533.79	2516.73	5059.21	1278.76
15-Feb	2490.13	2531.13	5558.17	2578.1
15-Mar	2826.57	2813.21	6687.21	2371.3
15-Apr	2358.28	2544.948	6200.157	958.955
1-May	2379.21	2316.996	4754.07	607.817
Jun-15	2478.18	2612.089	3977.25	2145.376
Jul-15	2726.95	2681.868	3073.059	2750.529
Aug-15	2568.08	3187.271	2180.972	2662.203
Sep-15	2604.63	3032.625	3246.524	4102.424
Oct-15	2502.38	2915.051	7313.772	6949.384
Nov-15	2109.25	3021.494	9453.724	5150.837
Dec-15	2404.4	2658.154	9422.998	2605.78
Jan-16	2120.96	2617.459	7593.695	775.582
Feb-16	2387.88	2345.643	6937.52	1689.77
Mar-16	2489.49	2559.596	5812.72	1427.188
Apr-16	2101.81	2202.838	3610.227	
May-16	2104.7	1448.761	2228.333	66.71
Jun-16	2207.03	1704.868	1239.564	713.82
Jul-16	2127.69	2883.637	537.942	2173.355
Aug-16	2369.74	2710.973	2979.361	5123.107
Sep-16	2348	2463.548	3763.224	3218.193
Mean	2324.9	2468.4	4677.13	2530.4
Std Dev	279.3	451.6	1613.2	1627.3

Avg value of jute stock is 4677.13 MT, which is very high compare to Jute purchased. The standard deviation of jute stock is very high 1613.2 MT, indicates that stock position of Raw Jute varies month to month round the year. Standard deviation of jute requirement and issue are comparatively less compare to purchase and stock. Mean value of Jute issue is slightly higher that requirement value.

We consider that Raw Jute Purchased in quantity/month is a function of Issue, Requirement and Stock position at warehouse.

Ie, Raw Jute purchased in quantity = f (Raw jute stock, Raw jute requirement, Raw jute issue)

So the multiple regression equation models is

Table 02: Pearson correlation: coefficient (R)

	Jute Requirement	Jute issue	Jute stock	Jute purchased
Jute Requirement	1			
Jute issue	R=0.6475 R ² =0.4196 p= 0.000463 Comments =Moderate positive relationship. The result is significant at p<0.05	1		

$$JP = a + b JS + c JR + d JI \text{ or } Y = a + b(X_1) + c(X_2) + d(X_3)$$

{JP=Jute Purchased/month, JS = Jute Stock/month, JR =Juterequirement,JI=Jute issue }

a, b, c and d are regression parameters

Correlation between Variables

From the table 02 it is cleared that Jute Purchased is positively correlated corelated with Jute issue, jute stock position at ware house and Jute requirement. Here the Pearson correlation coefficient (r) is positive. Jute issue and jute requirement are strongly positively correlated and the value of r is 0.6475. On the other hand Jute purchased is strongly positively related with Jute issue. The Pearson correlation coefficient is 0.5259.

Jute stock	R=0.159 R ² =0.0253 p= 0.447764 Comments=Weak positive relationship. The result is not significant at P<0.05	R=0.3189 R ² =0.1023 p= 0.11963 Comments=Positive correlation exist. The relationship is weak. The result is not significant at p< 0.05	1	
Jute purchased	R=0.2038 R ² =0.0415 p= 0.328501 Comments= Positive correlation exist but it is weak.. The result is not significant at p < 0.05	R=0.5259 R ² =0.276 p= 0.00693 Comments= Moderate positive correlation exists. The result is significant at p < 0.05.	R=0.2295 R ² =0.052 p=0.26978 Comments=positive correlation ship exist. It is weak. The result is not significant at p< 0.05	1

From the table 02, it is concluded that Jute purchased is statistically significant co related with Jute issue, ie, Monthly purchased quantity is dependent with monthly jute issue quantity.

Multiple Regression Analysis

Table 03 and Table 04 explained the multiple regression results. Purchasing Jute (Y) here is dependent variable and there are three independent variables. They are Jute Requirement(X₁), Jute Issue (X₂) and Jute Stock (X₃) . The objective of the study is to

identify a multiple regression equation and the extent of dependency of dependent variables in independent variables. Table 03 explained the goodness of Fit measures It tells how well the regression equation fits our data. Multiple R indicates correlation coefficients. Here the value of R=0.55823 indicates there are positive relationship between dependent and independent variables. -The value of R square is 0.311 indicates that 31 % of the variable of y values around the mean are explained by the X values ie, 31.1% of the values fit the model.

Table 3: Summary output

Regression Statistics							
Multiple R	0.55823						
R Square	0.31162						
Adjusted R Square	0.21328						
Standard Error	1482.567						
Observations	25						

Table 4: Anova

	df	SS	MS	F	Significance F			
Regression	3	208951	6965	3.168	0.045621			
Residual	21	461581	2198					
Total	24	670532						
	Coefficients	Standard Error	t Stat	P-value	Lower 95%	Upper 95%	Lower 95.0%	Upper 95.0%
Intercept	-552.252	2544.97	0.217	0.830	-5844.82	47403	-5844.8	4740.3
XVariable 1	-1.38326	1.42510	0.970	0.342	-4.34693	1.580	-4.3469	1.5804
X Variable 2	2.434185	0.91851	2.650	0.014	0.524021	4.344	0.5240	4.3443
X Variable 3	0.040337	0.13820	0.291	0.773	-0.24707	0.327	-0.2470	0.3277

Now from the table 04, it is observed that, only the p value of X_2 variable has lower than 0.05. p values of other two ie, X_1 and X_3 variables are higher than 0.05. So we can exclude these two variables to set up regression equation.

$Y = a + c X_2$ ie Quantity of Purchased Jute will be = $-552.252 + 2.434185$ (Quantity of Jute Issue) . From the equation we can calculate the quantity of purchased Jute in future.

The expected regression equation then becomes stated as

Table 5: Summary output

Regression Statistics							
Multiple R	0.525878						
R Square	0.276547						
Adjusted R Square	0.245093						
Standard Error	1452.283						
Observations	25						

Table 6: ANOVA

	df	SS	MS	F	Significance F			
Regression	1	1854339	1854339	8.791	0.006935			
Residual	23	4850989	210911					
Total	24	6705329						
	Coefficients	Standard Error	t Stat	P-value	Lower 95%	Upper 95%	Lower 95.0%	Upper 95.0%
Intercept	-2374.69	1645.958	-1.442	0.162	-5779.61	1030.2	-5779.61	1030.23
X Variable 2	1.946085	0.656324	2.965	0.006	0.588375	3.3037	0.58837	3.30379

After excluding the variables X_1 and X_3 , further regression analysis are performed. Table 05 explained that regression equation is moderately strong. The value of R is 0.525878 indicates that the Y and X_2 are positively correlated and linear relationships are exist. Value of R square indicates that 27.65 % of data points fall on the regression line. 27.65 % of variation of Y values around the mean are explained by X_2 values, ie, 27.65 % of the values fit the model. From the table it is found that p value of X_2 is less than 0.05. So the final regression equation will be

$$Y = -2374.69 + 1.946085 X_2$$

Conclusion

In this study, a better inventory management of Raw Jute are explained which will surely be helpful in solving the

problems in jute industry. A large amount of money is investing for inventory for Raw Jute at ware house of the company. Jute is Natural fiber. It should be utilized in time with planned manner. Higher timings of Raw Jute in warehouse can damage the fiber, since it is biodegradable in nature. On the other hand, sufficient stock of Raw Jute at warehouse are essential for proper mixing of different grade of Jute fiber to get customer desired product in time. So, an optimum quantity of Raw Jute has to be maintained at warehouse of the company.

This study helps us the purchasing pattern of Raw Jute and explained that it is entirely dependent on day wise Jute issue of various grade for day wise requirement of production at plant. This concept helps the top management of Industry for purchasing

decision of different grade of Jute for future requirement.

Efficient inventory Management of Raw Jute for production process will be achieved which gives cost effective production process and less wastage of golden Jute Fiber [5-11].

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Acknowledgement

We are extremely thankful to the senior staffs, officers and supervisors for their kind cooperation and help for this research work. Without their work this work cannot be completed in time.