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**IMPACT OF PROCUREMENT OF STANDARISED CHEMICAL PACKAGES  
BY SHASUN RESEARCH CENTRE, CHENNAI**

A PROJECT REPORT

Submitted by

**ASHOK K**

**Reg. No. 0820400004**

In partial fulfilment of the requirements  
for the award of the degree

Of

**MASTER OF BUSINESS ADMINISTRATION**

**KCT Business School**

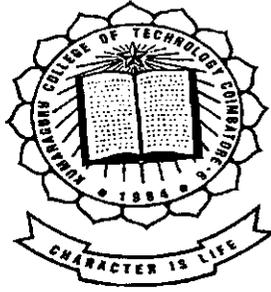
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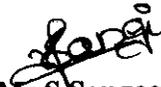
**August 2009**



**DEPARTMENT OF MANAGEMENT STUDIES  
KUMARA GURU COLLEGE OF TECHNOLOGY (AUTONOMOUS)  
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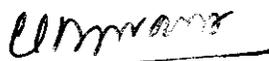
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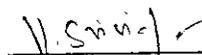
Certified that this project titled “**IMPACT OF PROCUREMENT OF STANDARIZED CHEMICAL PACKAGES BY SHASUN RESEARCH CENTER, CHENNAI**” is the bonafide work of Mr. **K.ASHOK** who carried out this project under my supervision. Certified further, that to the best of my knowledge the work reported herein does not form part of any other project report or dissertation on the basis of which a degree or award was conferred on an earlier occasion on this or any other candidate.

  
**Ms.S.Sangeetha**  
**Faculty Guide**

  
**Prof.Dr.S.V.Devanathan**  
**Director**

Evaluated and viva-voce conducted on .....11-09-2009.....

  
**Examiner I**

  
**Examiner II**



4<sup>th</sup> July, 2009

**TO WHOMSOEVER IT MAY CONCERN**

This is to certify that Mr. K. Ashok from KCT Business School of MBA – I year has successfully completed his Summer Project Internship Training from 18<sup>th</sup> of June 2009 to 14<sup>th</sup> of July 2009 in our Finance & Accounts Department of Shasun Research Centre, No.27 Vandalur Kelambakkam Road, Keelakottaiyur Village, Melakottaiyur Post, Chennai 600 048.

We wish him all the best towards his academic and professional career.

For Shasun Chemicals and Drugs Limited

**RB Selvakumar**  
**Head - Human Resources.**

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I thank the GOD, Almighty for his blessings bestowed upon me, which gave strength, confidence and health for completing this project.

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I thank **Mr. Pradeep Balakumar** Assistant Manager HR Department SHASUN RESEARCH CENTRE for giving permission to carry out the project.

## **DECLARATION**

I hereby declare that the dissertation entitled “**IMPACT OF PROCUREMENT OF STANDARIZED CHEMICAL PACKAGES BY SHASUN RESEARCH CENTER, CHENNAI**” submitted in partial fulfillment of the requirement for the award of the degree of **MASTER OF BUSINESS ADMINISTRATION** degree is my original work and the dissertation has not formed the basis for the reward of any degree, associate ship, fellowship or any other similar titles.

  
**K.ASHOK**

## **EXECUTIVE SUMMARY**

Inventory control is a critical aspect of a successful inventory management. Inventory management requires continuous decision making. Corporate managers can increase the profitability of making good inventory management decisions by using fundamental inventory management strategies.

In this study the impact of the standard chemical packages procured by Shasun research centre is studied, and the way for reducing the loss is found out. Impact of excess chemicals on the environment is also studied and the proper suggestion is given.

The study is taken through based on the existing data available in the company financial statements, store ledger and inventory records. The study reveals that there is a locking of raw materials in huge quantity, and they are incurring loss on it.

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# **CHAPTER 1**

## **INTRODUCTION**

# **CHAPTER-1**

## **ABOUT THE STUDY**

### **INVENTORY MANAGEMENT:**

Inventories are unconsumed or unsold goods purchased or manufactured. According to the accounting standard: 2(revised), inventories are assets:

- Held for sale in the ordinary course of business
- In the process of production for such sale or
- In the form of materials or supplies to be consumed in the production process or in the rendering of services.

### **IMPORTANCE OF INVENTORY MANAGEMENT**

Holding inventory is often interpreted as carrying an asset but also means carrying risk in terms of obsolescence, deterioration and quality faults. In financial terms inventory impacts the balance sheet, cash flow and profit and loss accounts. In short, good inventory management is essential to achieving business objectives and building competitive advantage. Yet the Traditional techniques most often used to manage inventory do not always provide optimal solutions. Inventory control refers to the events or activities that affect inventory during the process of transforming input resources and materials to output goods. Different stock items are however controlled in different ways, for example in an assembly operation nuts and bolts are not treated in the same way as high value, long lead time parts.

Control is a necessary step on the road to optimizing inventory and requires that relevant business processes are in place to enable materials to be tracked through the system and accurate data records maintained. In this way the quantity and location of physical stock are tied to system data records. Poor inventory control, often due to manual intervention, leads to self-perpetuating errors.

### **THE REASONS FOR KEEPING STOCK:**

There are three basic reasons for keeping an inventory:

- Time - The time lags present in the supply chain, from supplier to user at every stage, requires that you maintain certain amount of inventory to use in this "lead time"
- Uncertainty - Inventories are maintained as buffers to meet uncertainties in demand, supply and movements of goods.
- Economies of scale - Ideal condition of "one unit at a time at a place where user needs it, when he needs it" principle tends to incur lots of costs in terms of logistics. So bulk buying, movement and storing brings in economies of scale, thus inventory.

## **SPECIAL TERMS USED IN DEALING WITH INVENTORY:**

- Stock Keeping Unit (SKU) is a unique combination of all the components that are assembled into the purchasable item. Therefore any change in the packaging or product is a new SKU. This level of detailed specification assists in managing inventory.
- Stock out means running out of the inventory of an SKU.
- "New old stock" ( NOS) is a term used in business to refer to merchandise being offered for sale which was manufactured long ago but that has never been used. Such merchandise may not be produced any more, and the new old stock may represent the only market source of a particular item at the present time.
- Buffer stock is held in individual workstations against the possibility that the upstream workstation may be a little delayed in long setup or change-over time. This stock is then used while that change-over is happening.

## **CLASSIFICATION OF INVENTORY:**

### **1. Raw Materials:**

These are the materials that which are essential and which are in raw state awaiting conversion process to become finished goods.

## 2. In-Process Inventories:

The materials that which are in the process of becoming the final product are called as in-process inventory.the materials at various stages of production are called as in-process inventory.

## 3. Finished Inventories:

These are the final products that have been manufactured. These product may be stocked up in the stockyard that which are awaiting dispatch.

## **RISK AND COST OF HOLDING INVENTORIES:**

The holding of inventories involves blocking of a firms funds and incurrence of capital and other costs. It also exposes the firm to certain risks. The various costs and risks involved in holding inventories are as below;

### 1. Capital Cost:

Maintaining of inventories results in blocking of the firms financial resources.the firm has, therefore, to arrange for additional funds to meet the cost of inventories. The funds may be arranged from own resources or from outsiders. But in both cases, the firm incurs a cost. In the former case, there is an opportunity cost of investment while in the later case the firm has to pay interest to the outsiders.

## 2. Storage And Handling Cost:

Holding of inventories also involves costs on storage as well as handling of materials. The storage costs include the rental of the godown, insurance charges, etc.

## 3. Risk of Price Decline:

There is always a risk of reduction in the process of inventories by the suppliers in holding inventories. This may be due to increased market supplies, competition or general depression in the market.

## 4. Risk Of Obsolescence:

The inventories may become obsolete due to improved technology, changes in requirements, change in customer's tastes, etc.

## 5. Risk Deterioration In Quality:

The quality of the materials may also deteriorate while the inventories are kept in stores.

## **BENEFITS OF INVENTORY MANAGEMENT:**

- It ensures proper and efficient utilization of raw materials, so storage of materials doesn't arise.

- Helps to maintain the quality of finished goods as the raw materials are procured on time, which reduces the damage caused to storage.
- Helps in preventing the build-up of the inventories and thus reducing the investment in inventories.
- It aims at efficient and optimum use of physical and financial resources of the enterprise.
- It helps the smooth working of production process by minimizing all bottlenecks.
- Efficient management helps to improve production and sales.

#### **FUNCTIONS OF INVENTORY MANAGEMENT:**

- This separates different operations from one another and makes the independent, so that each operation can be performed economically.
- To maintain smooth and efficient production flow.
- Helps to nullify the effects of change in price or supply by purchasing the desired quantities at the right time.
- The operation is kept operation continuously with the required supply of materials for the operation at the right time.
- To ensure continuous supply of materials of spares and finished goods so that production should not suffer at any time and the customers demand should also be met.
- To avoid both over-stocking and under-stocking of inventory.
- To maintain investments in inventories at the optimum level as required by the operational and sales activities.
- To keep material cost under control so that they contribute in reducing cost of production and overall costs.

- To eliminate duplication in ordering or replenishing stocks. This is possible with the help of centralising purchase.
- To minimise losses through deterioration, pilferage, wastages, and damages.
- To design proper organisation for inventory control so that materials shown in stock ledgers should be actually lying in the stores.
- 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.
- To facilitate furnishing of data for short term and long term planning and control of inventory.
- To ensure perpetual inventory control so that materials shown in stock ledgers should be actually lying in the stores.

## REVIEW OF LITERATURE

**Retsef Levi, Robin O. Roundy, David B. Shmoys<sup>1</sup>** consider two fundamental inventory models, the single-period newsvendor problem and its multiperiod extension, but under the assumption that the explicit demand distributions are not known and that the only information available is a set of independent samples drawn from the true distributions. Under the assumption that the demand distributions are given explicitly, these models are well studied and relatively straightforward to solve. However, in most real-life scenarios, the true demand distributions are not available, or they are too complex to work with. Thus, a sampling-driven algorithmic framework is very attractive, both in practice and in theory.

The researchers shall describe how to compute sampling-based policies, that is, policies that are computed based only on observed samples of the demands without any access to, or assumptions on, the true demand distributions. Moreover, researchers establish bounds on the number of samples required to guarantee that, with high probability, the expected cost of the sampling-based policies is arbitrarily close (i.e., with arbitrarily small relative error) compared to the expected cost of the optimal policies, which have full access to the demand distributions. The bounds that researchers develop are general, easy to compute, and do not depend at all on the specific demand distributions.

**Edgars K. Vasermanis & Nicholas A. Nechval, Konstantin N. Nechval<sup>2</sup>** In the classical statement of the one-period inventory problem, one determines the optimum order quantity to maximize the expected profit. In this case, the variability of costs – or benefits – resulting from different inventory policies is completely ignored.

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1. Provably Near-Optimal Sampling-Based Policies for Stochastic Inventory Control Models- Vol. 32, No. 4, November 2007, pp. 821–839.

2. New objective in inventory control problem- vol.3, n 1, 2002

In order to take into account the ‘riskiness’ of the inventory policies, in the literature two alternative objectives were proposed. The first objective – “maximizing expected utility” – suffers from two drawbacks: (i) the relevant risk of an investment by a value-maximizing firm cannot be appropriately measured by the total variance of the return from that investment, (ii) this criterion may imply the existence of agency problems. The second objective – “maximizing the probability of realizing a predetermined level of profit” avoids the definition of risk altogether, but it is not at all clear how a value-maximizing firm should specify the cut-off rate of profit. This paper considers the inventory problem under the new objective. This objective – “maximizing the expected profit multiplied by the probability of reaching or exceeding its value” – is commonly adopted by managers but largely ignored in the literature. To illustrate the proposed criterion, a numerical example is given.

***Sumit Kunnunkal Huseyin Topaloglu***<sup>3</sup> consider numerous inventory control problems for which the base-stock policies are known to be optimal and researchers propose stochastic approximation methods to compute the optimal base-stock levels. The existing stochastic approximation methods in the literature guarantee that the iterate converge, but not necessarily to the optimal base-stock levels. In contrast, researchers prove that the iterates of our methods converge to the optimal base-stock levels. Moreover, our methods continue to enjoy the well-known advantages of the existing stochastic approximation methods. In particular, they only require the ability to obtain samples of the demand random variables, rather than to compute expectations explicitly and they are applicable even when the demand information is censored by the amount of available inventory.

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3. Using Stochastic Approximation Methods to Compute Optimal Base-Stock Levels in Inventory Control Problems- School of Operations Research and Information Engineering, Cornell University, Ithaca, New York 14853, USA

**Retsef Levi, Ganesh Janakiraman, Mahesh Nagarajan** <sup>4</sup> describe the first computationally efficient policies for stochastic inventory models with lost sales and replenishment lead times that admit worst-case performance guarantees. In particular, researchers introduce *dual-balancing policies* for lost-sales models that are conceptually similar to dual-balancing policies recently introduced for a broad class of inventory models in which demand is backlogged rather than lost. That is, in each period, researchers balance two opposing costs: the expected marginal holding costs against the expected marginal lost-sales cost. Specifically, researchers show that the dual-balancing policies for the lost-sales models provide a worst-case performance guarantee of 2 under relatively general demand structures. In particular, the guarantee holds for independent (not necessarily identically distributed) demands and for models with correlated demands such as the  $AR(1)$  model and the multiplicative auto-regressive demand model. The policies and the worst-case guarantee extend to models with capacity constraints on the size of the order and stochastic lead times. Their analysis has several novel elements beyond the balancing ideas for backorder models.

**Nicole DeHoratiuss & Ananth Raman** <sup>5</sup> Traditional inventory models, with a few exceptions, do not account for the existence of inventory record inaccuracy (IRI) and those that do treat IRI as random. This study explores IRI observed both within and across product categories and retail stores. Examining nearly 370,000 inventory records from 37 stores of one retailer, we find 65% to be inaccurate. They characterize the distribution of IRI and show, using hierarchical linear modeling (HLM), that 26.4% of the total variance in IRI lies between product categories and 2.7% between stores.

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5- Inventory Record Inaccuracy: An Empirical Analysis

4-A 2-Approximation Algorithm for Stochastic Inventory Control Models with Lost Sales.

They identify several factors that mitigate record inaccuracy such as inventory auditing practices and several factors that exacerbate record inaccuracy such as the complexity of the store environment and choice of shipping methods. Collectively, these covariates explain 67.6% and 69.0% of the variance in IRI across stores and product categories, respectively. Our findings underscore the need to design processes to reduce the occurrence of IRI and highlight factors that can be incorporated into inventory planning tools developed to account for its presence.

## **STATEMENT OF PROBLEM**

- Less consumption of raw materials.
- Due to cancellation of order the raw materials are in surplus amount.
- Standard package leads the surplus stocking of chemicals..

## **OBJECTIVES OF THE STUDY:**

- To study the impact of procurement of standardized chemical packages by Shasun research center, Chennai.

### **Secondary objectives:**

- To identify the quantum of chemicals unused.
- To identify the list of chemicals that can be resold.

## **SCOPE OF THE STUDY:**

The study on inventory system followed in Shasun research center is based on the data available in the company's record. In this study only raw materials are been taken into account. By this study company could able to reduce the loss because of the standardized packages, and company could protect the environment from pollution by reselling the excess chemicals.

## **RESEARCH METHODOLOGY:**

### **RESEARCH DESIGN**

Explorative research design is used in this study as the facts and information are explored and, the evaluation is made.

### **DATA COLLECTION METHOD**

Secondary data have been used in this project.

- Data have been collected through the interactions with the executives in the stores and finance department.
- Secondary data have been collected through the stores records and annual reports.

## **PERIOD OF STUDY**

To study the inventory management process at Shasun research center for the period of 6 months, from April 2009 to September 2009

## **TOOLS USED**

The tools used for analysis is cost benefit analysis.

## **LIMITATION OF THE STUDY:**

- The study is based on the data procured from the monthly reports that have their own limitations.
- The study is restricted only for the period of six months from april2009 to September 2009.
- Only major items have been selected for the purpose of introducing inventory control techniques.

## **CHAPTER 2**

# **ORGANIZATION PROFILE**

## **CHAPTER 2**

### **ORGANIZATION PROFILE**

Shasun Chemicals and Drugs Limited (SCDL) were incorporated in 1976 and is headquartered in Chennai, India. It manufactures active pharmaceutical ingredients (APIs), their intermediates and enteric coating recipients with a significant presence in some key generics. Shasun has created a strong product portfolio, building on its R & D Expertise, regulatory capabilities and multi scale production capacities. Shasun has also emerged as a key player in various service segments in the pharmaceutical field besides APIs and intermediaries, and is strengthening its offer of contract research, custom synthesis, contract manufacturing and contract formulation services to clients.

Today, Shasun is one of the largest producers of Ibuprofen worldwide. The company offers derivatives of Ibuprofen like Ibuprofen Sodium, Ibuprofen Lysinate and S+Ibuprofen. It is also one of the major producers of Ranitidine and Nizatidine in the world. Its products are exported to countries across North America, Europe, Asia and Latin America.

Shasun in its endeavour to become a true one-stop shop for global pharma companies is evolving its business model to become a complete service provider, offering services right from the discovery stage to manufacturing formulations. The company has recently added finished formulations capability as forward integration, and has invested in large facility to cater to the international regulated market. It has tied up with multinational companies in the formulations space wherein it will be developing and supplying

products for the US market. The recent acquisition of the business and facilities of Rhodia Pharma Solutions by Shasun's wholly owned subsidiary Shasun Pharma Solutions Ltd (SPSL), UK equipped the company to evolve as a technology based service provider than as a contract manufacturing and research provider. Its services include innovative process research and development, rapid response small scale manufacture for clinical trial supply and full scale commercial manufacture of advanced intermediates and API's, all with seamless technology transfer with and without cGMP. The formulation unit at Puducherry has been approved by US FDA.

By integrating its facilities in India and UK, the company is trying to offer the benefits of operations in both the countries to its clients. The company has aligned its facilities so that while research can be conducted in India, development and manufacturing in kilo labs and pilot plant can be conducted either in UK or India and the optimal mix could be decided based on the regulatory, IP and cost. The company is planning to set up a multi-product pilot plant facility at Vizag, Andhra Pradesh, focusing on Contract Manufacturing Services business. In FY06, CRAMS business revenue has reached INR 3430 million.

## **CORPORATE PROFILE**

Today's new medicines are usually the result of collaborations between multi-skilled teams involved in different parts of the drug life cycle. Modern Pharma or Biotech companies often partner with companies who specialize in these diverse activities including: cutting-edge research, medicinal chemistry and biotechnology, process

development, production, validation and regulatory approval for both API and Drug Product. Rarely are these conducted by just one company. However Shasun has the ability to offer a wide range of these specialist activities thus allowing the innovative drug company to reach the market quicker and more cost effectively.

Shasun is engaged in the manufacture of active pharmaceutical ingredients and drug products with a significant presence in the anti-inflammatory and anti-ulcerative therapeutic groups. In addition, the company has recently strengthened its offering in contract research, custom synthesis, contract manufacturing and contract formulation services through its acquisition of Rhodia Pharma Solutions and offers services and products to clients in US, Europe and Asia.

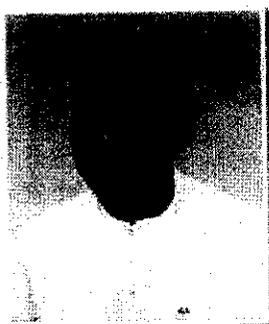
Today Shasun exports products to countries across Europe, North America and others and a wide range of customers from the smallest Biotech to most of the world's largest Pharmaceutical giants.

Shasun employs more than 1400 people in India, the UK and the US. Headquartered in Chennai ( India), Shasun operates world-class API facilities at Cuddalore and Puducherry in South India and Dudley in UK and Annan in Scotland. In the last few years Shasun has added a state-of-the-art research center in Chennai and a world class solid oral dosage formulation facility in Puducherry.

Shasun is publicly-held and listed on the National Stock Exchange and the Bombay Stock Exchange in India.

## **SHASUN'S HISTORY**

From the modest beginning in 1976, shasun has acquired a worldwide reputation for the manufacture of Active Pharmaceutical Ingredients (APIs) and their intermediates. The company's products are exported to customers in countries across Europe, North America, latin America and asia.



**Late Shri. Shankarlal Jain**  
1917 to 1991



**Late Smt. Sundarbai**  
1919 to 2003

SHASUN is derived from the name of the founder, Late Shri. Shankarlal Jain and his wife Smt. Sundarbai.

## **PRODUCTS PROFILE**

- Ibuprofen
- Ibuprofen Derivatives
- Ranitidine base

- Ranitidine HCl
- Nizatidine
- Methoxital
- Isradipine
- Gabapentine
- Olanzapine
- Quinapril HCl
- Meprobamate

## **MILESTONES**

### **1976-1990**

- Incorporated as a private limited company, Shasun Chemicals in Chennai
- First production facility established at Velachery, Chennai, for manufacture of Analgin (antipyretic).
- Second production facility was established at Puducherry for manufacture of Ibuprofen (anti-inflammatory).

## **1990-2000**

- Third manufacturing unit set up at Cuddalore to manufacture the anti-ulcerative Ranitidine HCl
- Shasun converted into a public limited company, incorporating its present name.
- US subsidiary, Shasun Inc., is established
- The company's shares were listed on Mumbai, Ahmedabad and Chennai stock exchanges.
- Technology and joint marketing agreement signed with Nagase & Co., Japan for S+Ibuprofen
- The company signed a technology agreement with Chircotech, UK, for S+Naproxen.
- The company signed a joint venture agreement with Austin Chemical Company, USA,

## **2000-PRESENT DAY**

- The company's exports exceeded Rs.100 crores.
- Established a biotech laboratory in its R&D centre.
- Signed a letter of intent with Eli Lilly for supply and manufacture of an anti-TB drug.
- Multi Purpose Plant at Cuddalore was commissioned.
- Completed setting up its new Research Centre.

- Strategic partnership with Glenmark and Alpharma(now part of Actavis) for Development & Supply of Formulation products.
- Completed its first ever acquisition of Rhodia Pharma Solutions business marking its advent in the Global supply arena

## **AWARDS AND RECOGNITION**

- Mr.S.Abhaya Kumar, Joint Managing Director, Shasun receives an Award, for being nominated as one of the Finalist for the Ernst & Young Entrepreneur of the Year 2003, from Mr.L.K.Advani, Deputy Prime Minister of India, at New Delhi.
- British Safety Council after conducting an audit awarded 4 Star rating for Puducherry facility for the year 2002.
- Shasun Cuddalore facility has been recognised for its Quality Excellence by Indian Drug Manufacturer's Association in 2002.
- First Award by Chemexcil for the year 1998 - 1999 for Outstanding Export performance.
- Shasun has been recognized for its Quality Excellence by the Indian Drug Manufacturers Association in 2000.
- Top Award for Outstanding Export performance from Chemexcil for the year 1999 - 2000.
- Shasun has been recognized for its export achievements by the Government of India in the form of the Trishul Award in 1993 and Certificate of Merit in 1996.

## **EHS POLICY**

Shasun Chemicals and Drugs Limited (Shasun) are committed to protecting the health and safety of their employees and protecting the environment. Shasun is committed to providing a safe working environment for all its employees, independent contractors, vendors, and customers, and will operate its facilities in a manner that prevents harm to public health and the environment. Shasun will seek to conserve energy, water, raw materials and other resources, use recycling and reduce waste generation where appropriate. Shasun shall be good neighbors in their communities by insuring that the facilities do not pose unreasonable risks and by participating in community activities related to Environment, Health & Safety (EHS). In all its activities, Shasun will comply with all applicable laws. Shasun will design its products in a manner that eliminates unreasonable risks from the manufacture, use and disposal of the product. This policy applies to all Shasun units and locations.

## **COMPETITIVE PRICING**

- Shasun enjoys India's inherent advantage of low project and labour costs, leading to cost-effective customer solutions.
- This is reinforced by the capability of its development chemistry group to develop efficient alternative processes within costs and deadlines
- The company's experienced scale-up team helps which migrate lab

projects to successful product development.

## **CORE STRENGTH**

- High quality, cGMP production.
- Continuous process innovation.
- Strong MNC relationships in API supply, contract manufacturing and contract research.
- Deep regulatory capability.
- Richly experienced and professional team.
- Successful R&D initiatives in the development of non-infringing processes for generic APIs and intermediates

## **FORMULATION – INTRODUCTION**

Shasun Pharmaceutical Division develops and manufactures formulations for solid dosage products. The Division is a vertically integrated formulations partner for the pharmaceutical industry. Its services include formulation research and development activities, Analytical method development and validation, scale-up and technology transfer, clinical supplies manufacturing to full scale commercial manufacturing of oral solid dosage forms.

The formulation facility is located in Puducherry, in the south eastern coast of India. The site is located on a 14 acre campus with plenty of room for future expansion.

It is a new facility completed in 2006 with 100,000 square feet of constructed space. It contains office areas, analytical laboratories, formulation development laboratories, a cGMP pilot plant and

commercial manufacturing space. The facility is built to meet the regulatory requirements of the US FDA, Health Canada, MHRA in the U.K and other European Agencies.

Some of the key features include separate air handling units with terminal mounted EU13 HEPA filters, to provide a class 100000 environment in the manufacturing areas. These are continuously monitored by a building automation system. Tablet compression areas have vertical material flow to avoid cross contamination. Automatic container cleaning system ensures validation of cleaning procedures.

The facility has limited access controls and CCTV monitoring of man movement to various areas side the facility, to avoid violation of current Good Manufacturing Practices (cGMP).

### **SRC**

Shasun Research Center (SRC) is Shasun's state-of-the-art research & development center established at Keelakottaiyur, around 35 km from Chennai. This facility is spread over 9.3 Acres of land approximately 377150 sq. ft. This project is executed in 3 Phases. The first phase was completed in 2005 and has been fully functional. In the 2nd phase, SRC plans to double the organic and analytical infrastructure by building another organic block and an additional floor of the analytical department. The corporate office of Shasun is also planned to shift to the center by the end of next financial year (2007-08).

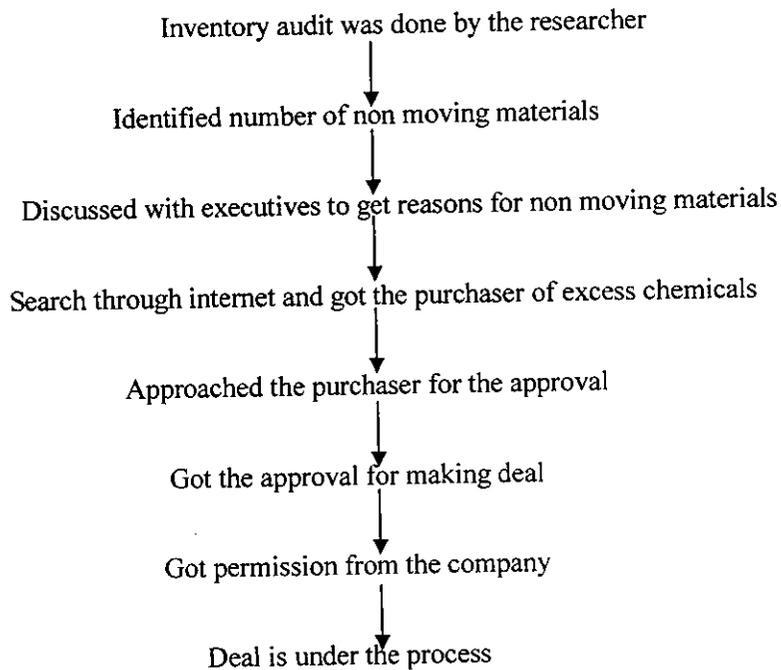
- The overall objective of the center is to achieve excellence in chemistry for manufacture of APIs and intermediates for the health care industry by complying with full cGMPs standards and quality.

- It serves as a nerve center for research and development where activities includes contract research and customs synthesis, in-house API research, technology development etc. along with other innovative collaborative research with academics as well as industries.
- Shasun Research Center creates an environment for innovation and learning that fosters, in each one of us at Shasun, a desire to excel and willingness to experiment as we believe – "For Life - Science works"

The R&D Centre has a total land area 9.36 Acres. The constructed total area is 1,38,748 sq.ft.

## HIGHLIGHT OF THE PROJECT

Set of process have been done by the researcher for processing the deal.



# **CHAPTER 3**

## **DATA ANALYSIS & INTERPRETATION**

## CHAPTER- 3

### DATA ANALYSIS AND INTERPRETATION

#### ANALYSIS AND INTERPRETATION:

In the present study, an attempt has been made to study and analyze the inventory system followed at SHASUN RESEARCH CENTER and to give suggestions accordingly. In this ABC analysis is used to estimate the loss which can be reduced.

In this ABC analysis the classification is done as follows

A- above 60000

B- 15000-60000

C- below 15000

**TABLE 3.1 Table showing list of unconsumed & Non-moving materials under A-classification**

RAW MATERIALS/MONTHS	QUANTITY IN KG						PRICE/kg (Rs)	PRICE (Rs)
	APRIL	MAY c/f	JUNE c/f	JULY c/f	AUG c/f	SEP c/f		
<b>A-CLASSIFICATION</b>								
PALLADIUM ON CARBON 10%	5.07	5.07	5.07	5.07	5.07	5.07	37500.09	190,125.46
4- FLURO BENZALDEHYDE	163.00	163.00	163.00	163.00	163.00	163.00	1073.22	174,934.86
3- METHYLTHIOPHENE	11.90	11.90	11.90	11.90	11.90	11.90	8060	95,914.00
Sodium triacetoxyborohydride	7.04	7.04	7.04	7.04	7.04	7.04	12315.1	86,698.36
L-LEUCINE	85.00	85.00	85.00	85.00	85.00	85.00	864.78	73,506.30

These are some of the non moving materials under the classification of 'A'.

**TABLE 3.2 Table showing list of unconsumed & non-moving materials under B-classification.**

RAW MATERIALS/MONTHS	QUANTITY (KG)						PRICE/kg (Rs)	PRICE (Rs)
	APRIL	MAY C/F	JUNE C/F	JULY C/F	AUG C/F	SEP C/F		
<b>B- CLASSIFICATION</b>								
2-Ethoxynapthoic acid	0.50	0.50	0.50	0.50	0.50	0.50	118560	59,280.00
3Piperidine carboxylic acid ethyl ester	5.00	5.00	5.00	5.00	5.00	5.00	9942	49,710.00
Potassium tert-butoxide	31.00	31.00	31.00	31.00	31.00	31.00	1582.73	49,064.76
4-Chloro-3-sulfamoylbenzoic acid	17.00	17.00	17.00	17.00	17.00	17.00	2820.57	47,949.70
DI ETHYL CARBONATE	170.00	170.00	170.00	170.00	170.00	170.00	275	46,750.00
POTASSIUM CARBONATE POWDER	519.26	519.26	519.26	519.26	519.26	519.26	75.199	39,048.35
Tetrahydro-4H-pyran-4-one	0.85	0.85	0.85	0.85	0.85	0.85	43700	37,145.00
P-METHYL ACETOPHENONE	98.50	98.50	98.50	98.50	98.50	98.50	325	32,012.50
(4)PARA HYDROXY BENZALDEHYDE	64.50	64.50	64.50	64.50	64.50	64.50	464.99	29,991.86
Dowtherm A	140.46	140.46	140.46	140.46	140.46	140.46	211.91	29,764.88
RANEY NICKEL	9.80	9.80	9.80	9.80	9.80	9.80	3028.5	29,679.30
t-Butylchloro acetate	7.00	7.00	7.00	7.00	7.00	7.00	3790.71	26,534.97
FORMAMIDE	145.00	145.00	145.00	145.00	145.00	145.00	158	22,910.00
L-CAMPHOR 10-SULPHONIC ACID	14.55	14.55	14.55	14.55	14.55	14.55	15099	21,955.95
Phenyl acetyl chloride	60.00	60.00	60.00	60.00	60.00	60.00	293.03	17,581.80

Trifluoroacetic acid	26.40	26.40	26.40	26.40	26.40	26.40	627.74	16,572.34
ETHYLACRYLATE	170.50	170.50	170.50	170.50	170.50	17.50	944.37	16,016.77
1-Iodopropane	13.00	13.00	13.00	13.00	13.00	13.00	1180	15,340.00

These are some of the non moving materials under the classification of 'B'. It can be observed that the quantity of materials is remaining constant for all the six months.

**TABLE 3.3: Table showing list of unconsumed & non moving materials under the classification of c-category**

RAW MATERIALS/MONTHS	QUANTITY(KG)						PRICE/kg (Rs)	PRICE (Rs)
	APRIL c/f	MAY c/f	JUNE c/f	JULY c/f	AUG c/f	SEP c/f		
<b>C-CLASSIFICATION</b>								
TRIMETHYL SILYL CHLORIDE	4.49	4.49	4.49	4.49	4.49	4.49	2132.09	9,573.09
METHYL ETHYL KEYTONE	87.00	87.00	87.00	87.00	87.00	87.00	58	5,046.00
4Chloro butyrylchloridebisulphateaduct	0.70	0.70	0.70	0.70	0.70	0.70	4500	3,150.00
3,4-Dihydro-2H-pyran	0.12	0.12	0.12	0.12	0.12	0.12	5000	600.00

These are the non-moving materials under the classification of 'C'. The number of non-moving materials in c-category is few in number.

**Table 3.4 Resale price details of non-moving materials**

<b>RAW MATERIAL</b>	<b>PRICE(Rs)</b>	<b>RECOVERABLE AMOUNT(Rs)</b>
PALLADIUM ON CARBON 10%	190,125.46	95,062.73
4- FLURO BENZALDEHYDE	174,934.86	87,467.43
3- METHYLTHIOPHENE	95,914.00	47,957.00
Sodium triacetoxyborohydride	86,698.36	43,349.18
L-LEUCINE	73,506.30	36,753.15
2-Ethoxynapthoic acid	59,280.00	29,640.00
3Piperidine carboxylic acid ethyl ester	49,710.00	24,855.00
Potassium tert-butoxide	49,064.76	24,532.38
4-Chloro-3-sulfamoylbenzoic acid	47,949.70	23,974.85
DI ETHYL CARBONATE	46,750.00	23,375.00
POTASSIUM CARBONATE POWDER	39,048.35	19,524.18
Tetrahydro-4H-pyran-4-one	37,145.00	18,572.50
P-METHYL ACETOPHENONE	32,012.50	16,006.25
(4)PARA HYDROXY BENZALDEHYDE	29,991.86	14,995.93
Dowtherm A	29,764.88	14,882.44
RANEY NICKEL	29,679.30	14,839.65

t-Butylchloro acetate	26,534.97	13,267.49
FORMAMIDE	22,910.00	11,455.00
L-CAMPHOR 10-SULPHONIC ACID	21,955.95	10,977.98
Phenyl acetyl chloride	17,581.80	8,790.90
Trifluoroacetic acid	16,572.34	8,286.17
ETHYLACRYLATE	16,016.77	8,008.39
1-Iodopropane	15,340.00	7,670.00
TRIMETHYL SILYL CHLORIDE	9,573.09	4,786.55
METHYL ETHYL KEYTONE	5,046.00	2,523.00
4Chloro butyrylchloridebisulphateaduct	3,150.00	1,575.00
3,4-Dihydro-2H-pyran	600.00	300.00
	<b>TOTAL =</b>	<b>613,428.13</b>

By this deal company could able to recover Rs.613428.13.

# **CHAPTER 4**

# **CONCLUSIONS**

## CHAPTER-4

### FINDINGS AND INFERENCES

From the data it is clear that there are numerous non moving materials.

Reasons for it are as follows

- Research center does not require raw materials in plethora but the standardized packages are available in bulk quantity. This is reason for excess chemicals.

A- 272.01KG

B- 1493.32KG

C- 92.31KG

- Monthly audit is being done by the company. The reasons for the monthly audit are

1. To check out the theft.
2. To know whether it is accounted correctly.

Impacts of the monthly audit are

1. Vaporization loss.
2. Prolivity of time.

- Added reason for the surplus chemicals is cancellation of order by the corporate clients.
- Adequate number of customers are available only for research project and not for the purpose of production project which has ended up with excess stacking of raw materials.
- Storage of chemicals for long run has led to quality deterioration. Similarly chemicals that are preserved in iron drums are corroded due to rust formation.

## SUGGESTIONS

- Excess chemicals can be resold to the ‘**LEWIS ASSOCIATES**’, a UK based company, which deals in surplus chemicals, pharmaceuticals and technical raw materials internationally. It provides an environmentally considerate solution to the problem of surplus or slow moving raw materials, which may ultimately have to be disposed of. Lewis Associates supplies discrete consignments of prime unused raw materials, complete with appropriate documentation, at substantially less than the normal market price. This deal would help shasun to recover 50% of its original price.
- The business deal was approved by the company and it is under the process.
- As stated earlier company could able to recover 50% amount by reselling the excess chemicals to the “**LEWIS ASSOCIATES**”. The total amount which could be recovered is **Rs.613, 248.13** (approximately).
- By reselling the materials, company could protect the environment from pollution. Because storing chemicals is not good for the environment, it has to be utilized or discarded at a regular time interval.
- Monthly audit can be avoided through the system of having bar code in the raw materials. So that the issues and receipts of the raw materials can be accounted in a proper manner. Moreover theft of raw materials can be reduced.

## **CONCLUSION**

It is essential for every company to have the optimum utilization of raw materials. The present study reveals that the shasun research centre is incurring with a loss as far as raw material is concerned. So it has to be sold out to the lewis associates so that the company could reduce the loss to a greater extent. By this deal to an extent efficient inventory system can be obtained.

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