A STUDY ON INVENTORY MANAGEMENT AT KERALA MINERALS AND METALS LIMITED, CHAVARA, KOLLAM

by

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DECLARATION

DECLARATION

I hereby declare that this project report entitled A Study on Inventory Management at Kerala Minerals and Metals Limited is a bonafide record of work done by me during the course of project work and that it has not previously formed the basis for the award to me for any degree/diploma, associateship, fellowship or other similar title of any other University or Society.

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CERTIFICATE

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Certified that this project report entitled **A STUDY ON INVENTORY MANAGEMENT AT KERALA MINERALS AND METALS LIMITED** is a record of major project work done by **PAVITHRA.P S (2016-31-009)** under my guidance and supervision and that it has not previously formed the basis for the award of any degree, fellowship, or associateship to her.

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For any errors or inadequacies that may remain in this work, of course the responsibility is entirely my own.

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CHAPTER 1

DESIGN OF THE STUDY

1.1. INTRODUCTION

Inventory is a cushion between production and consumption of goods. It constitutes the most significant part of the current assets of manufacturing firm. Because of the large size of inventories maintained by the firms, a considerable amount of funds is required to be committed to them. It is, therefore, absolutely essential to manage inventories efficiently and effectively to avoid excess or insufficient investment. The profitability of business concerns to a large extent depends upon efficient consumption and storage of inventory.

Inventory management is a science based art of ensuring that enough inventories are held by an enterprise to meet both its internal and external demand commitments economically. It is a subject which merits the attention of the top level management and influences the decision of the planning and execution personnel. An efficient inventory management should ensure a continuous supply of materials to facilitate uninterrupted production and also help to minimize carrying cost, ordering cost and lead time. Effective inventory management is all about knowing what is on hand, where it is in use, and how much finished product results.

Inventory management is the process of efficiently overseeing the constant flow of units into and out of an existing inventory. This process usually involves controlling the transfer in of units in order to prevent the inventory from becoming too high, or dwindling to levels that could put the operation of the company into jeopardy. Competent inventory management also seeks to control the

costs associated with the inventory, both from the perspective of the total value of the goods included and the tax burden generated by the cumulative value of the inventory.

1.2. STATEMENT OF THE PROBLEM

A study on inventory management at Kerala Minerals and Metals Limited (KMML). KMML is undertaken in order to know the inventory performance and position of the company and to know the strength and weakness and to assess the profitability of the company. Inventories constitute most significant part of assets of large majority of the companies in India. Inventory a double edged sword is usually an asset of an organization, if not used properly it will become liability. It is therefore absolutely very important to manage inventories efficiently and effectively in order to overcome unnecessary investment. This study intended to identify the efficiency of inventory management at Kerala Minerals and Metals Limited (KMML).

The problem selected to the analysis is to study the efficiency of inventory management of Kerala Minerals and Metals Ltd. The purpose of inventory management is to minimize investment in inventories. Thus it is very essential to have proper management of inventory. Management of inventory becomes crucial to the successful management of overall working capital of an organization.

1.3. OBJECTIVE OF THE STUDY

To study the efficiency of inventory management of Kerala Minerals and Metals Limited.

1.4. METHODOLOGY

1.4.1. Location of Study

The study was conducted in Kerala Minerals and Metals Limited (KMML) Chavara, Kollam.

1.4.2. Data Source

The study was based on both primary and secondary data.

1.4.3. The Period of Study

The study was conducted using secondary data from 2011-12 to 2016-17.

1.4.4. Data Collection

- The primary information regarding the inventory management practices of the company were collected through direct interview with various officials of the organization.
- Secondary data were collected from the annual reports published by Kerala Minerals and Metals Limited (KMML) for the last 6 years, Journals, Company website and internet and data regarding industrial average were collected from websites CMIE reports.

1.4.5. Data Analysis

The study on the existing inventory management practices was done by using the records of the organisation as well as by interviewing the concerned officials of Kerala Minerals and Metals Limited. Efficiency of inventory management is studied by using accounting tools like ratios and percentage. Efficiency of inventory management is also studied by comparing industry average with company performance.

1.5. VARIABLE UNDER THE STUDY

The efficiency of the inventory management system of Kerala Minerals and Metals Limited is analysed through computation of ratios and comparing with the industry averages.

1.6. SCOPE OF THE STUDY

Inventory management has often meant too much inventory and too little management or too little inventory and too much management. Proper management and control of inventory not only solve the problem of liquidity but also increase the profitability. Inventory establishes a link between the production and sales. It should be available in proper quantity at all times neither more nor less than what is required.

The basic objective of inventory management is to optimize the size of the inventory in a firm so that smooth performance of production and sales functions may be possible at the minimum cost. Therefore, investment in inventories should be subjected to rigorous control to ensure that every rupee of investment in inventory has to be contributed for increased productivity and profitability.

This study is mainly focused on the inventory management system. The results of this study were enable the company to improve the efficiency of the inventory management system and thereby increase its profitability.

1.7. LIMITATION OF THE STUDY

The study is based on secondary data, errors may be possible.

1.8. CHAPTERISATION OF THE STUDY

The study is presented in six chapters. The first chapter Design of the Study covers introduction, statement of the problem, research objectives, methodology, scope, limitation and scheme of the study. The second chapter Review of Literature examines the research gap. The Conceptual framework of the study is presented in chapter in three. The fourth chapter presents the industry profile and company profile- Kerala Minerals and Metals Limited. The efficiency of inventory management is covered in fourth chapter. The last chapter concludes with the summary of findings, conclusions and suggestions.

Chapter 2

REVIEW OF LITERATURE

CHAPTER II

REVIEW OF LITERATURE

Inventory managers are concerned with cost, criticality and contribution of their holdings. Ordering and maintaining inventory has several costs. These include capital costs, administrative expenses, storage charges, shrinkage, taxes and insurance. Most of these vary directly with the average quantity of inventory held. An obvious strategy for cost avoidance would be to reduce or eliminate inventories. That probably cannot be done in very many cases. Most Firms in USA, West and Eastern Europe determine the level of inventory necessary to provide an acceptable level of customer service and manage that size inventory as efficiently as possible.

In any business or organization, all functions are interlinked and connected to each other and are often overlapping. Some key aspects like supply chain management, logistics and inventory from the backbone of the business delivery function. Therefore these functions are extremely important to marketing managers as well as finance controllers.

Inventory Management is a very important function that determiners the health of the supply chain as well as the impacts the financial health of the balance sheet. Every organization constantly strives to maintain optimum inventory to be able to meet its requirements and avoid over or under inventory that can impact the financial figures.

Inventory is always dynamic. Inventory Management requires constant and careful evaluation of external and internal factors and control through planning and review. Most of the organization have a separate department or job function called inventory planners who continuously monitor, control and review inventory and interface with production, procurement and finance departments.

In the following few paragraphs, an attempt is made to analyse some of the relevant studies made so far in the field of inventory management.

In the year (1985), Bhawmik and Jain in their research article entitled "Practical Inventory Control Models" deal with development and implementation of inventory control models which have been successfully in paper mills. According to the authors inventory management is a part of the overall management system. Hence its effectiveness depends to a large extent on the working of the total management system. Various sub-systems of the organization have to be matched with the inventory control system for the desired results. Also the inventory control system should be designed by taking into account the peculiarities of different sub-systems of the organization.

Phaniswara Raju (1986) has conducted a research study on materials management in Andhra Pradesh State Road Transport Corporation (APSRTC) in 2006. In his study, he examines the materials management practices and purchasing systems in APSRTC on the basis of various parameters like material consumption per vehicle, material consumption per kilometre, inventory per vehicle, inventory in terms of number of month's consumption etc. He highlights some major problems in the procurement of materials. The study is primarily based on the secondary data collected from the published annual reports of APSRTC, the records of MIS, the reports on performance of National Road Transport Undertakings of CIRT, Pune etc., In addition to the personal discussions held with various officials of the corporation. The study reveals the increasing levels of materials consumption in APSRTC. As compared to other undertakings. The study points to the absence of the use of important analytical techniques like value analysis and network techniques in the purchasing system of APSRTC. The inventory control system in APSRTC is critically examined in respect of stock out pattern, reordering and review policies, Lead time patterns, stock out levels etc. He suggests the reclassification of stores stems based on the criticality, the re fixation of reorder

level and reorder quantities. The study has also indicated the wastage caused by maintenance of unnecessary stock records relating to stems which are not in use.

According to Swamy (1987), inventory represented more than 61 percent of the total current asset of the concerns. At the same time inventories stood at more than 108 percent of the net working capital of the under takings taken together. Moreover, the rate of growth of inventory in the selected public enterprises has been very high. Swami concluded that the existing system of materials management in public undertaking is not satisfactory and needs improvement in the directions without delay.

According to Bardie (1988), he opines that for a firm to be successfully, the proportion of inventory to current asset should be kept at the minimum. Also a high inventory turnover ratio which indicates faster movements of materials is advantageous to the firm. He also points out the proportion of finished/semi-finished inventory should be kept at minimum.

In this article "Inventory Management in Iron and Steel", Harbans Lal Verma, (1989) evaluated the practices and performance in inventory management in Iron and Steel Industry in India. The study is divided into two sections, in the first section, an attempt has been made to analyse the size, composition, circulation and the growth of the inventory in the selected units during the period under study and in the second section inventory control techniques adopted in the selected units. The study concludes with the findings that almost all the selected units during the period of investigation have had overstocking with serious repercussions on liquidity and profitability of the company.

According to Mohan Reddy (1991), he concluded that the inventory formed the major chunk of current asset of the sample private sector enterprises studied. Bigger enterprises in the private sector carried the larger inventories as compared to the smaller ones. Inventory turnover ratio of all the units recorded improvement over the period under the reference. Besides, an analysis of output inventory,

inventory turnover ratios had shown that none of the private sector units had carried on inventory unduly in the aggregates.

Cuthbert son and Gasparro (1993) developed a model of inventory holding which embodied most of the key ideas of earlier theoretical work. Previous theories include the production level smoothing and production cost smoothing models, the accelerator principle and the precautionary model. They were able to modify the above models to incorporate financial effects and technological change which might affect inventory holdings. They found that the level of manufacturing inventories had unit elasticity with respect to output, was positively related to the conditional variance of output and negatively related to the overall gearing position of the firm.

McComas (1995) recommends that the following actions take place within a company in the management of inventory:

- establish purchasing review criteria to review the inventory characteristics
- purchase only the amount of raw materials needed for a production run or a period of time
- Collaboration with vendors to improve the purchasing practice
- improve inventory control through application of effective inventory control systems
- encourage materials exchange within the company
- consider just-in-time manufacturing

Lieberman et al. (1996) have focused on work-in process and finished goods inventories, but they have also examined determinants of raw materials inventory, production and delivery lot sizes, and manufacturing throughput time. Their findings pointed to the importance of both technological and managerial factors in determining inventory levels. Their results on the role of technology factors were consistent with predictions derived from the EOQ formula and related models of

optimal inventory holding. Inventories were higher when the underlying technologies required longer setup and processing times.

In the year (1997), a study in "Inventory Management in Chemical Industry" was undertaken by Rajeswar Rao and Natarajan. The study examines the component wise impact on inventory management in the sample units selected from the small scale sectors. For this purpose ratio of raw materials to current assets, work-in-progress to current assets, finished goods to current assets are examined. The study exposes the poor performance of sales and material utilization. From the analysis, the researcher makes it clear that the sample units under the study are not in consistent in raising their inventory to productivity.

Baldenius and Reichelstein (2000) examined inventory management from an incentive and control perspective. They demonstrated that the residual income performance measure based on historical cost accounting provided managers with incentives to make optimal production and inventory depletion decisions. The lower-of-cost-or-market rule is shown to be effective in situations where inventory may become obsolete due to unexpected demand shocks.

According to Rajagopalan and Malhotra (2001) numerous normative models have been developed to determine optimal inventory levels and several articles and case studies have been written about the concerted efforts and practices adopted by manufacturing firms in the United States to reduce inventories. The analysis provided an encouraging picture about the results of U.S. manufacturing inventory-reduction efforts

According to Thomas (2002), studies inventory changes and future returns with data from 1970 through 1997. He finds that a firm with inventory increase has experiences higher level of profitability, however, this trend changes immediately with a change of inventory decrease. He finds the negative relationship between inventory level and firm's profitability but he cannot explain the reason.

Samba Siva Rao. K (2002) in his Study on Materials Management in Public Sector Ship Building Industry evaluates. The performance of materials management and identifies some problems faced by materials management in the heavy engineering industry. The method of investigation involves the documentary evidence and survey of expert opinion. He evaluates the existing purchase systems and lead time involved in procurement of materials and suggests that the long lead time should be reduced. His study points at the excess inventory in terms of number of months cost of production in all the engineering units. He also highlights some of the problems in the area of materials management such as delay on the part of customers in supplying their own materials, existence and disposal of surplus and non-moving items, excessive lead times and excessive dependence on imports. According to him the administrative and procurement lead times of the company are on the higher side due to the peculiar nature of the industry. He suggests liberalized purchase procedures, increased financial powers to the personnel, Opening up of liaison offices in various countries to reduce the lead time.

According to Anil (2003), an effective inventory management framework seeks to optimize the available resources towards enhancing the productivity levels. It also helps to keep distribution and logistics costs under control and hence evolves cost-efficient avenues for production.

Financial managers have a responsibility both for raising the capital needed to carry inventory and for the firm's overall profitability. The goals of inventory management are to ensure that the inventories needed to sustain operations are available, but to hold the costs of ordering and carrying inventories to the lowest possible level. There is always pressure to reduce inventory as part of firms' overall cost containment strategies, and many firms are taking drastic steps to control inventory costs (Brigham, Daves, 2004).

According to Chen et.al (2005), investigates inventories of U.S. manufacturing companies in the last two decades of 20th century. They find that firms with high

inventory have poor long-term stock returns while firms with slightly lower than average inventory have good stock returns. However, firms with lowest inventory have only normal returns. All four papers study about the relationship with financial performance of U.S. manufacturing industry. But their results are not consistent. The data used in the previous four papers are data of 20th century.

Lai (2005) has provided empirical evidence that the market cannot differentiate between «good» and «bad» inventory, the market punishes firms when it can tell that inventory decisions are «bad» and the inventory levels do not statistically explain firm value. Lai (2006) has proposed that in a world with signalling incentives, short-termism and information asymmetry, inventory has a signalling role. Firms and the stock market understand this, resulting in separating or pooling equilibrium and this is one channel in which inventory translates into market valuation. Finally, the model has been worked out as if the firm is a monolithic, aligned entity, without agency problems between managers and shareholders. Suppose managers are keen to not only increase share price for shareholders, but also their private benefits related to inventory and the latter benefits could come with higher levels of inventory.

According to Shah and Shin (2007), investigate the relationship among IT investment, inventory, and financial performance with industry sector level data of 1960 to 1999. They find that lower inventory levels lead to higher financial performance in manufacturing sector. Their conclusions that there exists indirect effect on financial performance through inventory management from IT investment.

According to McPharson (2007), in apparel manufacturing, "inventory management systems are designed to obtain concise and accurate information for control and planning of planned goods, issues, cuts, projections, WIP and finished goods." Inventory management has been a concern for academics as well as

practitioners, in that overall investment in inventory accounts for relatively large part of a company's assets. Inventories tie up money, and success or failure in inventory management impacts a company's financial status. Having too much inventory can be as problematic as having too little inventory. Too much inventory requires unnecessary costs related to issues of storage, markdowns and obsolescence, while too little results in stock out or disrupted production.

According to Branam (2008), factors which management should consider for better inventory management. Specifically emphasized the importance of in-plant throughput time reduction because throughput time is the ultimate constraint on inventory turnover ratio (inventory turnover ratio = annual cost of goods sold/average on hand inventory), which is one of the major performance indicators in inventory management. The author's interpretation of the in-plant throughput time is the time span from the point of raw material receipt to final assembly. The factors for better inventory management as better forecasting, improved transportation, improved communication, improved technology, better scheduling, and standardization.

According to Pachura (2009), he suggested that management should start the process of improving inventory management by determining the manufacturing type, benchmarking the inventory control performance, validating strategy (i.e., make-to-order, make-to –stock and build-to- forecast),determining underlying causes through the use of an operational review, and implementing corrective action. He suggested specific techniques for inventory management by focusing on cycle time, improved communication, supplier relationships, production scheduling, and cross- functional approach within a company.

According to Slack et al. (2010), a company recognizes that customer satisfaction is an important key to success. Also term that the customer is always the "king" thus the organization ensures the availability of materials in the store so as to prevent any disruption during production processes. The company recognizes that

customer satisfaction in a manner that the Inventory control managers defines how often inventory levels are reviewed to determine when and how much to order. It is performed on either a perpetual or a periodic basis. Inventory manager's implements inventory policy, they use customer demand to pull product through the distribution channel and an alternative philosophy used in the organization which allocates inventory on the basis of forecasted demand of product availability.

The importance of inventory management for small and medium-sized manufacturing companies proved Rajeev (2010) who analysed its influence on economic performance. His study was aimed especially at machine tool industries sector in India which was an extremely inventory intensive. The results showed that inventory management had really some impact on labour productivity, capital productivity and returns to scale in respondent companies.

According to Rajeev (2011), he analysed Inventory management in small & medium enterprises and mentioned that there was a positive relationship between inventory and sales and between inventory and production cost. This does not imply that inventory automatically determines production costs or sales and vice-versa. However, it does show that inventory levels can be a useful indication of what level of sales to expect. It is thus recommended that the sales and marketing department of the company should pay closer attention to the growth pattern of inventory usage and incorporate it in sales forecasting technique.

According to Leong (2012), Inventory management or control refers to a planned method of purchasing and storing the material to prevent stock out. Organization uses inventory control to minimize idle time caused by shortage of inventory and non-availability of inventories as per requirement to keep down capital investment in inventory.

Panigrahi (2013) has examined the relationship between inventory conversion period and firms' profitability and the results indicate that there is a significant negative linear relationship between inventory conversion period and profitability.

Several researches have attempted to link inventory levels with financial performance and have found little or no relation between them. We also attempt this approach and find little relation between the inventory level expressed in terms of different ratios and profitability expressed in terms of return on total assets.

According to James (2016) describes Inventory represents an important decision variable at all stages of product manufacturing, distribution and sales, in addition to being a major portion of current assets of many organizations. Too much and too low inventories bring down the level of profitability of an organization. The study wanted to determine the effects of inventory control on profitability of industrial and allied firms in Kenya. It was explained by economic order quantity model (EOQ) which is based on minimization of costs between stock holding and stock ordering. Co relational research design was adopted. Two types of data were collected. Primary data was collected through the use of a questionnaire and secondary data through the use of a record survey sheet. A sample of 71 industrial and allied companies was determined using stratified random sampling technique from a target population of 399 industrial and allied firms in Nairobi City and her environs. Data collected was analysed at two levels; descriptive and inferential data analysis.

It is recommended that firms should install and maintain good inventory control systems such as Economic Order Quantity (EOQ) and Just in Time (JIT). This should ensure that firms are maintaining ideal levels of inventory that have an effect of increasing profitability of the firms. The management should ensure that the staffs are qualified to perform duties assigned and ideal inventories levels are maintained. It should also ensure that the staffs are maintaining accurate inventory records.

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Conclusion

The above mentioned review clearly states about the relevance of inventory management. Proper management and control of inventory not only solve the problems of liquidity but also increases the profitability. But so far no other studies have been conducted on the topic "A Study on Inventory management at Kerala Minerals and Metals Limited". So this study focused the efficiency of inventory management system followed by Kerala Minerals and Metals Limited and the, particularly significant to Kerala Minerals and Metals Limited.

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Chapter 3

CONCEPTUAL FRAMEWORK - INVENTORY MANAGEMENT

CHAPTER III

INVENTORY MANAGEMENT – A CONCEPTUAL FRAME WORK

3.1 INTRODUCTION

Inventory

Inventory is an idle stock of physical goods that contain economic value, and are held in various forms by an organization in its custody awaiting packing, processing, transformation, use or sale in a future point of time.

Any organization which is in production, trading, sale and service of a product will necessarily hold stock of various physical resources to aid in future consumption and sale. While inventory is an evil of any such business, it may be noted that the organizations hold inventories for various reasons which include speculative purposes, functional purposes, physical necessities etc.

From the definition the following points stand out with reference to inventory:

- All organizations engaged in production or sale of products hold inventory in one from or other.
- Inventory can be in complete state or incomplete state.
- Inventory is held to facilitate future consumption, sale or further processing/vale addition.
- All inventory resources have economic value and can be considered as assets of the organization.

Inventory constitutes a very significant part of working capital or current assets in manufacturing organisation. Inventory which consists of raw materials components and other consumables, work in process and finished goods, is an important component of 'current assets'. There are several factors like nature of

industry, availability of material, technology, business practises, price fluctuation, etc. That determine the amount of inventory holding. Holding inventory ensures smooth production process, price stability and immediate delivery to customers. Inventory represents a large portion of the business investment and must be well managed in order to maximise the profits. An undertaking neglecting the management of inventories will be jeopardizing its long run profitability and may fail ultimately. Therefore, there must exist some optimum inventory policy which balances the demands of the production and transportation facilities.

3.2 TYPE OF INVENTORY

Inventory of materials occurs at various stages and departments of an organization. A manufacturing organization holds inventory of raw materials and consumables required for production. It also holds inventory of semi-finished goods at various stages in the plant with various departments. Finished goods inventory is held at plant, finished goods stores, distribution canters etc... Further both raw materials and finished goods that are in transit at various locations also from a part of inventory depending upon who owns the inventory at the particular juncture. Finished goods inventory is held by the organization at various stocking points or with dealers and stockiest until it reaches the workers and end customers. Besides Raw materials and finished goods, organizations also hold inventories of spare part to service the products. Defective products, defective parts and scrap also forms a part of inventory as long as these items are inventoried in the books of the company and have economic value.

3.3 PURPOSE OF INVENTORY

1. MEET DEMAND

In order for a retailer to stay in business, it must have the products that the customer wants on hand when the customer wants them. If not, the retailer will have to backorder the product. If the customer can get the good from some other source, he or she may choose to do so rather than electing to allow the original

retailer to meet demand later (through back-order). Hence, in many instances, if a good is not in inventory, a sale is lost forever.

2. KEEP OPERATIONS RUNNING

A manufacturer must have certain purchased items (raw materials, - components, or subassemblies) in order to manufacture its product. Running out of only one item can prevent a manufacturer from completing the production of its finished goods.

3. LEAD TIME

Lead time is the time that elapses between the placing of an order (either a purchase order or a production order issued to the shop or the factory floor) and actually receiving the goods ordered.

If a supplier (an external firm or an internal department or plant) cannot supply the required goods on demand, then the client firm must keep an inventory of the needed goods. The longer the lead time, the larger the quantity of goods the firm must carry in inventory.

4. HEDGE

Inventory can also be used as a hedge against price increases and inflation. Salesmen routinely call purchasing agents shortly before a price increase goes into effect. This gives the buyer a chance to purchase material, in excess of current need, at a price that is lower than it would be if the buyer waited until after the price increase occurs.

3.4 INVENTORY MANAGEMENT

Inventory Management is the process of ensuring that a company always has the products it needs on hand and that it keeps costs as low as possible. Inventory management is the supervision of non – capitalized assets (inventory) and stock items.

A component of supply chain management, inventory management supervises the flow of goods from manufacturers to warehouses and from these facilities to point of sale. A key function of inventory management is to keep a detailed record of each new or returned product as it enters or leaves a warehouse or point of sale.

3.5 OBJECTIVES OF INVENTORY MANAGEMENT

The main objectives of inventory management are operational and financial. The operational objectives mean that the materials and spares should be available in sufficient quantity so that work is not disrupted for want of inventory. The financial objective means that investments in inventories should not remain idle and minimum working capital should be locked in it. The following are the objectives of inventory management:

(1) To ensure continuous supply of materials, spares and finished goods so that production should not suffer at any time and the customers demand should also be met.

(2) To avoid both over-stocking and under-stocking of inventory.

(3) To maintain investments in inventories at the optimum level as required by the operational and sales activities.

(4) To keep material cost under control so that they contribute in reducing cost of production and overall costs.

(5) To eliminate duplication in ordering or replenishing stocks. This is possible with the help of centralizing purchases.

(6) To minimize losses through deterioration, pilferage, wastages and damages.

(7) To design proper organization for inventory management. A clear cut accountability should be fixed at various levels of the organization.

(8) To ensure perpetual inventory control so that materials shown in stock ledgers should be actually lying in the stores.

(9) To ensure right quality goods at reasonable prices. Suitable quality standards will ensure proper quality of stocks. The price-analysis, the cost-analysis and value-analysis will ensure payment of proper prices.

(10) To facilitate furnishing of data for short-term and long-term planning and control of inventory.

3.6 TOOLS AND TECHNIQUES OF INVENTORY MANAGEMENT

Effective inventory management requires an effective control system for inventories. A proper inventory control not only helps in solving the acute problem of liquidity but also increases profits and causes substantial reduction in the working capital of the concern. The following are the important tools and techniques of inventory management and control:

(1) Determination of Stock Levels

(2) Determination of safety stocks

(3) Selecting a proper System of Ordering for Inventory

(4) Determination of Economic Ordering Quantity

(5) JIT Analysis

(6) Ageing Schedule of Inventories

(7) Perpetual Inventory System

3.6.1. Determination of Stock Levels

Carrying of too much and too little of inventories is detrimental to the firm. If the inventory level is too little, the firm will face frequent stock-outs involving heavy ordering cost and if the inventory level is high it will be unnecessary tie up of capital. Therefore an efficient inventory management requires that a firm should maintain an optimum, level of inventory where inventory costs are the minimum

and at the same time there is no stock-out which may result in loss of sale or stoppage of production. Various stock levels are discussed as such.

i. Minimum Level: This represents the quantity of stock that should be held at all time, stock level is normally not allowed falling below this level. This level of stock is a buffer stock for use during emergencies. Fall in stock level below minimum level will indicate potential danger to the business. Thus, extra efforts have to be taken to expedite the supply. Minimum Stock Level = Re-order Level - (Normal Consumption × Normal re-order Period) the following factors are to be considered in fixing the minimum level:

   (i) Nature of items of materials.

   (ii) Minimum time required for delivery.

   (iii) Rate of consumption of materials.

   (iv) Stock-out costs which include loss of contribution margin, loss of Goodwill etc.

ii. Re-ordering Level: When the quantity of materials reaches a certain figure then fresh order is sent to get materials again. The order is sent before the materials reach minimum stock level. The rate of ordering level is fixed between minimum level and maximum level. The rate of consumption, number of days required replenishing the stocks, and maximum quantities of materials required on any day are taken into account while fixing re-ordering level. Re-ordering level is fixed with the following formula:

   Re-ordering Level = Maximum Consumption x Maximum Re-order period

iii. Maximum Level: It is the quantity of materials beyond which a firm should not exceed its stocks. If the quantity exceeds maximum level limit then it will be overstocking. A firm should avoid overstocking because it will result in high material costs. Overstocking will mean blocking of more working capital, more space for storing the materials, more wastage of materials and more chances of losses from obsolescence. Maximum stock level will depend upon the following factors:

- The availability of capital for the purchase of materials.
- The maximum requirements of materials at any point of time.
- The availability of space for storing the materials.
- The rate of consumption of materials during lead time.
- The cost of maintaining the stores.
- The possibility of fluctuations in prices.
- The nature of materials; If the materials are perishable in nature, then they cannot be stored for long.
- Availability of materials.
- Restrictions imposed by the Government
- The possibility of change in fashions will also affect the maximum level.

The following formula may be used for calculating maximum stock level:

Maximum stock level = Re-ordering v Level + Re-ordering Quantity-(Minimum Consumption x Minimum Re-ordering period)

(a) Danger Level: It is the level beyond which materials should not fall in any case. If danger level arises then immediate steps should be taken to replenish the stocks even if more cost 15 incurred in arranging the materials. If materials are not arranged immediately there is a possibility of stoppage of work. Danger level is determined with the following formula: Danger Level = Average Consumption x Maximum re-ordering period for emergency purchases

(b) Average Stock Level: The average stock level is calculated as such:

Average Stock Level = Minimum Stock Level + 1/2 of re-ordering quantity

OR

Average Stock Level = Minimum Stock Level + Maximum Stock Level

3.6.2. Determination of Safety Stocks

Safety stock is a buffer to meet some unanticipated increase in usage. The usage of inventory cannot be perfectly forecast. It fluctuates over a period of time. The demand for materials may fluctuate and delivery of inventory may also be delayed and in such a situation the firm can face a problem of stock-out. The stock out can prove costly by affecting the smooth working of the concern. In order to protect against the stock out arising out of usage fluctuations, firms usually maintain some margin of safety stocks. The basic problem is to determine the level of quantity of safety stocks. Two costs are involved in the determination of this stock i.e. opportunity cost of stock-outs and the carrying costs. The stock-outs of raw materials cause production disruption resulting in higher cost of production. Similarly, the stock-outs of finished goods result in the failure of the firm in competition as the firm cannot provide proper customer service. If a firm maintains low level of safety, frequent stock-outs will occur resulting in the larger opportunity costs. On the other hand, the target quantities of safety stocks involve higher carrying costs.

3.6.3. Ordering Systems of Inventory

The basic problem of inventory is to decide the re-order point. This point indicates when an order should be placed. The order point is determined with the help of these things:

(a) Average consumption rate,

(b) Duration of lead time,

(c) Economic order quantity

When the inventory is depleted to lead time consumption, the order should be placed. There are three prevalent systems of ordering and a concern can choose any one these:

40

(a) Fixed order quantity system generally known as economic order quantity (EOQ) system;

(b) Fixed period order system or period re-ordering system or periodic review system;

(c) Single order and scheduled part delivery system.

3.6.4. Economic Order Quantity (EOQ)

EOQ is an important factor in controlling the inventory. It is a quantity of inventory which can reasonably be ordered economically at a time. It is also known as 'Standard Order Quantity', 'Economic Lot Size,' or 'Economical Ordering Quantity'. In determining this point ordering costs and carrying costs are taken into consideration. Ordering costs are basically the cost of getting an item of inventory and it includes cost of placing an order. Carrying cost includes costs of storage facilities, property insurance, and loss of value through physical deterioration, cost of obsolescence. Either of these two costs affects the profits of the firm adversely and management tries to balance these two costs. The balancing or reconciliation point is known as economic order quantity. The quantity may be calculated with the help of the following formula:

$$EOQ = \sqrt{2} \times R \times O\ C$$

Where R = Annual quantity used (in units)

O = Ordering cost per order/ Cost of placing an order

C = Inventory carrying cost of one unit / carrying cost of one unit per year

Assumptions of EOQ:

While calculating EOQ the following assumptions are made:

(i) The supply of goods is satisfactory. The goods are purchased whenever these are needed.

(ii) The quantity to be purchased by the concern is certain

(iii) The prices of goods are stable. It helps to stabilize carrying costs.

3.6.5. Just-in-Time (JIT) System

Japanese firms popularized the just-in-time (JIT) system in the world. In a JIT system material or the manufactured components and parts arrive to the manufacturing sites or stores just few hours before they are put to use. JIT system eliminates the necessity of carrying large inventories and thus, saves carrying and other related costs to the manufacturer. The system requires perfect understanding and coordination between the manufacturer and suppliers in terms of the timing of delivery and quality of the material. The success of the system depends on how well a company manages its suppliers. The system puts tremendous pressure on suppliers.

3.6.6. Ageing of Inventories

According to this method, an inventory is to be classified according to the dates of their purchase or manufacture. Thus, schedule of inventories can be prepared on the basis of the age of different items of inventories. Efforts should be made to clear off the old inventories at the earliest.

3.6.7. Perpetual Inventory System

Perpetual inventory system implies maintenance of up-to-date stock records. According to Weldon, it may be defined as "a method of recording stores balances after every receipt and issue to facilitate regular checking and to obviate closing down for stock-taking". The basic object of this system is to make available details about the quantity and value of stock of each item at all time.

3.7. Selective Inventory Control

Selective inventory control is an essential part of material management. Selective control is emphasizes on variations in methods of control from item based on selective basis. We cannot apply uniform control since it's expensive and gives diffused effect. For this purpose we can use some criterion such as lead time,

consumption, criticality, cost of the items, procurement difficulties etc. the following classification can be used for selective treatment of various type of materials.

3.7.1. ABC Inventory Control System

Large numbers of firms have to maintain several types of inventories. It is not desirable to keep the same degree of control on all the items. The firm should pay maximum attention to those items whose value is the highest. The firm should, therefore, classify inventories to identify which item should receive the most effort in controlling. This analytical approach is called the ABC analysis. The high value items are classified as 'A items' and would be under the highest control. 'C items' represent relatively least value and would be under simple control. 'B items' fall in between these two categories and requires reasonable attention of management. The ABC analysis concentrates on important items and is also known as control by importance and exception (CIE). This approach is also known as proportionate value analysis (PVA).

3.7.2. VED Analysis

The VED analysis is used generally for spare parts. Spare parts are classified as vital essential (E) and desirable (D). The vital spares are must for running the concern smoothly and these must be stored adequately. The E types of spares are also necessary but their stocks may be kept at low figures. The stocking of D type of spare may be avoided at times, if the lead time of these spares is less, then stocking of these spares can be avoided.

3.7.3. FSN Analysis

The FSN Analysis is based on the rate of issue or rate of usage of spare parts and the alphabets F S and N stands for Fast Moving, Slow Moving and Non Moving items. The FSN classification system categorizes the items based on how frequently the parts are issued and how frequently they are used.

Usual classification of Items at Inventory can be classified based on the following criteria

- Fast Moving – Items which are frequently issued from inventory which are more than once for a specific time period
- Slow Moving – Items which are less frequently issued which might be once in a specific time period
- Non-Moving – Items which are not issued from the inventory at all in a specific time period

The FSN classification system is extremely helpful in distributing spare parts which are kept near the dispensing are having items which belong to the fast-moving category. The items which fall into the non-moving category can be discontinued if the further scope of use is not expected. As companies in production for a longer period have a specific percentage of non-moving spare parts which are usually disposed at regular intervals. Selling the spare parts or reusing the same can be again in the capital which can be used for other uses

3.7.4. XYZ Analysis

XYZ analysis has a correlation with ABC analysis, only the difference is that instead of annual consumption and price per unit, the inventory value is considered. Usually XYZ analysis is used in conjunction with either ABC analysis or HML analysis. XYZ analysis is based on value of stock on hand (i.e. - inventory investment). Items whose inventory values are high are called X items, while those whose inventory values are low are called Z items and Y items are those which have moderate inventory stock. This can also be shown as below:-

X- High inventory value

Y- Moderate inventory value

Z -Low inventory value

3.7.5. HML Analysis

H-M-L analysis is similar to ABC analysis except the difference that instead of "Annual Inventory Turnover", cost per unit criterion is used. The items under this analysis are classified based on their unit prices. They are categorized in three groups, which are as follows:

H- High Price Items

M- Medium Price Items

L- Low Price Items

3.8. Factors determining the optimum level of inventory

General factors

1. Nature of business
2. Anticipated volume of sales
3. Operation levels
4. Price level variation
5. Availability of funds
6. Attitude of management

Specific factors

1. Seasonal nature of raw materials and demand of finished goods.
2. Length of technical nature of production process
3. Durability of perishability
4. Terms of purchase
    i) Loan credit
    ii) Conditions of supply
    iii) Rebate/ discount
5. Time factor

6. Lead time
7. Time lag
8. Time required for production process
9. Average time required for sale
10. Management policies.

Chapter 4

INDUSTRY AND COMPANY PROFILE

CHAPTER IV

INDUSRYAND COMPANY PROFILE

4.1 INDUSTRY PROFILE

The Minerals and Metals Industry has been flourishing since ancient times. Fr.William Gregor in the year 1789 discovered Ilmenite in Konwat in England. He found that the Black Sand contains some important Metal but he failed to discover it. In 1875a Hungarian scientist MARTIN KEINWITCH found the same metal contents in there fine Minerals. The Geological Survey of India found the presence of Monazite in the coastal sands of Kerala .Besides the Mineral deposits are also found in Tamilnadu, Orissa because of which they also have well established Mineral Industries.

GLOBAL SCENARIO

Like many companies in the present economic climate companies operating in the metals and mining market are undertaking policies of cost improvement and margin maintenance whilst looking to further develop immature markets(such as China where it is hoped the development of a growing IT industry will increase demand for precious metals and aluminium used in computers).Although turbulent by its very nature the metals and mining industry and the companies within it, should enjoy a moderate compound annual growth rate (CAGR)going forward with forecasts predicting that the market will reach a value of $900 billion by 2007.

The metals and mining industry comprises six sub-categories: Aluminium, Gold, Precious Metals, Other Metal Extraction, and Coal mining and Steel. The largest segment of the global metals market is Iron and Steel followed by aluminium. The iron and steel segment comprises of more than half the industry in terms of volume. Regionally Asia pacific is the largest market for metals and mining full owed by Europe. The metals and mining

sector find end-use in industries such as automobile sand consumer durables that rely upon this industry for the new materials with which they created their familiar everyday products, Computers in particular require aluminium, steel and precious metals in their production. For these reasons demand for a broad range of different types of product translates into demand for the products produced in this industry-sustaining in even the harshest economic climates

The industry is therefore also highly cyclical and has been negatively affected by the global downturn of the past few years .The industry is highly affected by fluctuations in its largest segment, steel (which accounts for over 60%of the market value) which has been strongly affected by the continuing global economic downturn, and in turn has adversely affected the metals and mining market. Chronic overproduction is a problem in several sectors, especially the beleaguered steel manufacturing industry. The overall outlook for the global metals and mining industry remains positive with the recovery in global economic conditions. Developed regions like US and Europe are showing signs of uptake in industrial output and economic revival. Emerging regions like Asia-pacific are fuelling demand as industrial output increases to satisfy latent demand.

Transportation is one of the most important markets for the aluminium sub-industry, and is expected to prove an important driver of future growth. Increasing numbers of automobiles are aluminium intensive, benefiting from the recyclability and lightweight characteristics of the metal. Aluminium is also widely used for packaging, beverage cans, food containers and foil products. In contrast, the steel sub- industry is suffering from massive over –capacity; consequently, steel prices have declined in recent years. The steel industry has been subjected to numerous trade disputes over the year with the US in particular imposing tariffs up to 30% on imported steel, triggering a tariff war.

The global industry has been boosted by the recent recession. Although the general outlook is positive, the competitive landscape differs across the sectors of the precious metals and minerals sub-industry. The gemstone sector is more susceptible to economic change than gold and is characterized by smaller producers. The diamond industry by contrast is highly consolidated, but has come under ethical pressure recently because of alleged links with African warlords. A global increase in mining capacity is currently underway with numerous new projects around the world. The major minerals and deposits of the world are spread throughout different continents across the globe. The exploration for mineral sand deposits has intensified since the mid-1980s due to increasing use and demand for heavy minerals. The major countries where these deposits are found are Australia, Canada, India, Kenya, Madagascar, Mozambique, South Africa etc.

INDIAN SCENARIO

Mining and mineral industry constitute the backbone for industrial expansion in India. The mining sector contributes substantially in the socio-economic prosperity of our country by supplying essential raw materials to the industries and power sector gifted with a wide range of its minerals, India is one of the leading producers and exporters of several minerals in the world. Mining industry in India started its journey long back in 1774, when the East India Company permitted an English company to undertake mining activity in the coal field in Ranging, gold mining in Kolar gold.

In India, 80% of mining is in coal and the balance 20% is in various metals and other raw materials such as gold, copper, iron, lead, bauxite, zink and uranium. India with diverse and significant mineral resources is the leading producer of some of the minerals. India is not endowed with all the requisite mineral resources. Of the 89minerals produced in India 4 are fuel minerals, 11 metallic, 52 non –metallic, 22 minor minerals. India

is the largest producer of mica blocks and mica splitting; ranks third in the production of coal and lignite, barites and chromate; 4th in iron ore, 6th in bauxite and manganese ore, and 10th in aluminium and 11th in crude steel. Iron-ore, copper-ore, chromate and zinc concentrate percent of non-metallic minerals. The index of mineral production, excluding fuel and atomic minerals, (base year 1993-94=100) for the year 2005-2006 is expected to be 154.23 as compared to 153.48 in 2004-2005.

STATE SCENARIO

God's Own Country is best owed with along coastal belt .Kerala State isendowed with a number of deposits of minerals such as Heavy Miner al Sand(Ilmenite,Rutile,Zircon,Monazite,Sillimanite), Gold, Iron Ore, Bauxite,Graphite,China clay, fire clay, tile and brick clay, Silica sand, Lignite, Limestone, Lime sell, Granite, Gemstones, Magnetite, Steatite etc. . However, Mining activities on large scale are confined mainly to a few minerals – Heavy Minerals, China Clay and to a lesser extent Limestone, Silica Sand and Granite. In fact, Heavy Minerals and China clay contribute more than 90% of the total value of mineral production in the state.

The State owns mineral deposits like china clay,limestone,limes hell,silicasand,bauxite,graphite,iron ore etc.The major mineral based in dustries like KeralaMinerals and Metals Ltd., Chavara, Indian Rare Earth Ltd. Chavara, Malabar Cements, Walayar, Travancore cements Ltd. Kottayam, Kundara Ceramics, Kollam. English Indian Clays Ltd, Thiruvananthapuram. Excel Glass Industry, Alappuzha, Kerala Clays and Ceramics Products Ltd, Palayangadi, Kannur are some of the mineral based industries working in the state since several years. The resources of beautiful ornamental granites in the state are being exported to different countries.

4.1.1. HISTORY

The history of the beaches of Sankarmangalam and nearby areas is inextricably intertwined with the history of the precious beaches and KMML. Precious, as was discovered in 1909 by the German scientist Dr. Schomberg who found traces of monazite in the sand flakes on the imported coir from Sankaramangalam. The beaches with a wealth of rare earth minerals became the centre of scientific attraction.

By 1932, a visionary private entrepreneur established the F. X. Perira and Sons (Travancore) Pvt. Ltd, the forerunner to KMML. During the course of time, KMML changed hands three times over. In 1956 it was taken over by the state government and was placed under the control of the industries department. The unit was subsequently converted as a limited company in 1972 by the name of 'The Kerala Minerals and Metals Ltd.' with the following broad objectives.

1. Optimum utilisation of mineral wealth found along the sea coast of Kollam-Alappuzha districts.
2. Large scale generation of employment in the state in general.
3. Overall growth and development of the local area in particular and the state in general.

The construction of Titanium Dioxide Pigment using chloride technology started in 1979. The same was commissioned in 1984 as the first and only integrated Titanium Dioxide Plant in the world. Today, with over 2000 employees and a range of products, KMML has become part and parcel of local and international life. On 27th December 2006 Hon. Ex-Chief Minister of Kerala Shri V.S. Achuthanandan laid the foundation stone of the Titanium Sponge Plant in the presence of the Hon. Minister for Industries, Shri. Elamarom Kareem and other eminent dignitaries. On 27th February 2011 Honorable Minister of Defence Shri. A K Antony Inaugurated country's first Titanium Sponge Plant (TSP) at KMML. With the inauguration of TSP, India became the 7th country in the world having the technology for producing titanium sponge, which is the raw material for

titanium metal. Thus KMML has become a strategic Supplier of country's present requirements of Titanium for its prestigious space missions. On 6th September 2011 KMML TSP manufactured the 1st Batch of Titanium sponge & now the production is in full swing.

COMPANY PROFILE

4.2 The Kerala Minerals and Metals Limited

By 1932, a visionary private entrepreneur established the F. X. Perira and Sons (Travancore) Pvt. Ltd, the forerunner to KMML. During the course of time, KMML changed hands three times over. In 1956 it was taken over by the state government and was placed under the control of the industries department. The unit was subsequently converted as a limited company in 1972 by the name of 'The Kerala Minerals and Metals Ltd.' with the following broad objectives.

KMML a fully owned government enterprise is the world's first fully integrated titanium dioxide plant. Since its inspection, KMML has made an incredible mark in the field of mining, mineral processing and manufacturing with the state art factories at Sankaramangalam and Kovilthottam. KMML has its own national acclaim for its impressive performance KMML is the India's first and only manufacture of rutile grade titanium dioxide by chlorine route. KMML products are marketed under the brand name KEMOX.

KEMOX R.C 882 is a multiple application pigment which is of great demand in the world market. KMML also produces other grades of titanium dioxide pigments like RC 800 PG; RC 800 RANGE includes titanium tetra chloride, illuminate, rutile, leucoxene and sillmenite which are the basic raw materials for variety of industrial uses. KMML also manufactures iron oxide bricks used for building purpose. Close access to one of the world richest beaches helps KMML retain its leadership. KMML Titanium pigments are reputed for their high degree of glows, tins retention and case of dispersion. These qualities give KMML affordable identity in the industry. KMML is certified ISO 9002 in the year 2000 for implementing world class quality standard.

According to the corporate plan by 2007 and 2008, the domestic revenues generation will be less than 30 percentages. They have already proved their capacity to produce TiO2 is 50 million tons, which is produced by 71 companies around the world. Of this, 29 million tons, which is produced by chloride route by

26 companies, the remaining 21 million tons are produced by 45 companies through the sulphate process. Thus it is clear indication that in the global market, the chloride technology products are the most in demand. To increase its presence in the international market and counter the import competition. KMML is all set to expand its TiO2 production capacities.

4.2.1. GROWTH STORY

MILESTONES OF KMML

1974	Letter of Intent for the production of 48,000 tonnes of Titanium Dioxide Pigment through Chloride process technology. Collaboration agreement with: Benelite Corporation of America, USA – Synthetic Rutile Plant. Woodall Duck ham, U.K – Acid Regeneration Plant Kerr McGee Chemical Corporation, USA – Titanium Dioxide Pigment (Chloride process)
1979	Construction of plants started at Sankaramangalam, Chavara, Kollam
1983	R&D recognition for KMML laboratory by DSIR.
1984	Commissioned the first fully integrated Titanium Dioxide Pigment Plant in the world. Launched for the first time in India, Rutile grade Titanium Dioxide Pigment under Trade Name: KEMOX RC-822.
1992	Launched another grade of Titanium Dioxide Pigment – KEMOX RC-800.
1992	Launched Plastic Grade Pigment – KEMOX RC-800 PG. 1992
1992	Won the First National Award for in-house R&D efforts in Industry for Technology Absorption under TAAS programme by DSIR
1997	A new grade of pigment for the new water based paint application was

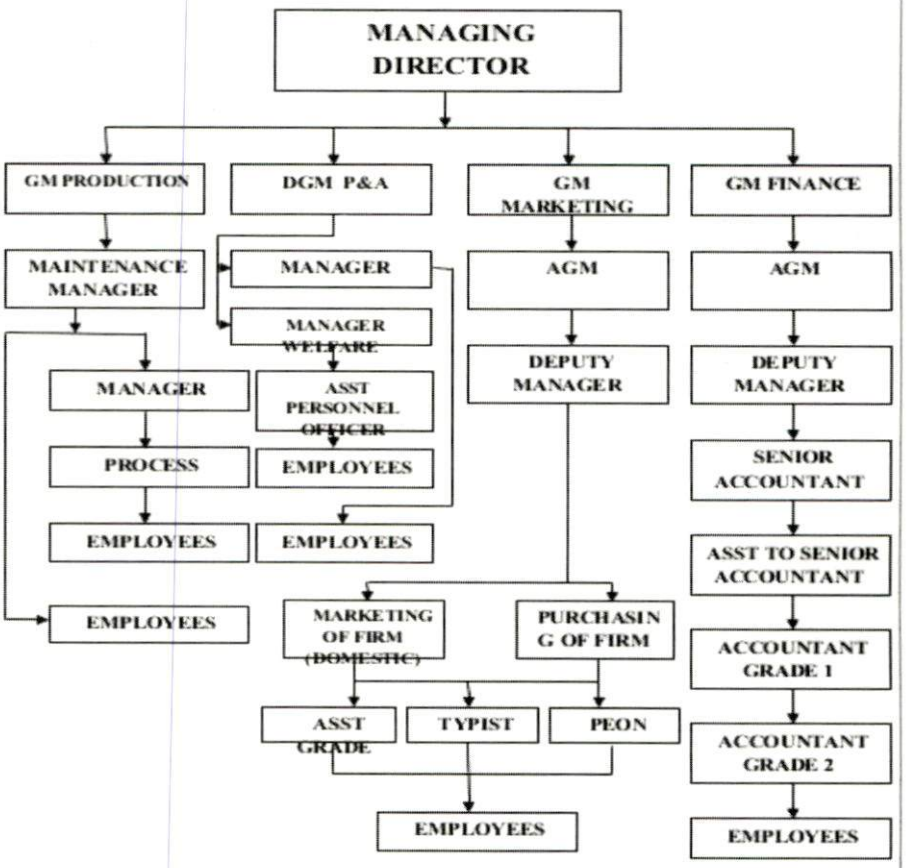
	introduced – KEMOX RC-813.
1998	Launched another improved grade pigment – KEMOX RC-822SG (Renamed as KEMOX RC-802)
1998	Commercial production of Iron Oxide Bricks from the waste Iron Oxide – an innovative development by in-house R&D.
1998	Supported Combustion Process was successfully commissioned in one of the streams in the Oxidation Plant. This In-house developed process is a significant breakthrough which enables KMML to improve productivity of the plant and for further capacity enhancement.
1999	Bypass system in both streams and support combustion in other streams was also commissioned.
1999	Erected and commissioned one more Chlorinator in Chlorination section.
2003	New modern Lime Preparation Plant (LPP) for effluent neutralization was commissioned.
2004	Commissioned new DM Plant and added two more digesters in IBP.
2004	Commissioned a new product packaging machine, modern energy efficient filter and drier system, DCS system in Unit-400.
2005	World class quality management systems like ISO 14001 and OSHAS-1800 implemented
2006	Capacity enhancement to 40,000MT
2006	Foundation stone laid for Titanium sponge plant
2007	Commissioned Recovery cyclone

2008	Commissioned new ETP sludge and Oxide pond
2009	Development of Nano Titanium Dioxide particles in laboratory scale.
2010	Commissioned the Enhanced Zircon Recovery plant at MS Unit.
2011	India's first commercial titanium oxy chloride pilot plant commissioned on 16/6/2011
2011	India's first commercial plant for synthesis of Nano titanium dioxide commissioned on 19/7/2011
2011	Commissioned the Siliminite Recovery System at MS Unit
2011	Started the sale of Siliminite. --on 18th August 2011
2011	Birth of First Batch of Titanium Sponge on 06.09.2011

4.2.2. GOVERNING BODY

BOD's are the promoters of KMML and the BOD's consists of six members, appointed by the government of Kerala. Chairman is the head of the BOD's and he is the principal secretary to industries department of Kerala government. But he is only a part time chairman since his position changes. Normally the BOD s as appointed for a period of 5 years, but the government can change them as they wish. MD, head of the KMML. He is entrusted to co-ordinate all the function of the organization on behalf of the government.

ORGANIZATION STRUCTURE



4.2.3. VISION OF KMML

"Be a world class producer of minerals sand based value-added products"

4.2.4. MISSION OF KMML

- To become a nodal agency of establishing and promoting and establishing minerals based industries in the state to ensure value addition and effectiveness and control exploitation of the mineral reserve.
- To develop adequate supply base for the services and utility development of the minerals based industry.
- To create more awareness about corporate social responsibilities for chemical industries in the state.
- To become the leader in controlling Green House Gas Emission so as to promote the concept of Green House.

4.2.5. AWARDS AND RECOGNITION

- **GLOBAL RECOGNITIONS**

  - International Gold Medal Award for Quality & Efficiency from UK in 2003

  - APCJ Award from Asia Pacific Coating Forum for the Best International Marketing Campaign - May 2003

- **STANDING TALL**

Award for R&D efforts in Industry	1992
FACT MKK Nair Memorial Productivity Award	1993 – 1994
Energy Conservation Award	1999

FACT MKK Nair Memorial Productivity Award	1999 – 2000
FACT MKK Nair Memorial Productivity Award	2000 – 2001
Energy Conservation Award	2001
CAPEXIL Award for best export performance	2003, 2004 & 2005
Award for best revenue Performance- Govt. of India (National)	2003 & 2004
Pollution Abatement Outstanding Achievement Award – Government of Kerala –	2008
FACT MKK Nair Memorial Productivity Award	2009-2010
Best Performing PSU – Factories & Boilers, Govt. of Kerala	2010
Outstanding Achievement (entrepreneur performance) – Department of Industries & Commerce	2010
Outstanding Achievement (Pollution Abatement) – Department of Industries & Commerce	2010

Special Awards for Exports from Chemicals and Allied Export Promotion Council (CAPEXIL) – 3rd time consecutively.

4.2.6. QUALITY STATUS

KMML achieves ISO 9002 certificate by Bureau Virtues Management (BVQM), holes certification of United Kingdom Accreditations services, Dutch council for certification (Holland) and register accreditations board (USA). KMML has won the 1997th national award for in-house research and development effort in industry

for technology absorption under the TAAS programmer. The Kerala productivity council award for high productivity standard has also won by KMML.

a) Company delights their customer with world class products and services at competitive prices.

b) The company is maintaining a quality manual, which provides adequate description of the quality management system to be followed.

c) The company work for continual improvement in the area of Delivery, Inventory, Control ,Cost reduction, New Product Development, Communication, Safe and Clean work place, HR development through implementation of ISO 9001-2000 Quality Management System.

4.2.7. CERTIFICATION

KMML achieved ISO 9002 certificate by M/S Bureau virtues Quality International (BVQI) and holes certification of United Kingdom Accreditations Service. Dutch Council for certification (Holland) and Register Accreditations Board (USA): KMML has won the 1997 National award for in-house research and development effort in industry for technology absorption under the TAAS program. The Kerala Productivity Council award for high productivity standard has also been won by KMML.

ISO 9001: 2000 (Quality policy)

KMML as certified for quality management system ISO 9002:9004 in June 2000 and was rectified and upgraded to ISO 9001:2000 Quality Management Systems(QMS) in November 2003 for its TP unit.

ISO 14001:2004 (Environment Policy)

KMML has been certified an ISO 14001:2004 in the year 2005. As recognition of protecting and safeguarding the environment by

- Strictly complying statutory and regulative requirement.
- To control their impact on land, air and water and thus prevent pollution.
- To reduce health and safety risks.
- To optimize the use of resources.

OHSAS 18001:1999 (Occupational Health and Safety)

The manufacturer of synthetic rutile and rutile grade TiO2 are committed to protect health and safety of the employees and everybody involved in this activity of the company. Compliance with health and safety regulations and other requirement to which they subscribe.

4.2.8. EXPORTS

The company exports the products to UK, USA, Italy and Middle East countries.

4.2.9. FUTURE PLANS OF KMML

1. Existing illuminate beneficiation plant (IBP) 50000 units per annum capacity utilisation.
2. Titanium sponge plant 500 metric tons in collaboration with AVISMA technology.
3. Introduction of 100 titanium oxygen plant.
4. Introduction of new 100 fluids dispend plant.
5. Introduction of a Nano pigment production.
6. Enhancement of minerals separation plant.
7. Introduction of titanium oxy chloride production.
8. Introduction of additional chlorinators and titanium tetra chloride plant.
9. Implementation of social accountability standard system 8000.

4.2.10. POLICY

KMML delight the customers with class products and prompt services at competitive price. The quality objectives of KMML are as follows;

- Customers driven continuous development.
- Encouraging innovation and technology updating.
- Training and empowering workforce.
- Better communication, cost reduction.
- Curing for requirements of the society.
- Compliance with documented quality system.

4.2.11. PRODUCT PROFILE

SL NO.	PRODUCTS	APPLICATIONS
1.	Titanium Dioxide	Paints, Printings, Inks, Plastics, Paper, Rubber, Textiles, Ceramics
2.	Titanium Tetra Chloride	Titanium Dioxide pigments, Titanium sponge, Titanium salts, Titanium ox chloride, Buty Titanate.
3.	Rutile	Wedding electrodes, Titanium compounds, Titanium Dioxide pigments, Titanium Sponge, Titanium Tetra Chloride.
4.	Ilmenite	Synthetic Rutile, Titanium Tetra Chloride, Ferro Titanium Alloys, Titanium Dioxide salts, Welding electrodes.
5.	Leucoxene	Titanium Tetra Chloride, Welding Electrodes,

		Titanium Compounds, and Titanium Dioxide pigments.
6.	zircon	Ceramics, Foundries, Refectories, Zirconium chemicals, Zirconium metals, Nuclear Technology.
7.	Silimanite	High temperature refectory ceramics
8.	Iron Oxide Bricks	As building materials.

4.2.12. MAJOR COMPETITORS

The titanium dioxide until grade is produced only by KMML in India. KMML has to free competition from Tio2 produces due to liberalization and globalization. The major competitors are:

4.2.12.1. INDIAN COMPETITORS

- Travancore titanium products ltd
- Kilburn chemicals ltd Chennai
- Kolmark chemicals ltd Kolkata

4.2.12.2. WORLD COMPATITORS

- Dupont (USA)
- Ishihara ltd (Japan)
- Millennium (Germany)
- Tiofin (Netherlands)
- Kemege (Finland)
- Mom itox (USA)
- Kerse megree chemical (USA)
- Fletcher titanium product (Netherlands)

4.2.13. MAJOR CUSTOMERS

The major customers of KMML are as follows:

- Asian paints
- Nerolac paints
- Camilin
- Plastic chemical industries
- Shalimar paints
- Indian chemical industry
- Berger paints
- Jenson and Nicolson
- Bharat solvent and Chemical Corporation

4.2.14. MARKET SHARE

In the world market, USA has been in the vanguard of development 0f titanium dioxide industry. In India KMML enjoys monopoly in the production of Rutile Grade Titanium Dioxide pigment. In world, KMML enjoys 40% market share.

4.2.15. POLLUTION CONTROL

KMML has elaborated pollution control system with respect to both water and air pollution. The waste (acidic) from illuminate beneficiation plant is sent to effluent neutralization plant (ENP). It consists of a primary neutralization tank (PNT) and secondary neutralization tank (SNT) where it is treated with caustic soda solution. The totally neutralized slurry from the SNT pumped to 500 meter cube capacity setting pond provided with impervious day, polythene lining at bottom side where the balance solids are allowed to settle. The clean water from the polishing pond meeting all specification stipulated by pollution control board authorities is pumped in Arabian Sea. All gases from chlorination, oxidation, ilmenite beneficiation plant and acid regeneration plant are scrubbed water or line caustic

solution to absorb the toxic gases dilated with enough fresh air and only yet out to the atmosphere through slacks.

4.2.16. FUNCTIONAL DEPARTMENTS

The first real task in designing an organisation structure is the identification of activities and groups them properly. The process of grouping the activities is commonly known as departmentalisation. The basic advantage of this specialization lies in the terms of efficiency with which the work is performed because a person focuses his attention on a narrow aspect. Naturally this results in to performing the work more efficiently. Each department in the organisation helps the management to carry out the activities smoothly. Departmentalisation helps delegation of authorities, specialisation in work etc. like any other organisation there are various departments which lead the company to achieve its objectives. The various departments in KMML are as follows;

The major departments working operating KMML are;

1. PRODUCTION DEPARTMENT

The production department play an important role in KMML. It is equipped with latest state of art technologies. It strives to achieve a high standard by achieving technical assistance in every stage of production. The plant works 24 hrs a day with three shifts. Occasionally the plant is closed for maintenance work. The production department comprises of two divisions, namely production planning division and production division.

This production department undertakes activities and decision regarding the production work. Deputy General Manager (production and maintenance) controls the activities of the department. Production of TiO2 is carried out in lot wise with specific lot number. Each lot contains 15 MT of TiO2 samples are collected from production at specific intervals and examined thoroughly in the laboratory or the company. If any defect is identified, then the lot is considered

as inferior quality. Company always maintain high standard of perfection by achieving technical excellence in every phase of production. Catering to strict guideline, it offers a wide range of products used in everyday life. Paint material, facial creams, tablets, newsprint, rubber products, cosmetics and printing inks all contain TiO2.

2. MARKETING DEPARTMENT

Functions of Marketing Department

The marketing functions undertaking by the marketing department of KMML can be broadly classified into three;

- **Function of exchange**

The functions of exchange carried out by the marketing department are subdivided into three:

- Buying and assembling:

The raw illuminate is necessary for production are either collected from minerals separation plant or brought from USA. The raw materials like chemicals petroleum coke, burning oil etc. are brought either from the vendors the list or the selected vendors. The marketing department carry out the selection of buyer and making arrangement for procuring the items. The marketing department also arranges the machines required in the plants.

- Packaging:

The marketing give special instructions regarding the packaging of the TiO2 pigments. They receive instruction from the customers and then this is passed on to the packaging section. Today all pigment grades except RC813 is packaged in 25kgs net weight air laminated multi paper bags.

- Selling:

It is one of the important functions carried out by this department. They provide facilities for the customers to make direct purchase from the company. More they appoints stockiest for distributing the pigments to small customers. At present they have appointed 28 stockiest all over India.

➢ **Functions of physical supply:**

The marketing department functions related to physical supply can be explained as follows:

- Dispatching

Once the order from the customers as well as from the stockiest were the marketing department arranges the execution of orders by the way of preparing dispatch. The mode of payment for purchase made by consumer has to be advance payments in the form of demand drafts or telegraphic transfers which are payable at any schedule banks in Kollam.

➢ **Marketing facilitating function:**

The marketing department also performs the facilitating functions like

- Financing:

For helping the company to maintain a proper working capital management, the marketing department insists on advance payment from the customer. This help the company to reduce the debt collection purled of the considerably.

- Risk bearing:

It take all possible to avoid the chance of good, being returned, by the customer and also take special care of protecting the goods from being damage on storing in the go down.

DISTRIBUTION SYSTEM

In KMML distribution is divided into 2 major categories;

1. Direct supply

Direct supply to the actual customers who require seven metric tons or more at a time. By this policy, KMML have estimated the middle men and it is easily adapted to any circumstances. Some of the major direct customers of KMML are;

- Asian paints
- Berger paints
- Raj hoot paints
- Mega Meditex
- Camlin
- Jenson and Nicholson
- Hindustan latex and resin
- Finolex
- Shalimer paints
- Sanderson chemicals
- Plastic chemix industry

2. Supply through stockiest

Supplies to small sectors are done through stockiest appointed by the company in all major cities. Company fixes prices for its products and the stockiest are responsible to see the pelts at fixed price. All the grades of TiO2 pigments would produce in KMML come under the category of industrial goods. TiO2 is mainly used in paint industry, textile industry, printing ink industry etc.

Some of the major stockiest are;

- Ashit enterprises
- Kemco corporation
- Hero dyne chemical industries
- Bharat solvent and chemical corporation
- Balaji export house
- Karnataka chemicals
- Manorama sales corporation
- Bajaj chemicals

EXPORT MARKET IN KMML

Even though KMML faces stiff competition from multinational giants, KMML receives a number of export order through email, fax and through correspondence from customers abroad. KMML enjoys good reputation for quality pigment in the international market. The company is exporting its products in Korea, South Africa, Srilanka, Turkey, Dubai, China, UK and Philippine.

3. FINANCE DEPARTMENT

Finance is the life blood of any organisation. It deals with both acquisition of as well as allocation of funds. Hence finance department assumes a great role in this organisation. A finance department in an organisation is responsible for maintaining fair and just accounting, working capital management, long term funding decision making. The Finance department of KMML is divided in two sections such as internal audit and accounting section. The internal audit section carriers auditing function internally. They prepare internal audit report. The accounting section prepares profit & loss account and balance sheet performs other accounting functions.

FUNCTIONS OF FINANCE DEPARTMENT

The general areas of finance are business finance, personal finance (private finance), and public finance. Finance includes saving money and often includes lending money. The field of finance deals with the concept of time, money, risk and how they are inter-related. It also deals with how the money is spent and budgeted. The main function of this department is to collect all the receipts and make all the payments and also to record all the transactions and prepare the final accounts. The major functions of this department are as follows:

- Maintain the accounts as per the provision of the Section 20G of the Company Act 1956.
- Provide depreciation at the rate prescribed in Schedule 14 of the Company s Act 1956. On straight line method.
- To account excise duty on goods manufactured when dispatched.
- To ascertain the accrued gratuity, liability of the company on the date of Balance Sheet.
- To value finished goods at cost or market price whichever is lower.
- Stock of raw materials, spares and chemicals are valued at weighted average method.
- Treat the claims against the company which are not admitted as contingent liability.
- To maintain clear and perfect accounting system.
- Preparation of Profit & Loss Accounts, Balance Statements, Cash Flow Statements, Fund Flow Statements etc.
- Working Capital Management.
- Dealing with the financial institutions with matters regarding to salary disbursement, credit arrangements, collecting payments from the customers etc.

ACTIVITIES CHARRIED OUT BY THE FINANCE DEPARTMENT

The activities earned out by the finance department are as follows:

1. **Recording and analysing of purchase**

The account section first analyses accounts related to purchase made by the purchase department. They check whether the invoices prepared by the purchase department are in line with the stated nouns of the company. If they have any doubt about it they send it back to the purchase department for the further reference. If it is accepted by them then accounting entries are in the books of account of the company. Normally accounting entries are made on daily basis.

2. Salary section and pay division

The finance department is entrusted to do following activities

- Preparation and disbursement of salary to all workers.
- Maintaining salary for nothing down the changes in the salary
- Keeping a separate account for deduction made in salary such as Insurance premium, advance Income tax etc.
- Making arrangements for salary payment.
- Providing ATM facilities to the employees who required it.

3. Sales and Revenue

The finance department is entitled to calculate and make arrangements for paying sales tax and excise duty to the respective state or central government. Present corporate tax is about 35% of the net profit and it is paid on quarterly basis. They make provisions for the quarterly basis tax by allocating the required Hinds whenever it is needed.

4. Cash and Bank transaction

The finance department has to keep a record of following

- Day to day cash transactions
- Receive and make payments for sales and purchase.

They are allowed to make payments through cash if the purchasing amount is less or equal to Rs.20, 000/- and for those payments which are above Rs.20000/- are made through DD (Demand Demand) or TT (Telegraphic Transfer).

5. Costing

The finance department is entrusted to prepare the cost sheet. Based on the cost sheets, they calculate the cost of producing one ton of Titanium Dioxide pigment. Fixed assets are stated at cost of acquisition net of taxes subsequently recoverable plus additions less accumulated depreciation and impairment loss, if any. Cost includes expenses relating to acquisition and installation of the concerned assets. Depreciation is pointed at rates and methods prescribed in schedule- xiv of the company's act 1956, on straight line method in respect of plant and machinery and railway sidings belonging to Ti02 pigment unit and on written down value method in respect of all other assets of the company.

6. Inventory Valuation

Stock of raw material, fuel, stores and spares are valued at weighted average cost. However, freight in respect of stores and spares is not absorbed towards 1 1 cost and it is not in accordance with AS-2 valuation of inventories (revised) work in progress is valued at cost plus conversion cost as applicable.

Finished goods are valued at cost or net realizable value whichever is lower. Costs for this purpose are arrived at on the basis of FIFO method. Until last year the cost for this purpose was arrived at in MS unit on the basis of LIFO

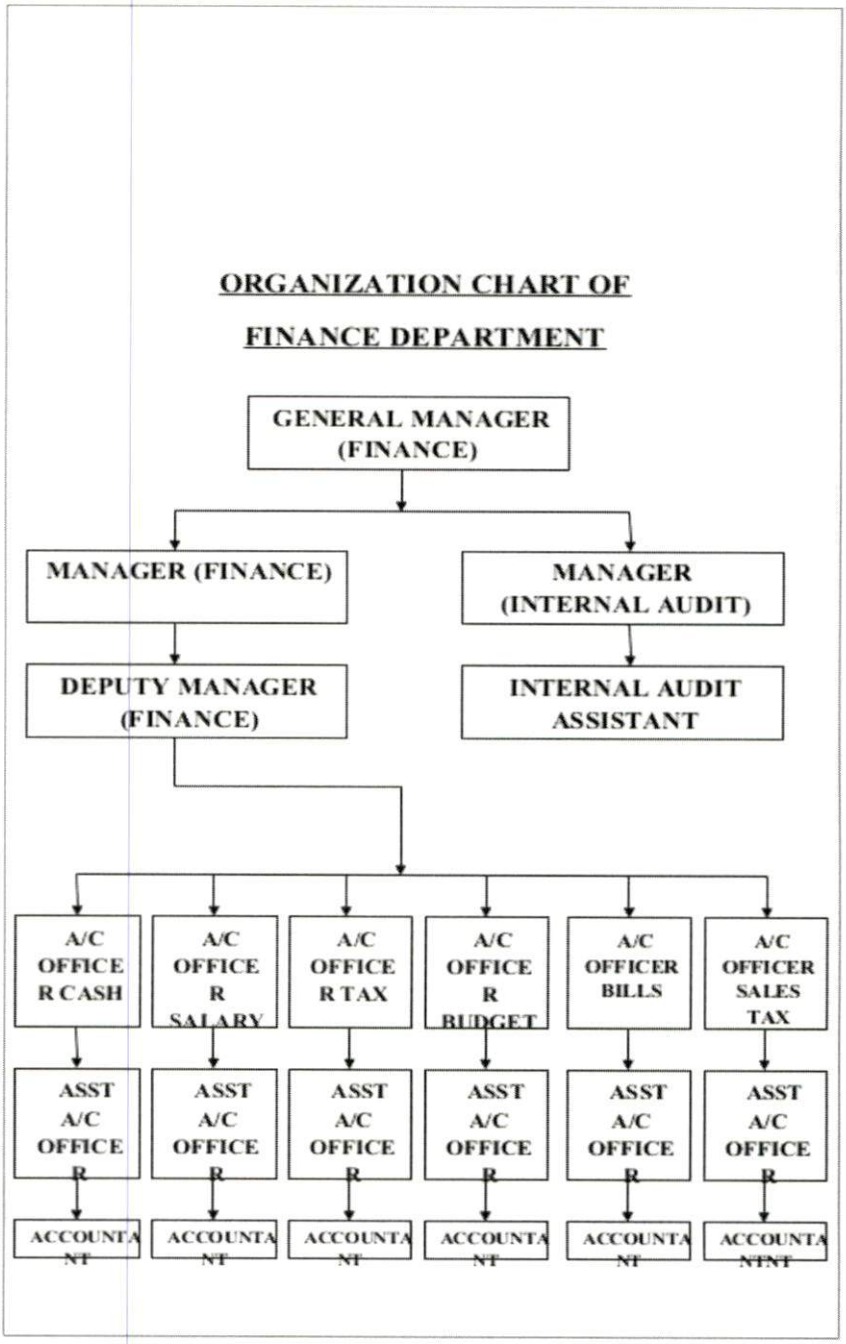
method which was not in accordance with AS-2 valuation of inventories (revised). Finished goods in transmit for export are valued at subsequently realizable price if they are lower than the cost. Excise duty on goods manufactured is accounted for on dispatch of the same. A provision for excise duty on the goods manufactured but not dispatched at the yearend is included in the closing stock.

7. Net Profit or Loss for the Period, Prior Period Items

Income or expenditure are disclosed as prior period and prepaid items only if the value exceeds RS3 lakh in each case considering the scale of operation of the company.

8. Provisions

Provisions are recognized in the account in respect of present probable obligation, the amount of which can be reliably estimated


ORGANIZATION CHART OF
FINANCE DEPARTMENT
GENERAL MANAGER (FINANCE)
MANAGER (FINANCE)
MANAGER (INTERNAL AUDIT)
DEPUTY MANAGER (FINANCE)
INTERNAL AUDIT ASSISTANT
A/C OFFICER CASH
A/C OFFICER SALARY
A/C OFFICER TAX
A/C OFFICER BUDGET
A/C OFFICER BILLS
A/C OFFICER SALES TAX
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4. PERSONNEL AND ADMINISTRATIVE DEPARTMENT

Human resource is one of the most valuable resources as far as a company is concerned. An organisation is a human grouping in which work is done for the accomplishing of some specific goals or mission. The management of man is very important and challenging job, because it is not managing men but of administrating a social system. The proper utilisation of the resource will indicate whether a company is successful or not. But managing this resource is complex one especially in a state like Kerala were unionism is strongly imparted in the minds of the workers. But the story of the KMML lays in the personal and administrative department's ability to properly the human resources. This department plays a prominent role in the day to day affairs of the company.

5. MATERIALS DEPARTMENT

The functions of materials department can be grouped in two;

- Purchase
- Storage

PURCHASE SECTION

The purchase department and store department placed under the name MATERIALS in KMML. Assistant general manager of materials is the departmental head of these two departments. Under him there is a deputy general manager and below him manager (materials).

The broad classification of purchase function;

- Purchase made in India; items brought from Indian market.
- Purchase made in foreign countries; items that are brought from foreign market. Cash purchase, payment of purchase in cash. If purchase order costs less than Rs.20000 the mode of payment will made through cash.

- Local purchase; if the materials required are of emergency type, the concerned department representative along with assistant purchase officer buys them from the near market. Then formalities for approved of purchases done after purchase.

TERMS OF PAYMENT MADE BY THE PURCHASE SECTION

- Direct payment; payment made by cash.
- Payment through banks; most of the purchase made by KMML are done through the associated banks of KMML.
- Advanced payment; the payment made before the purchase.

STORES DEPARTMENT

Stores department plays a prominent in the company many improper store activities lead to huge losses. The store department KMML is one which runs efficiently and effectively, it incorporates many management techniques like inventory control system, ABC classification of items, store reviewing based on moving and non-moving items and store location design. The activities carried out by a typical store department are as follows;

- Receiving materials
- Inspection of material
- Proper classification and codification of material
- Materials handling
- Storage and preservation of material
- Issue and dispatch
- Stock record keeping and stock verification report keeping
- Stock accounting

6. INVENTORY CONTROL SECTION

Proper inventory management is necessary to provide and maintain good customer service. It enables smooth flow of goods through the production process. It is important as it provides protection against the uncertainties of demand and supply and also performing the various production operations economically and independently. Materials purchased for month is analysed an issue price is fixed for the month. The company follows weighted average method.

7. FIRE AND SAFETY SECTION

Fire and safety department, manages the process of giving security to employees by providing training and giving license to employee and mechanist. The structure in their fire and safety department is given below;

8. MAINTENANCE DEPARTMENT

The maintenance department of KMML comprises with the various functioning and the development of the machineries and equipment's and is grouped in to electrical, mechanical and instrumentation section. The joint general manger of maintenance is the top authority of the maintenance department.

The main objectives of the maintenance department are as follows;

- To carry out the maintenance work in the plant.
- To carry out preventive measures to avoid breakdown of machines.

9. PROJECT DEPARTMENT

Project department is engaged in the expansion programs of the company. They are engaged in the building up of new projects and also decide up on the future plans of the company.

Chapter 5

DATA ANALYSIS AND INTERPRETATION

CHAPTER V

EFFICIENCY OF INVENTORY MANAGEMENT AT KMML–An Analysis

5.1Analysis of policies regarding the inventory management in KMML

Data required for analysing the policies regarding the inventory management of KMML were collected through a direct interview from concerned officials. KMML follows certain policies regarding the procurement of raw materials, storage of goods, etc. The following are the details of the policies existing in the KMML related with the inventory management

5.1.1 Procurement policy

They maintain a specific policy regarding the procurement of raw materials. They are following specific criteria for selecting suppliers who are supplying the raw materials to the KMML. At first they will advertise and then they accept the proposal from suppliers and then they will scrutinise among them and selects all the suppliers with their requirements like low cost and high quality. They will not compromise with the quality of the raw materials. They follow one time quality checking process, at the time of procurement of raw materials. They use their own fund for the procurement of raw materials.

5.1.2 Policy regarding purchase procedure and determination of ordering size

They maintain a separate department headed by a purchase manager for purchase of raw materials and consumables. They had a policy regarding the purchase of raw materials. The policy is high quality of raw materials purchased at low cost. They determine the ordering size according to information, collected from stores department.

5.1.3 Storage of raw materials, consumables and finished goods

They have some standard policies regarding the storage of raw materials; semi-finished goods and finished goods and it follows a scientific stock system. Hence, they use a qualified person as store manager for the effective functioning of the store department.

5.2 EFFICIENCY OF INVENTORY MANAGEMENT OF KERALA MINERALS AND METALS LIMITED

Circulation of inventory directly affects profitability of a firm. Other things remaining the same, the faster the circulation, the larger is the profits. Each turnover adds to the volume of profits. A high inventory turnover means that the firm has conducted more business with less amount of inventory. There is no single measure that can be used to test the overall effectiveness with which inventory is being managed. One of the measures of evaluating inventory management is the inventory holding ratio. This ratio indicates the length of time required for conversion of investment in inventories to cash of a firm. Lower the ratio, better is the inventory management and vice-versa. The inventory holding ratio indicates in general whether the firm's inventory relative to sales is too high or too low (measured in days).

In order to judge the velocity with which inventory and its components have circulated in the KMML during the period under study, the inventory turnover ratio, ratio of holding period of aggregate inventory, raw material turnover ratio, holding period of raw materials, work in progress turnover ratio, holding period of work-in progress, the finished goods turnover ratio and holding period of finished goods are calculated.

5.2.1 INVENTORY TURNOVER RATIO

The inventory turnover ratio is an efficiency ratio that shows how effectively inventory is managed by comparing cost of goods sold with average inventory for a period. This measures how many times average inventory is "turned" or sold during a period.

$$Inventory\ turnover\ ratio = \frac{\text{cost of goods sold}}{\text{Average stock}}$$

Or

$$\frac{sales}{\text{inventory}}$$

$$Average\ stock = \frac{\text{Opening stock} + \text{Closing stock}}{2}$$

Table 5.1 Inventory Turnover Ratio

Year	Net sales (in lakh)	Average inventory (in lakh)	Inventory turnover ratio (%)
2011-12	57302.87	11007.39	5.20
2012-13	54763.36	18689.59	2.93
2013-14	65219.73	20790.24	3.13
2014-15	53801.11	20829.55	2.58
2015-16	51506.79	25698.41	2.00
2016-17	72704.13	23798.71	3.05

Source: Annual Report of KMML

The table shows that in 2011-12 the ratio is 5.20 it decreased to 3.05 in the year 2016-17. In this we can understand the ratio declined since 2011-12 to 2016-17.

Decreasing inventory indicates the company is not converting its inventory into cash as quickly before. This occurs the company having increased storage, insurance and maintenance costs.

5.2.2 INVENTORY CONVERSION PERIOD

When the number of days is divided by inventory turnover, we obtain days of inventory holding. It indicates the efficiency in selling the goods in terms of days. The smaller the number of days stocks in hand, the higher the efficiency of inventory management. Too high an inventory holding period is not desirable due to its adverse impact on profitability and liquidity of the firm.

$$Inventory\ conversion\ period = \frac{365}{\text{Inventory Turnover Ratio}}$$

Table 5.2 Holding Period of Aggregate Inventory

Year	No: of days	Inventory turnover ratio	Inventory conversion period	
			KMML	Industry Average
2011-12	365	5.20	70	59
2012-13	365	2.93	125	59
2013-14	365	3.13	117	59
2014-15	365	2.58	141	59
2015-16	365	2.00	183	59
2016-17	365	3.05	120	59

Source: Annual Report of KMML

CMIE financial aggregate and ratios

Note: Average of financial aggregates and ratios from 2001-02 to 2007-08.

When compared with industry average during the year 2001-02 to 2007-08 KMML inventory holding period is greater than industry holding period.

Table 5.3 Holding Period of Aggregate Inventory - A Comparison With Industry Average

Year	Inventory conversion period	Industry Average	Deviations
2011-12	70	59	-11*
2012-13	125	59	-66*
2013-14	117	59	-58*
2014-15	141	59	-82*
2015-16	183	59	-124*
2016-17	120	59	-61*

*negative value indicates unfavorable

Source: Annual report of KMML

CMIE financial aggregate and ratios

Note: Average of financial aggregates and ratios from 2001-02 to 2007-08.

From the table we can understand the comparison between Industry average and holding period of aggregate inventory, the inventory conversion period is higher than industry average so the deviation is negative value. It indicates unfavorable or the company is inefficient.

5.2.3 RAW MATERIAL TURNOVER RATIO

Raw material turnover ratio is velocity at which raw material converted into goods ready for sale. It raw material turnover ratio is high then company is efficient in converting into finished good.

$$Raw\ material\ turnover\ ratio = \frac{\text{Cost of raw material } consumed}{\text{Average stock of raw material}}$$

Table 5.4 Raw Material Turnover Ratio

Year	Raw material consumed (in lakhs)	Average Raw material	Material Turnover ratio
2011-12	9948.05	1226.50	8.11
2012-13	9767.12	1511.19	6.46
2013-14	9443.75	2073.96	4.55
2014-15	9244.25	3726.97	2.48
2015-16	11743.28	5058.29	2.32
2016-17	10373.12	4104.44	2.52

Source: Annual Report of KMML

Over the period of study the raw material turnover ratio showed a decreasing trend. In 2011-12 the ratio is 8.11 it decreased to 2.52 in the year 2016-17. High turnover ratio indicates fast moving stock and the low turnover ratio indicates slow moving stock.

5.2.4 RAW MATERIAL HOLDING PERIOD

It helps to find out how many days inventory is held in store before processing. Lesser the number of days, better the efficiency.

$$Days\ of\ raw\ material\ holding = \frac{365}{\text{Raw material Turnover Ratio}}$$

Table 5.5 Raw Material Holding Period

Year	Total Days	Material Turnover ratio	Raw Material Holding Period	Industry Average
2011-12	365	8.11	45	55
2012-13	365	6.46	57	55
2013-14	365	4.55	80	55
2014-15	365	2.48	147	55
2015-16	365	2.32	157	55
2016-17	365	2.52	145	55

Source: Annual Report of KMML

CMIE financial aggregate and ratios

Note: Average of financial aggregates and ratios from 2001-02 to 2007-08.

From the table it is understand that from 2011-12 raw material holding period is favourable when compared with industry average. But in the year 2012-13 to 2016-17 holding period of raw material is higher than industry average.

Table 5.6 Holding Period of Raw materials - A Comparison With Industry Average

Year	Raw Material Holding Period	Industry Average	Deviations
2011-12	45	55	10
2012-13	57	55	-2*
2013-14	80	55	-25*
2014-15	147	55	-92*
2015-16	157	55	-102*
2016-17	145	55	-90*

*negative value indicates unfavorable

Source: Annual report of KMML

CMIE financial aggregate and ratios

Note: Average of financial aggregates and ratios from 2001-02 to 2007-08.

From the table it is understand the comparison between Industry average and holding period of Raw materials the deviation is negative value, it indicates unfavorable and the positive value indicates favorable. In 2011-12 raw material holding period is favorable compared with industry average it indicate the company is efficient in the year. But in the year 2012-13 to 2016-17 holding period of raw material is higher than industry average it indicate the company is inefficient.

5.2.5 WORK IN PROGRESS TURNOVER RATIO

Work in progress turnover ratio is concerned with the cost of goods produced and average work in process inventory. If WIP inventory ratio is high then company is efficiency converting into finished goods.

$$Work\ In\ Progress\ Turnover\ Ratio = \frac{Cost\ of\ goods\ produced}{\text{Average Work In Progress}}$$

Table 5.7 Work In Progress Turnover Ratio

Year	Cost of goods produced (in lakhs)	Average W.I.P	W.I.P Turnover Ratio(Times)
2011-12	57302.87	743.96	77.02
2012-13	54763.36	1114.54	49.13
2013-14	65219.73	1013.36	64.35
2014-15	53801.11	850.8	63.23
2015-16	51506.79	567.48	90.76
2016-17	65391.71	174.50	374.73

Source: Annual Report of KMML

Work in progress indicates the stock withdrawn from warehouse and are yet to get converted into finished stock. The higher the ratio the higher will be the management efficiency. In 2011-12 the ratio is approximately 77.02 it increased to 374.73 in the year 2016-17. If the ratio is high it can be easily converted into finished goods and also it shows the high management efficiency.

5.2.6 WORK IN PROGRESS CONVERSION PERIOD

Work in progress conversion period is the period taken to convert raw materials into finished products.

$$Work\ In\ Progress\ Conversion\ Period = \frac{365}{\text{Work In Progress Turnover Ratio}}$$

Table 5.8 Work In Progress Conversion Period

Year	No. of Days	WIP turnover ratio	WIP conversion period (in days)	Industry Average
2011-12	365	77.02	5	15
2012-13	365	49.13	7	15
2013-14	365	64.35	6	15
2014-15	365	63.23	6	15
2015-16	365	90.76	4	15
2016-17	365	374.73	1	15

Source: Annual Report of KMML

CMIE financial aggregate and ratios

Note: Average of financial aggregates and ratios from 2001-02 to 2007-08.

From the table it is understand 2011-12 to 2016-17 holding period of work in progress is less than industry average.

Table 5.9 Holding Period of Work in progress - A Comparison With Industry Average

Year	Work in progress Holding Period	Industry Average	Deviations
2011-12	5	15	10
2012-13	7	15	8
2013-14	6	15	9
2014-15	6	15	9
2015-16	4	15	11
2016-17	1	15	14

Source: Annual report of KMML

CMIE financial aggregate and ratios

Note: Average of financial aggregates and ratios from 2001-02 to 2007-08.

From the table it is understand the comparison between Industry average and holding period of Work in progress. The deviation is positive value, it indicates favorable. In 2011-12 to 2016-17 work in progress holding period is favorable compared with industry average it indicates the company is efficient.

5.2.7 FINISHED GOOD TURNOVER RATIO

Finished goods turnover ratio is concerned with the cost of goods sold and average finished goods inventory. It is the velocity at which finished goods are converted into for sale. If finished goods turnover ratio is high then company is efficient.

$$Finished\ goods\ Turnover\ Ratio = \frac{Cost\ of\ goods\ sold}{\text{Average Finished goods inventory}}$$

Table 5.10 Finished Goods Turnover Ratio

Year	Cost of goods sold (in lakhs)	Average finished goods inventory	Finished goods turnover ratio (times)
2011-12	57302.87	12613.91	5
2012-13	54763.36	12594.93	4
2013-14	65219.73	8836.24	7
2014-15	53801.11	10437.84	5
2015-16	51506.79	9660.86	5
2016-17	65391.71	4064.04	16

Source: Annual Report of KMML

The higher the ratio the more will be sales and vice versa. From the table we come to know that finished goods turnover ratio is increased from 2011-12 to 2016-17. If finished goods turnover ratio is high it can easily converted into sales and also it shows the company is efficient.

5.2.8 FINISHED GOODS CONVERSION PERIOD

$$Finished\ goods\ Conversion\ Period = \frac{365}{\text{Finished goods Turnover Ratio}}$$

Table 5.11 Finished Goods Conversion Period

Year	No. of Days	Finished goods turnover ratio	Finished goods conversion period (in days)	Industry Average
2011-12	365	5	73	30
2012-13	365	4	91	30
2013-14	365	7	52	30
2014-15	365	5	73	30
2015-16	365	5	73	30
2016-17	365	16	23	30

Source: Annual Report of KMML

CMIE financial aggregate and ratios

Note: Average of financial aggregates and ratios from 2001-02 to 2007-08.

From the table it is understand 2011-12 to 2015-16 holding period of finished goods is greater than industry average.

Table 5.12 Holding Period of Finished Goods - A Comparison With Industry Average

Year	Finished goods holding period	Industry Average	Deviations
2011-12	73	30	-43*
2012-13	91	30	-61*
2013-14	52	30	-22*
2014-15	73	30	-43*
2015-16	73	30	-43*
2016-17	23	30	7

Source: Annual report of KMML

CMIE financial aggregate and ratios

Note: Average of financial aggregates and ratios from 2001-02 to 2007-08.

From the table it is understand the comparison between Industry average and holding period of finished goods the deviation is negative value, it indicates un favorable and the positive value indicates favorable. In 2011-12 to 2015-16 finished goods holding period is unfavorable compared with industry average it shows the company is inefficient. But in the year 2016-17 holding period of finished goods is higher than industry average it shows the company is efficient.

5.2.9 OPERATING CYCLE

Operating cycle is the number of days a company takes in realizing its inventories to cash. I t is called operating cycle because this process of producing/purchasing inventories, selling them recovering cash from customers, using that cash to purchase/produce inventories and so on is repeated as long as the company is in operations. Operating cycle is a measure of the operating efficiency and working capital management of a company. A short operating cycle is good as it implies that the company's cash is tied up for a shorter period.

Operating cycle = Raw material holding period + WIP conversion period + Finished goods storage period.

Table 5.13 Operating Cycle **(In days)**

year	Raw material holding period	WIP conversion Period	Finished goods storage period	Operating Cycle (in days)
2011-12	45	5	73	123
2012-13	57	7	91	155
2013-14	80	6	52	138
2014-15	147	6	73	226
2015-16	157	4	73	234
2016-17	145	1	23	169

Source: Annual report of KMML

From the table it is understand that the days required to convert the raw material to finished goods is slightly increasing. Increasing the number of operating cycle implies that the company's cash is tied up for a longer period.

5.2.10 SIZE AND GROWTH OF INVENTORY AND SALES

Table 5.14 Size and Growth of Inventory and Sales

Year	Inventory	% increase/ decrease	Sales	% increase/ decrease
2011-12	15204.34	-	57302.87	-
2012-13	22174.84	45.84	54763.36	(4.43)
2013-14	19405.65	27.63	65219.73	13.81
2014-15	22253.46	46.36	53801.11	(6.11)
2015-16	29143.37	91.67	51506.79	(10.11)
2016-17	18454.06	21.37	72704.13	(26.87)

Source: Annual report of KMML

Table reveals that the growth of inventory is considerably less than the growth of sales. In the study period sales sometimes shows a decreasing trend but throughout the study period inventory growth rate shows a considerably increasing trend compared with the year 2011-12. The production must be adjust to demand/ sales.

5.2.11 COMPOSITION OF INVENTORY

The major components of inventory in the KMML are raw materials, work in progress, finished goods and stores and spares,

The structure of inventory and the percentage share of each component appear in the table.

Table 5.15 Composition of Inventory

Year	Raw material	Work-in-progress	Finished goods	Stores & spares	Total
2011-12	1337.52	179.60	7558.80	6128.42	15204.34
	(8.79)	(1.19)	(49.72)	(40.30)	(100)
2012-13	1684.87	955.36	11865.76	7668.85	22174.84
	(7.59)	(4.30)	(53.52)	(34.59)	(100)
2013-14	2463.06	746.24	9112.72	7083.63	19405.65
	(12.69)	(3.85)	(46.96)	(36.50)	(100)
2014-15	4990.88	1280.48	8753.13	7228.97	22253.46
	(22.42)	(5.76)	(39.34)	(32.48)	(100)
2015-16	5125.70	948.61	16630.09	6438.97	29143.37
	(17.58)	(3.26)	(57.07)	(22.09)	(100)
2016-17	3083.10	539.32	8597.74	6233.9	18454.06
	(16.70)	(2.93)	(46.59)	(33.78)	(100)

Source: Annual report of KMML

Note: Percentage to total in brackets

It may be noted that there are wide variations among the company regarding the composition of inventory. No definite trend is visible in the pattern of composition of inventory. In total inventory the raw material and work in progress is very less. The stores and spares constituted a major component.

5.3 LIQUIDITY AND PROFITABILITY IMPLICATIONS

After having examined the size, composition, circulation, and the growth of inventory, it is more appropriate to look into the liquidity and profitability implications of inventory management in KMML.

5.3.1 CURRENT RATIO

The current ratio, a very popular financial ratio, measures the ability of the firm to meet its current obligations. As a measure of short-term financial liquidity, it indicates the rupees of current assets available for each rupee of current liability. The higher the ratio, the larger will be the amount of rupees available per rupee of current liability, the more the firm's ability to meet current obligations and the greater the safety of funds of short-term creditors. Thus, this ratio is a measure of safety to creditors. A current ratio of 2:1 has been considered generally satisfactory.

Table 5.16 Current Ratio

Year	Current Asset	Current Liability	Current Ratio	Industry Average*	Deviations
2011-12	36270.02	26404.87	1.37	1.25	0.12
2012-13	40595.05	15863.62	2.55	1.25	1.3
2013-14	41429.26	16881.01	2.45	1.25	1.2
2014-15	37706.95	14636.62	2.57	1.25	1.32
2015-16	44346.64	19791.30	2.24	1.25	0.99
2016-17	37421.25	12324.25	3.03	1.25	1.78

Source: Annual report of KMML

CMIE financial aggregate and ratios

Note: Average of financial aggregates and ratios from 2001-02 to 2007-08

Current ratio shows an increasing trend. The maximum ratio in KMML is recorded at 3.03 in the year 2016-17 and the minimum at 1.37 in the year 2011-12. In all the period current ratio of KMML is more than the industry average. So that the company is well-positioned to cover its current or short term liability.

5.3.2 ACID-TEST RATIO/QUICK RATIO

Acid-test ratio may be defined as the relationship between quick assets (or liquid assets) and current liabilities. An asset is said to be quick if it can be converted into cash within a short period without loss of value. In that case, cash in hand, cash at bank, marketable securities, bills of exchange, short-term investments, and sundry debtors can be included in this category. Acid-test ratio can be calculated by dividing the total of quick assets by total of current liabilities. Quick ratio comprises of two components, viz. quick assets and current liabilities minus bank overdraft. Usually, a high quick ratio is an indication that the concern is liquid. The concern has the ability to meet its current liabilities in time. Contrary is in case of low quick ratio. As a conversion, a quick ratio is very much suitable for measuring the liquidity position. The conventional ratio of 1:1 is considered satisfactory. It is the more rigorous test of liquidity. The quick ratio is very useful in measuring the liquidity position of a concern. Quick ratio measures the concern's capability to pay off current obligations immediately.

Table 5.17 Quick Ratio

Year	Quick Assets	Current Liability	Quick Ratio	Industry Average*	Deviations
2011-12	21065.68	26404.87	0.79	0.67	0.12
2012-13	18420.21	15863.62	1.16	0.67	0.49
2013-14	22023.61	16881.01	1.30	0.67	0.63
2014-15	15453.49	14636.62	1.05	0.67	0.38
2015-16	15203.27	19791.30	0.76	0.67	0.09
2016-17	18967.19	12324.25	1.53	0.67	0.86

Source: Annual report of KMML

Financial aggregates and ratios

Note: Average of financial aggregates and ratios from 2001-02 to 2007-08

The maximum quick ratio in KMML is recorded at 1.53 in the year 2016-17 and the minimum at 0.76 in the year 2015-16. In all the period quick ratio of KMML is more than the industry average. KMML has the ability to meet its current liability during the study period.

5.3.3 INVENTORY TO CURRENT LIABILITY

This ratio yields an indication of the extent to which a company relies on funds from disposal of unsold inventories to meet its debt. The ratio calculated by dividing current liabilities by inventory

$$Inventory\ to\ current\ liability = \frac{Current\ liability}{\text{Inventory}}$$

Or

$$Inventory\ to\ current\ liability\ = \text{Current ratio} - \text{Quick rati}$$

Table 5.18 Inventory to Current Liability

Year	Current Ratio	Quick Ratio	Current Liability	Industry Average*	Deviations
2011-12	1.37	0.79	0.58	0.58	0
2012-13	2.55	1.16	1.39	0.58	0.81
2013-14	2.45	1.30	1.15	0.58	0.57
2014-15	2.57	1.05	1.52	0.58	0.94
2015-16	2.24	0.76	1.48	0.58	0.9
2016-17	3.03	1.53	1.50	0.58	0.92

Source: Annual Report of KMML

Financial aggregates and ratios

Note: Average of financial aggregates and ratios from 2001-02 to 2007-08

In this table noted that the whole current ratio and quick ratio shows an increasing trend compared with 2011-12. So that the current liability is also an increasing trend. It shows a positive relationship. . In all the period current liability of KMML is more than the industry average.

5.3.4 RETURN ON INVESTMENT

The return on investment generally indicates the percentage of return on the total capital employed in the business. It is calculated as a percentage of net profit before interest and tax on the total assets of the company. It is a prime ratio and is the prime test for the overall efficiency of the business. It evaluates the performance of various departments. The owners (i.e. shareholders) are interested in knowing the profitability of the business in relation to amounts invested in it. A higher percentage of return on investment will satisfy the owners that their money is profitably used.

Table 5.19 Return on Investment of KMML

Year	Net profit (in lakhs)	Total Assets	ROI	Industry Average*
2011-12	11545.00	86480.22	13.34	27
2012-13	3588.63	80419.68	4.46	27
2013-14	1410.99	82069.04	1.71	27
2014-15	2489.62	77560.80	3.20	27
2015-16	1371.84	83024.53	1.65	27
2016-17	1134.94	81551.06	1.39	27

Source: Annual report of KMML

Financial aggregates and ratios

Note: Average of financial aggregates and ratios from 2001-02 to 2007-08

Compared with industry average, KMML Return on investment is not satisfactory because the cost is increased.

5.3.5 NET PROFIT MARGIN

The ratio of the net profit margin tells the relative efficiency of the firm after taking into account all expenses and income tax, but not extra-ordinary charges. This ratio reveals the profit of the firm relative to the sales.

Table 5.20 Net Profit Margin

Year	Net profit (in lakhs)	Net sales (in lakhs)	Net profit Ratio	Industry Average*
2011-12	11545.00	57302.87	20.14	14.30
2012-13	3588.63	54763.36	6.55	14.30
2013-14	1410.99	65219.73	2.16	14.30
2014-15	(2489.62)	53801.11	4.62	14.30
2015-16	(1371.84)	51506.79	2.66	14.30
2016-17	1134.94	72704.13	1.56	14.30

Source: Annual report of KMML

Financial aggregates and ratios

Note: Average of financial aggregates and ratios from 2001-02 to 2007-08

The company shows the maximum net profit to sales ratio of 20.14 percent in the year 2011-12 and the minimum rate of 0.34 percent is noted in the year 2015-16.

5.3.6 INVENTORY TO CURRENT ASSET RATIO

This ratio indicates the relationship between the inventory and current assets. It shows the percentage of inventory to current assets, which helps the organizations in deciding the current assets policy which also affect the liquidly position of the organization.

$$Inventory\ to\ Current\ Asset\ Ratio = \frac{\text{Inventory}}{\text{Current Asset}}$$

Table 5.21 Inventory to Current Asset

Year	Inventory	Current Asset	Percentage
2011-12	15204.34	36270.02	41.91
2012-13	22174.84	40595.05	54.62
2013-14	19405.65	41429.26	46.84
2014-15	22253.46	37706.95	36.67
2015-16	29143.37	44346.64	65.71
2016-17	18454.06	37421.25	49.31

Source: Annual Report of KMML

In this table noted that the whole inventory and current asset shows an increasing trend compared with 2011-12. So that the percentage is also an increasing trend. It shows a positive relationship.

5.3.7 INVENTORY TO TOTAL ASSETS

This ratio indicates the relationship between the inventory and total assets. The significance of this ratio is it reflects the position the inventory as a percentage of the total assets.

$$Inventory\ to\ Total\ Asset = \frac{\text{Inventory}}{\text{Total Asset}}$$

Table 5.22 Inventory to Total Assets

Year	Inventory	Total Asset	Percentage
2011-12	1520434	86480.22	17.58
2012-13	22174.84	80419.68	27.57
2013-14	19405.65	82069.04	23.64
2014-15	22253.46	77560.80	28.69
2015-16	29143.37	83024.53	35.10
2016-17	18454.06	81551.06	22.62

Source: Annual Report of KMML

In this table noted that the whole inventory shows an increasing trend and the total asset shows a decreasing trend compared with 2011-12 but the percentage shows an increasing trend.

Chapter 6

SUMMARY OF FINDINGS, SUGGESTIONS AND CONCLUSION

CHAPTER VI

SUMMARY OF FINDINGS, SUGGESTIONS AND CONCLUSION

The study entitled 'A Study on Inventory Management at Kerala Minerals and Metals Ltd. was undertaken with the objective to study the efficiency of inventory management followed by the institution. Both primary and secondary data were used for the study. Primary information regarding the inventory management policies of the KMML were collected from the concerned officials. Secondary data regarding the financial parameters were collected from the annual reports of KMML from 2011-12 to 2016-17. A Study on Inventory Management at Kerala Minerals and Metals Ltd. was examined with the help of different statistical tools like ratio and percentage analysis.

6.1 Findings of the Study

The major findings of the study are summarised below:

1. They maintain a specific policy regarding the procurement of raw materials. They are following specific criteria for selecting suppliers who are supplying the raw materials to the KMML. They will not compromise with the quality of the raw materials. They follow one time quality checking process, at the time of procurement of raw materials. They use their own fund for the procurement of raw materials.
2. They maintain a separate department headed by a purchase manager for purchase of raw materials and consumables. They had a policy regarding the purchase of raw materials. The policy is high quality of raw materials purchased at low cost. They determine the ordering size according to information, collected from stores department.

3. They have some standard policies regarding the storage of raw materials; semi-finished goods and finished goods and it follows a scientific stock system. Hence, they use a qualified person as store manager for the effective functioning of the sore department.

EFFICIENCY OF INVENTORY MANAGEMENT OF KERALA MINERALS AND METALS LTD

1. In 2011-12 the ratio is 5.20 it decreased to 3.05 in the year 2016-17. In this we can understand the ratio declined since 2011-12 to 2016-17. Decreasing inventory indicates the company is not converting its inventory into cash as quickly before. This occurs the company having increased storage, insurance and maintenance costs.
2. Compared with industry average during the year 2001-02 to 2007-08 KMML inventory holding period is greater than industry holding period.
3. The comparison between Industry average and holding period of aggregate inventory, the inventory conversion period is higher than industry average so the deviation is negative value. It indicates unfavorable or the company is inefficient.
4. Over the period of study the raw material turnover ratio showed a decreasing trend. In 2011-12 the ratio is 8.11 it decreased to 2.52 in the year 2016-17. High turnover ratio indicates fast moving stock and the low turnover ratio indicates slow moving stock.
5. From 2011-12 raw material holding period is favourable when compared with industry average. But in the year 2012-13 to 2016-17 holding period of raw material is higher than industry average.
6. Comparison between Industry average and holding period of Raw materials the deviation is negative value, it indicates unfavorable and the positive value indicates favourable. In 2011-12 raw material

holding period is favourable compared with industry average it indicate the company is efficient in the year. But in the year 2012-13 to 2016-17 holding period of raw material is higher than industry average it indicate the company is inefficient.

7. Work in progress indicates the stock withdrawn from warehouse and are yet to get converted into finished stock. The higher the ratio the higher will be the management efficiency. In 2011-12 the ratio is approximately 77.02 it increased to 374.73 in the year 2016-17. If the ratio is high it can be easily converted into finished goods and also it shows the high management efficiency.
8. From 2011-12 to 2016-17 holding period of work in progress is less than industry average.
9. Comparison between Industry average and holding period of Work in progress, the deviation is positive value, it indicates favourable. In 2011-12 to 2016-17 work in progress holding period is favourable compared with industry average it indicates the company is efficient.
10. The higher the ratio the more will be sales and vice versa. From the table we come to know that finished goods turnover ratio is increased from 2011-12 to 2016-17. If finished goods turnover ratio is high it can easily converted into sales and also it shows the company is efficient.
11. From 2011-12 to 2015-16 holding period of finished goods is greater than industry average.
12. Comparison between Industry average and holding period of finished goods the deviation is negative value, it indicates unfavorable and the positive value indicates favourable. In 2011-12 to 2015-16 finished goods holding period is unfavorable compared with industry average it shows the company is inefficient. But in the year 2016-17 holding period of finished goods is higher than industry average it shows the company is efficient.

13. The days required to convert the raw material to finished goods is slightly increasing. Increasing the number of operating cycle implies that the company's cash is tied up for a longer period.
14. The growth of inventory is considerably less than the growth of sales. In the study period sales sometimes shows a decreasing trend but throughout the study period inventory growth rate shows a considerably increasing trend compared with the year 2011-12. The production must be adjust to demand/ sales.
15. There are wide variations among the company regarding the composition of inventory. No definite trend is visible in the pattern of composition of inventory. In total inventory the raw material and work in progress is very less. The stores and spares constituted a major component.

LIQUIDITY AND PROFITABILITY IMPLICATIONS

1. Current ratio shows an increasing trend. The maximum ratio in KMML is recorded at 3.03 in the year 2016-17 and the minimum at 1.37 in the year 2011-12. In all the period current ratio of KMML is more than the industry average. So that the company is well-positioned to cover its current or short term liability.
2. The maximum quick ratio in KMML is recorded at 1.53 in the year 2016-17 and the minimum at 0.76 in the year 2015-16. In all the period quick ratio of KMML is more than the industry average. KMML has the ability to meet its current liability during the study period.
3. The whole current ratio and quick ratio shows an increasing trend compared with 2011-12. So that the current liability is also an increasing trend. It shows a positive relationship. . In all the period current liability of KMML is more than the industry average.
4. Compared with industry average, KMML Return on investment is not satisfactory because the cost is increased.
5. The company shows the maximum net profit to sales ratio of 20.14 percent in the year 2011-12 and the minimum rate of 0.34 percent is noted in the year 2015-16.
6. The whole inventory and current asset shows an increasing trend compared with 2011-12. So that the percentage is also an increasing trend. It shows a positive relationship.
7. The whole inventory shows an increasing trend and the total asset shows a decreasing trend compared with 2011-12 but the percentage shows an increasing trend.

6.2 Suggestions

1. For eliminating the excess inventory in the company, they should implement some policies regarding the marketing of products for the promotion of products.
2. Integrated inventory management system and all its element should be strictly practiced and to be applied in the company

6.3 Conclusion

The study on inventory management in KMML reveals that, they follow policies regarding the procurement, purchase procedure, storage of raw materials, consumables and finished goods etc. But there is excess inventory and delay in the conversion period of inventory. The reason for this is that KMML was improper in implementing the policies regarding the inventory management and they don't give adequate promotion for their products.

In order to solve these issues, strict implementation of policies should be ensured. An efficient management of the inventory plays a vital role in success of any organization. Therefore, the objective of inventory management by KMML should maintain optimum level of inventory, so that the company can reduce the cost of production.

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