

# **Inventory Optimization & Asset Accounting**

## **Report For**



**By**

**August 17, 2010**

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## **Purpose**

The purpose of this document is to analyze the process adopted by SIPCHEM with regard to Inventory Management, Assets and Equipment Management with the overall objective of recommending a road map for Inventory Optimization and Enterprise Asset Management [EAM]

## **Intended Audience**

This document is intended for the usage of SIPCHEM's Finance and Maintenance departments and Utopia consultants and employees involved with this Project.

## Introduction

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SIPCHEM is a Petro-Chemical company of manufacturing Methanol, Acetates etc at Al Jubal Industrial Complex. Saudi International Petrochemical Company (SIPCHEM) is a Saudi Company listed in Saudi Stock market. The company was established on December 22, 1999, with a current paid in capital of SR 3.3 billion (US\$ 880 million).

SIPCHEM actively develops and invests in petrochemical and chemical industries, both basic and intermediate to produce chemicals used to manufacture a multitude of products that improve the lives of people worldwide.

### Phase-I

SIPCHEM developed two operating affiliates:

- (i) International Methanol Company (IMC) that produces 1,000,000 metric tons Methanol
- (ii) International Diol Company (IDC) that produces 75,000 metric tons of Maleic Anhydride, Butanediol and derivatives, per annum.

### Phase-II

Three more affiliates were developed:

- (i) International Gases Company (IGC) that produces 345,000 metric tons of Carbon Monoxide
- (ii) International Acetyl Company (IAC) that produces 460,000 metric tons of Acetic Acid and Acetic Anhydride
- (iii) International Vinyl Acetate Company (IVC) that produces 330,000 metric tons of Vinyl Acetate Monomer, per annum.

As part of Phase-III, SIPCHEM established a new petrochemical company, namely International Polymers Company (IPC) that will produce 300,000 metric tons of Ethylene Vinyl Acetate (EVA) and other products per annum. The SR 4 billion (US\$ 1.1 Billion) project is scheduled to start in 2013. SIPCHEM investments will reach 13 Billion Saudi Riyals by the end of the year 2013 A.D. and the total production will reach 2.8 million metric tons of various products some of which to be produced for the first time in the Middle East

The company has commenced commercial production in the year 2004 and implemented SAP R/3 software to integrate the following departments

1. FI & CO (Assets & PS components)
2. SD
3. MM
4. PM

Though the operations are seemingly normal, they find various problems like

1. Identification of asset is difficult
2. The movement of assets could not be managed
3. There is no links to PM module and the maintenance of the same is done as a stand-alone and integrated one
4. Lack of Integration of Equipment master and Asset master
5. The Spare Parts Planning methodology needs full investigation to establish the correct process for optimization of spare parts inventory
6. The Material handling and their Inventory management needs a review with a specific reference to spare parts optimization



The Utopia - a SAP and Data Migration Service Provider was invited to identify the gaps and offer a solution road map. Utopia will offered to do the needful in two phases. In the first phase, Utopia analyzed the present process and procedures of SIPCHEM with a focus on completeness of Assets and spare parts optimization. This report is the result of their findings.



## Strategy Roadmap of Report

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This document contains three sections.

Section 1: Spare parts management and Inventory Process

Section 2: Existing Asset Accounting practices advantages of using EAM

Section 3: Road map for implementation

This Report is developed by Utopia, the various inputs gathered from the business process owners/core users by having various meetings and interactions. This document shows the business processes, their shortcomings in detail and serves as basis for SIPCHEM to enable various methods to optimize their Spare parts Inventory and asset accounting practice.

We have been provided with details of Company Code 1002 and 1003 and their plants 2000, 2001 and 3000.

# 1. Part 1 - Inventory Optimization

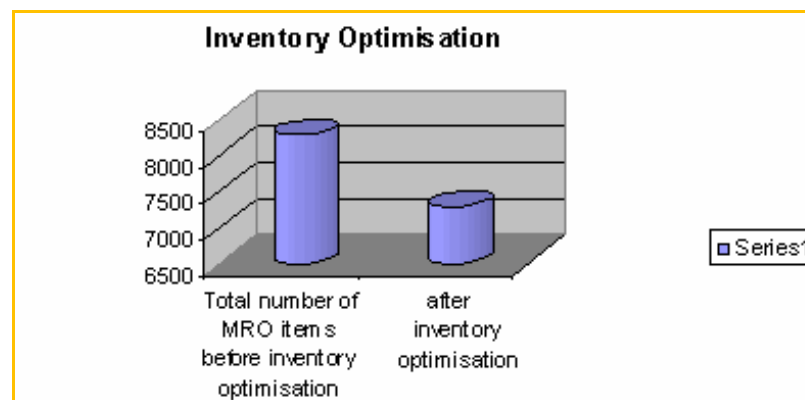
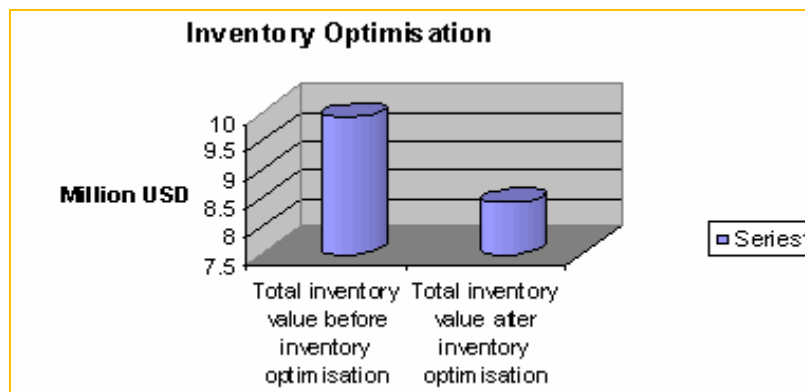
## 1.1. Objectives

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The primary objectives of this study are as follows:

1. Overall reduction of Inventory Holdings.
2. Reduction of number of items-due to Variety Reduction Standardization, disposal of non moving items
3. Reduction in value of Inventory Holdings due to Cost reduction and alternate source development of individual items.

In this study we are primarily focusing on 1 and 2 above

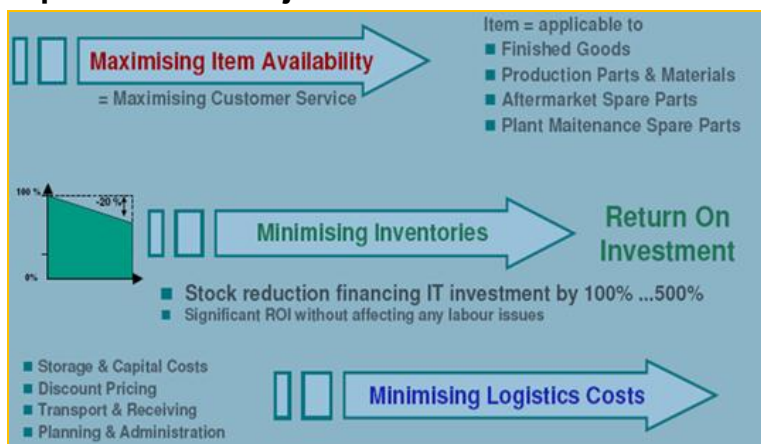


## 1.2. Spare Parts Management - Challenges & Constraints

### 1.2.1. Introduction

Spare parts Management plays an important role in achieving the desired plant availability at an optimum cost. Presently, the industries are going for capital intensive, mass production oriented and sophisticated technology. The downtime for such plant and machinery is prohibitively expensive. It has been observed in many industries that the non-availability of spare parts, as and when required for repairs, contributes to as much as 50% of the total down time. Also, the cost of spare parts is more than 50% of the total maintenance cost in the industry. It is a paradox to note that the maintenance department is complaining of the non-availability of the spare parts to meet their requirement and finance department is facing the problem of increasing locked up capital in spare parts inventory. This amply signifies the vital importance of spare parts management in any organization.

### 1.2.2. Inventory Optimization - Objectives



The unique problems faced by the organization in controlling/managing the Inventory of Spare Parts are as follows.

1. Firstly, there is an element of uncertainty as to when a part is required and also the quantity of its requirement. This is due to the fact that the failure of a component, either due to wearing out or due to other reasons, cannot be predicted accurately.
2. Secondly, spare parts are not that easily available in the market as they are not fast moving items. The original equipment manufacturer has to supply the spares in most of the cases. New models are introduced to incorporate the design improvements and old models are phased out. Hence the spares for old models are not readily available. Particularly, this is more so in case of imported equipment as the design changes are taking place faster in the developed countries.
3. Thirdly, the number and variety of spare parts are too large making the close control more and more tedious. For instance, the number of items of spares in a medium scale engineering industry may be around 15,000 and that in a large scale chemical industry such as SIPCHEM may be around 100,000.
4. Fourthly, there is a tendency from the stage of purchase of the equipment to the stage of the use of the spare parts, to requisition spare parts more number than that are actually required and accumulation of spares takes place.

5. Finally, the rate of consumption of spare parts for some is very high and for some is very low. These problems are to be faced in the inventory optimization process.

The objective of spare parts management is to ensure the availability of spares for maintenance and repairs of the plant and machinery as and when required at an optimum cost. Also, the spares should be of right quality. There are many actions required to ensure the spare parts management effective.

There is a need for systematic actions while managing spare parts as given below:

- Identification of spare parts
- Criticality Analysis-ABC-VED-FSN-SDE
- Forecasting of spare parts requirement
- Formulation of selective control policies for various categories
- Development of inventory control systems
- Stocking policies for capital & insurance spares
- Stocking policies for routable spares or sub- assemblies
- Replacement policies for spare parts
- Spare parts Storage and Preservation.
- Indigenization or Local Vendor Development of spares
- Variety reduction and Standardization of common parts
- Reconditioning of spare parts
- Establishment of spare parts bank – May be considered for common items such as Gaskets, pipes and bend seals etc.
- Computer applications for spare parts management

Every organization should proceed systematically and establish an effective spare parts management system. Codification helps the organization minimizing duplication of spare parts stocking thereby reducing inventory, aids the accounting process and facilitates the computerization of spare parts control systems. The inventory analyses carried out on the basis of different characteristics of the spare parts, such as annual consumption value, criticality, lead time, unit cost and the frequency of use; help the company in establishing suitable policies for selective control. This also helps in focusing our efforts on real problem areas.

A good inventory control system will help systemizing the ordering procedure and also achieving an optimum level of inventory. In addition, selectively efforts should be made to evolve optimum replacement policies for selected spare parts, for which cost of down time and cost of replacement are very high. So, we have to identify such spare parts and carry out the exercise for evolving optimum replacement policies.

For the spare parts which are very expensive and those which are to be imported, it is essential that the useful life for such spares is extended by appropriate applications of reconditioning and repair techniques.

Efforts should be made to indigenize the spare parts in view of the hard-to-get foreign exchange involvement. Also, for similar industries establishing of spare parts bank goes a long way in reducing the total inventory holding of the expensive spare parts and also reduces the stock holding cost.

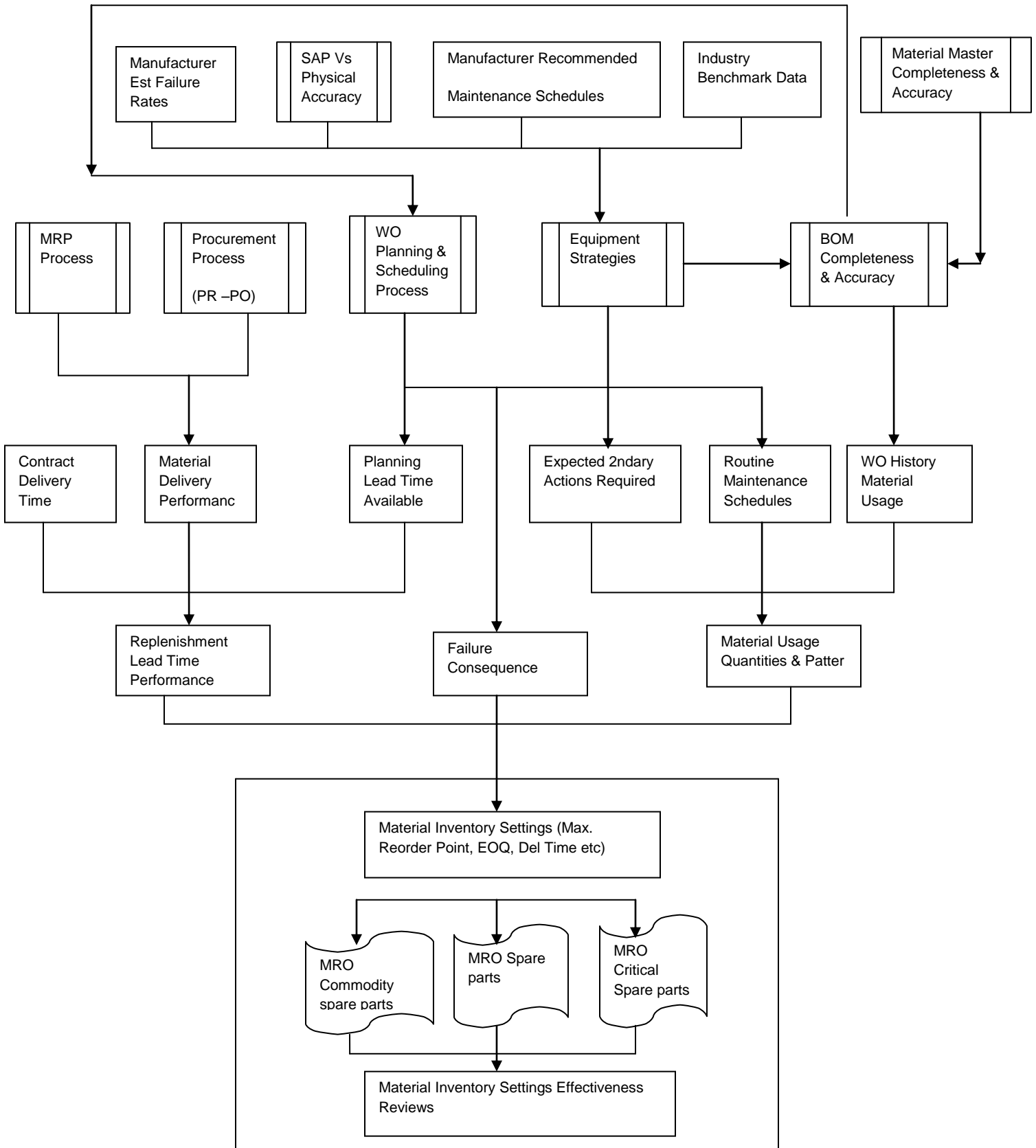
For different industries, it will be helpful to establish spare parts banks and a suitable information system for the exchange of spares.

Lately, the application of computers for the processing of spare parts information and operating an effective spare parts control system will be very helpful for the organization and will ensure timely actions for an efficient spare parts management system

## **1.3. Equipment BOM Hierarchy and Completeness**

### **1.3.1. Identification of Spare Parts**

The schematic below gives the total picture of the equipments spare parts in terms of equipment BOM relationship, usage and maintenance history. It also gives the main three groups into which the Maintenance spares are classified for the purpose of Optimization of Inventory



When a spare part is required to put back in operation equipment which is under breakdown, it becomes necessary to identify the part for getting the same issued from the store or for purchasing the same from the vendor. While identifying it becomes essential to give the complete description including the size and type of the spare to draw from the stores and it becomes essential for all concerned i.e., the maintenance personnel and stores personnel are aware of such description. If it is the vendor, he may not be satisfied with the description and he may also require the manufacturer's part number.

It is also very essential to link the spare part to its equipment BOM so that there is proper linkage of the spare with the equipment for quick reference.

It is a cumbersome and time consuming task during every transaction to identify a spare part by its description and manufacturer's part number accompanied by the parent equipment's name, make and model designation. Therefore, it is essential to give a numerical name or code to each spare part along with its reference to its BOM.

This process of giving code to each spare part is called codification. Since, the range of spares used in any organization is too large and there are quite a few spares meant for specific equipment, it is always preferred to use codes which are significant i.e., from the code number one will be able to find out

- The equipment type, make & model
- The type/class of the spare-part
- The size (in some cases)

If the spare part code is to incorporate the equipment type etc., then the codification of equipment becomes a prerequisite for spare part codification.

The number of digits required for spare part code depends on the actual requirement i.e., the range of equipment in use and the types and number of spare parts in the organization. It is very common to come across 9 to 16 digit codes for spare parts.

For instance, a 10-digit code may signify,

- 1st digit - imported or indigenous
- 2nd, 3rd & 4th digits - machine type, make & model
- 5th, 6th & 7th digits - spare-part class
- 8th, 9th & 10th digits - size or serial number.

By classifying and codifying all the spare parts, it becomes easy to minimize the duplication of spare parts thereby effecting reduction in the inventory. Codification also helps easy accounting and computerization in addition to easier communication between concerned parties.

In addition to codifying the spare part, it will be of immense benefit to codify the location of spare parts. Stock location number helps the stores personnel to locate the part and issue the same as and when the same is requisitioned. Also the stock verification and upkeep program becomes less and less cumbersome.

After codifying the spare parts and assigning stock location numbers, all the users 7-4 should be made aware of and should be supplied with the relevant codes and stock location numbers in the form of a spare parts catalogue.



The spare parts catalogue should contain the following information:

- Spare parts codification plan
- Spare part code
- Spare part description
- Drawing number
- Manufacturer's code & part number
- Stock location number.

The spare parts catalogue may be produced in sufficient copies so as to make available for all the users such as the maintenance personnel, stores personnel and purchase personnel. This is a very important aspect often neglected in the organization.

The next step in identification of spare parts is to put an identification tag or mark with the code to enable the stores personnel identify during the time of issue. If sufficient care is not taken to incorporate the code, a lot of time is spent in locating the part and that time is actually added to the down-time which is really very expensive in case of vital spare parts. There are a variety of stickers which are scratch-proof, water-proof and temperature-proof available in the market. Efforts should be made by the organizations to make use of such identification tags and it will go a long way in reducing the downtime.

## 1.4. Inventory Analysis & Selective Control - Classification of Spares

For the successful spare parts management, it is essential to analyze the spare parts inventory based on various characteristics such as the frequency of issues, the annual consumption value, and the criticality in terms of maintenance requirements - downtime, the lead time and the unit price. This is essential as it would not be possible to exercise the same type of control for all items and it may not really be effective. Inventory analysis aids selection of policies for selective control.

Commonly used inventory analyses in Materials Management function are:

1. ABC Analysis
2. VED Analysis
3. FSN Analysis

The inventory is classified in the form of matrix below

	<b>V</b>	<b>E</b>	<b>D</b>	
<b>A</b>				<b>F</b>
<b>B</b>				<b>S</b>
<b>C</b>				<b>N</b>

### 1.4.1. ABC Analysis - Classification Based on Consumption

Another method of classifying spares is on the basis of annual consumption value. As it is true for any inventory situation, Pareto's principle can be applied to classify maintenance spares based on consumption value.

Pare to principle: The significant items in a given group normally constitute a small portion of the total items in a group and the majority of the items in the total will, in aggregate, be of minor significance.

This way of classification is known as ABC classification.

CLASS A: 10% of total spares contributing towards 70% of total consumption value.

CLASS B: 20% of total spares which account for about 20% of total consumption value.

CLASS C: 70% of total spares which account for only 10% of total consumption value.

In a specific spares control system, it is quite possible that in a single year, many spares would not have been consumed at all. In such cases, it is better to perform ABC analysis on longer consumption period data, say 3 years. Then only spares will not be left out in this classification.

Policy for 'A' items

- Maximum control
- Value Analysis
- More than one supplier
- Control by top executives

Policy for 'B' items

- Minimum control
- Bulk Orders
- More items from same supplier

### 1.4.2. FSN Analysis - Classification based on Frequency of Issues/Use

F, S & N stand for fast moving, slow moving and Non moving items. This form of classification identifies the items frequently issued; less frequently issued for use and the items which are not issued for longer period, say, 2 years.

For instance, the items can be classified as follows:

Fast Moving (F) = Items that are frequently issued say more than once a month

Slow Moving (S) = Items that are issued less than once a month

Non-Moving (N) = Items that are not issued\used for more than 2 years

This classification helps spare parts management in establishing most suitable stores layout by locating all the fast moving items near the dispensing window to reduce the handling efforts. Also, attention of the management is focused on the Non-Moving items to enable decision as to whether they are required in the future or they can be salvaged. Experience shows that many industries which are more than 15 years old have more than 50% of the stock as non-moving spares.

Even if a few of them are disposed off and the locked up capital is made available, it will make available additional working capital to the organization. Action for disposal should be taken based on the value of each item of spare

### 1.4.3. VED Analysis - Classification Based On Criticality

Several factors contribute to the criticality of a spare part. If a spare is for a machine on which many other processes depend, it could be of very vital importance. Also if a spare is, say, an imported component for which procurement lead time could be very high its non-availability may mean a heavy loss. Similarly spares required for fighter aircraft at the time of war could be of great value in terms of fighting capability. In general, criticality of a spare part can be determined from the production downtime loss, due to spare being not available when required.

Based on criticality, spare parts are conventionally classified into three classes, viz. vital, essential and desirable

**VITAL (V):** A spare part will be termed vital, if on account of its non-availability there will be very high loss due to production downtime and/or a very high cost will be involved if the part is procured on emergency basis. In a process industry, most spare parts for the bottleneck machine or process will be of vital nature. For example, bearings for a kiln in a cement plant will be considered vital.

**ESSENTIAL (E):** A spare part will be considered essential if, due to its non-availability, moderate loss is incurred. For example, bearings for motors of auxiliary pumps will be classified as essential.

**DESIRABLE (D):** A spare part will be desirable if the production loss is not very significant due to its non-availability. Most of the parts will fall under this category. For example, gaskets for piping connection.

The VED analysis helps in focusing the attention of the management on vital items and ensuring their availability by frequent review and reporting. Thus, the downtime losses could be minimized to a considerable extent.

## 1.5. Inventory Control Systems - Costs

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### 1.5.1. Introduction

To ensure smooth function it is essential to develop a suitable inventory control by which optimization of spare parts cost is achieved in a systematic way. As regards the fast moving and slow moving items are concerned, the following procedure can be followed taking into consideration various cost elements.

While managing the spare-parts inventory, basically there are four cost elements to be considered

1. Cost of the spare part
2. Cost of ordering
3. Cost of storage
4. Cost of stock-out.

The cost of storage includes

1. Rent for the stores
2. Depreciation on storage and handling facilities
3. Handling charges
4. Salaries of stores staff and clerks
5. Taxes
6. Insurance
7. Costs of stationery etc.

The cost of ordering includes

1. Rent for purchase department
2. Depreciation for Office facilities
3. Salaries
4. Postage & Telephone expenses
5. Stationery expenses
6. Travel expenses
7. Incoming Inspection
8. Entertainment & Misc. expenses

## 1.6. SIPCHEM - Inventory Status-Overview

### 1.6.1. Organization Overview

SIPCHEM – Purchasing and Materials Management department functions on a shared services model for the 3 companies in Phase - 1 considered for this study which is company code 1000, 1001 1003 with corresponding plants - 2000, 2001 and 3000. The department is managed by Procurement-Head with a team of Buyers and Inventory specialist reporting to him.

### 1.6.2. Warehousing Infrastructure

Currently the SIPCHEM has two warehouses, Warehouse-1 and Warehouse-2 and is a common facility for all the plants in Phase-1.

### 1.6.3. SAP System

The company is using SAP-Materials Management module for the operations of the Purchasing and Materials function. The SAP-WM module is not being implemented and all inventory transactions are conducted using SAP-IM module.

Based on the information available from the SAP system we have done an analysis on the current stock holding value to highlight the seriousness of the issue and the results are summarized below

We have also taken the consumption analysis for the three plants 2000, 2001 and 3000 for a period of 18 months from Jan 2009 to June 2010 using the standard “ABC” report available in SAP.

The total of the consumption is given below.

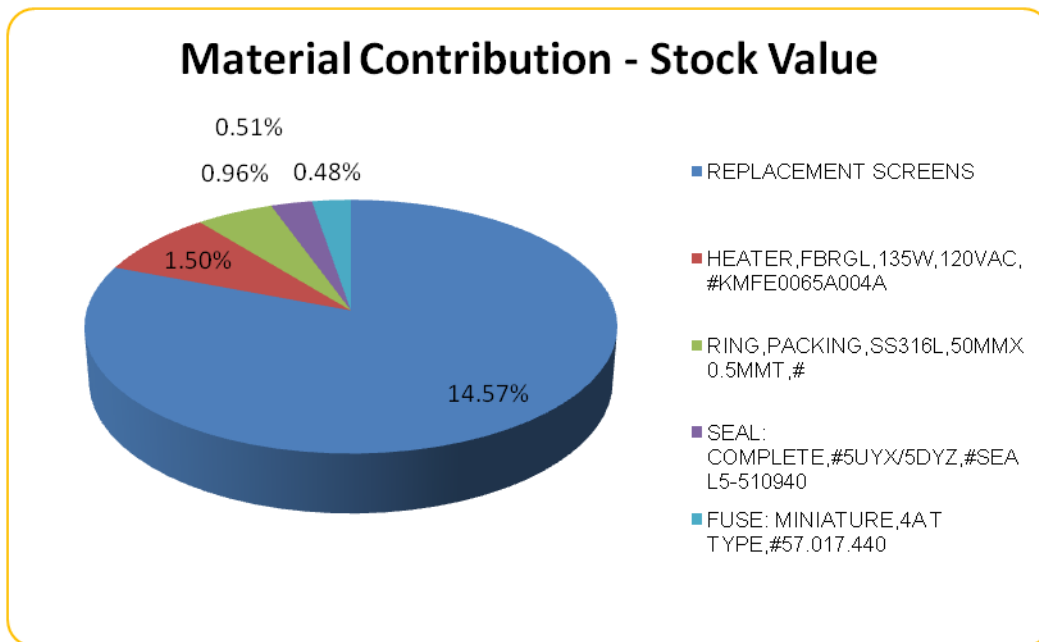
Based on the consumption value and the Inventory holding, the present coverage in the INVENTORY in terms of number of years of stock is determined from the formula

$$[\text{Total Stock Holding}] / [\text{Annual Consumption}] = 3.5 \text{ Years Approx}$$

The percentage of the High Value items with the details is also shown in the Pie Chart

SI.No	Statement of Analysis	Count / Percentage
1	Number of Materials with combination of SAP# & Plant	16,947
2	Top 5 Materials in Value of Stock Contribute	18.02%
3	Total Value of Stock on Hand as on 27th July 2010	46,368,547.73
4	Total Consumption for 2000, 2001, 3000	13,387,111.42

SAP#	Plant	Sales Orgn	Mat.Description	Moving Price	On - Hand QTY	VALUE	VALUE %
1000011813	3000	1003	REPLACEMENT SCREENS	355,650.00	19	6,757,350.00	14.57%
1000014113	3000	1003	HEATER,FBRGL,135W,120VAC,#KMF0065A004A	69,421.25	10	694,212.50	1.50%
1000013939	3000	1003	RING,PACKING,SS316L,50MMX0.5MMT,#	22,179.23	20	443,584.60	0.96%
1000009908	3000	1003	SEAL: COMPLETE,#5UYX/5DYZ,#SEAL5-510940	23,782.00	10	237,820.00	0.51%
1000008398	3000	1003	FUSE: MINIATURE,4A T TYPE,#57.017.440	498.20	450	224,190.00	0.48%



The above figures indicate the current stock holding at SIPCHEM for plants 2000, 2001 and 3000

## **1.7. Current Inventory Process**

Currently the Inventory Management processes used is explained as under:

### **1.7.1. Maintenance Spares**

All requirements for the above spares are raised through the Maintenance Notifications raised by the Maintenance Planner.

The Maintenance Planner will check the stock status for the spares required and create a RESERVATION in the SAP. In case stock is not available in the warehouse, planned order and Purchase Requisition will be created for the Procurement Process.

For the consumables MRP is run every week and Purchase Orders placed accordingly for items falling below RE-ORDER POINT. However a major difference is that REPLENISHMENT is done to the MAXIMUM LEVEL.

Similarly items drawn against Reservations by the Maintenance are returned back if not used. For example is 10 items are reserved and drawn, 4 may be returned back to the warehouse using 262 movement type.

### **1.7.2. Common Spares such as Gaskets Seals**

For these items the MRP Controller runs this MRP every week based on Consumption based planning of SAP and the replenishment is done to the Maximum Level wherever the Stock reaches the Re-Order level.

### **1.7.3. Issue of spares which are common across Plants**

Since SIPCHEM is following a shared services model for purchasing and distribution of equipment spare parts, they have situations where certain spares are common across the equipments in the plant. Each plant has its own MRP cycle and the Purchasing is done by the Central Purchasing organization for each plant whenever the level falls below the Re-Order point.

The materials are stored in the common warehouse for all the plants.

The problem arises when the stock of one plant depletes to zero and they have a urgent requirement for which they borrow from the stock in the other plant. As of no proper system has been established for this scenario.

### **1.7.4. Insurance or Rotable Spares**

There is no visible method for managing VERY CRITICAL SPARES AND SUB ASSEMBLIES OFTEN termed as “INSURANCE OR ROTABLE SPARES”

Such spares have generally called emergency spares and are generally complete sub assemblies, the absence of which will completely cripple the entire plant causing very high financial losses. They are also called “Capital spares” and are supplied by the manufacturer at the time of initial purchase order. Some examples of Insurance spares could be propeller in a ship, compressor unit in a fertilizer plant, aircraft engine

The failure rate is very low but the cost of not having a standby spare could be colossal. Hence Insurance spares need to be identified systematically.

## 1.8. Primary reasons for Inventory Buildup in SIPCHEM

Before we go into the reasons for the high inventory in SIPCHEM it is necessary to understand the main reasons for holding of inventory which are

1. Avoid interruptions in production
2. Quick customer response and turnaround time
3. Reduce MTTR/MTTF in the case of maintenance spares

Primarily Inventory buildup is combination of incorrect Planning and Purchasing and occurs due to the following reasons.

1. Purchases for production and maintenance against Purchase Orders
2. Stock Transfers
3. Returns

Based on the various interactions with the key users and after analyzing the inventory data available from the system the following are the key reasons for the increase in inventory in SIPCHEM

1. All Inventory items in SIPCHEM treated as one for the purpose of analysis leading to lack of priority and focus
2. All equipment spares, common spares such as bearings, belts all treated as one entity
3. No "ABC" analysis for consumption as per standard Inventory Management practice conducted
4. No CRITICALITY Analysis for equipment spares such as "VITAL", "ESSENTIAL", "DESIRABLE" "VED Analysis" conducted
5. All item replenished to MAXIMUM LEVEL after every MRP run leading to gradual increase in inventory as the consumption of spares is always erratic and highly variable.
6. Repetitive Purchase Requisitions raised in quick succession for the same item in a short span.
7. Progressive increase in Purchases as compared to Issues-Consumption over the last 4 - 5 years as shown in the analysis



## 1.9. Major Deviations in Inventory Management Process Leading to Increase in Stocks and Inventory Holdings

### 1.9.1. Observation IM-01

<b>Observation Number</b>	<b>IM-01</b>
Observation	ABC Indicator not used as in STANDARD Inventory Management Practice
Implication / Risk	Basic inventory control practices based on consumption of item not possible
Recommendation	Setup "ABC" Categories based on consumption values for each materials group and overall inventory
Benefits	Selective control of inventory for high consumption items 20% of items control 80% of usage value
Acceptance / Response	

### Sample "ABC Analysis" report from SAP R/3 for plant 2000 for a period of 18 Months from January 2009 to June 2010 Consumption

SAP No	Description	QTY ANN	SAP ABC	SIPCHEM ABC	CONS - VALUE	% OF CON	Cum%
1000003360	SHAFT,PUMP W/ KEYS,A276 TP410#6254999	1	A	B	79,264.98	5.59	5.59
1000012649	OIL,LUB,ISO VG46,200LT/DR,#OMEGA 615	3	A	A	70,680.00	4.98	10.57
1000003357	RING,IMPELLER BUSHING,AISI 420#/62891072	6	A	B	67,247.16	4.74	15.3
1000001104	FILTER,AIR,POLY,500MM WDX1500MMHTX25MMTH	18	A	A	53,543.33	3.77	19.08
1000005735	MODULE, --:	1	A	B	51,291.00	3.61	22.69
1000003356	RING,IMPELLER, INTER. STAGE#62924279	3	A	B	41,432.58	2.92	25.61
1000007346	SEAL,BRG ISOLATOR,316SS,#2100-R-03608-6	3	A	A	35,160.00	2.48	28.09
1000003380	BUSHING,THROTTLING,#441/62388939 DWG#-S0	1	A	B	34,917.00	2.46	30.55

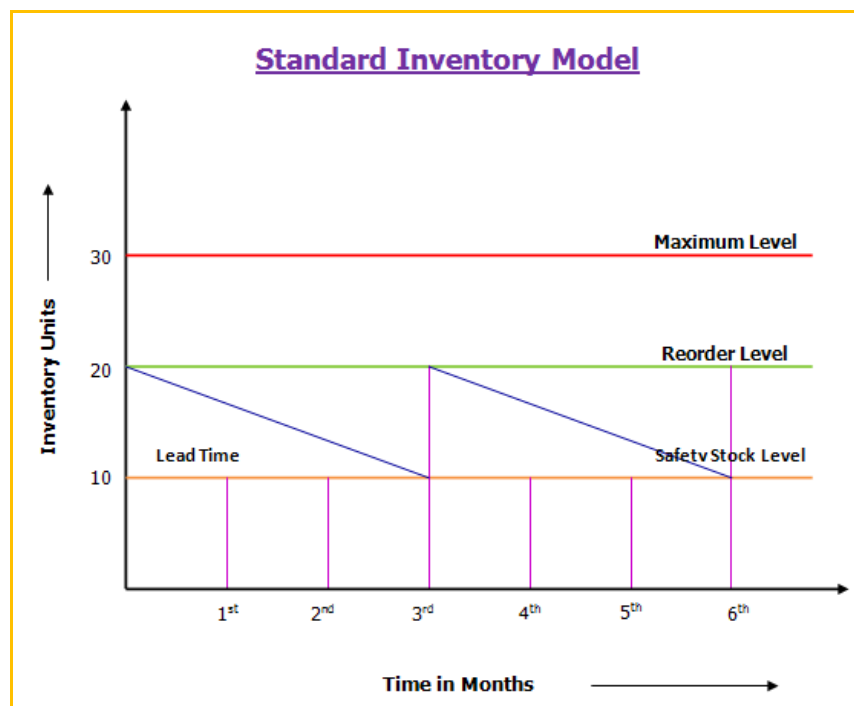
- The Standard "ABC" report from SAP enables to identify the top group of items which take up 70% of consumption value.
- There is also fundamental issue in the identification of "A" category items in SIPCHEM with the normal ABC classification.
- In SIPCHEM-ABC categories are based on unit value as against the conventional "ABC" which is on "CONSUMPTION VALUE". Both the classifications are shown above

## 1.9.2. Observation IM-02

<b>Observation Number</b>	<b>IM-02</b>
Observation	All materials treated as one for inventory control and replenished to maximum level in the inventory Re-Order cycle
Implication / Risk	High inventory holding
Recommendation	Operate between Re-Order Point & Max. level
Benefits	Reduction in inventory holdings
Acceptance / Response	

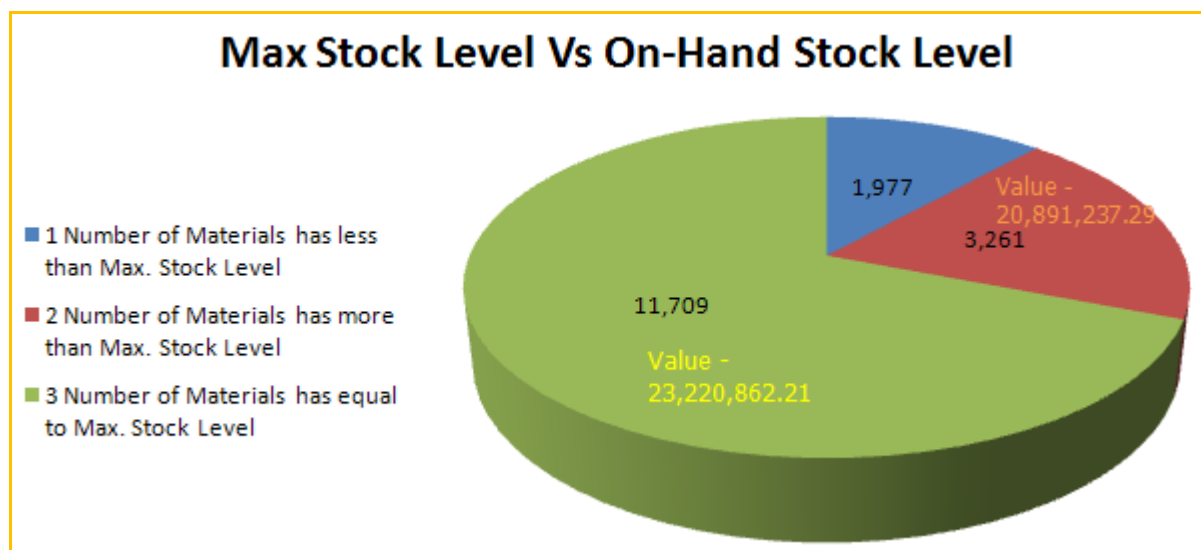
### Inventory Model

Placed below is the classical inventory model with Re-Order Point, Safety stock and Max Level shown in the exhibit below. At the current moment SIPCHEM is replenishing the stocks at RE-ORDER point to the maximum level or more as may be seen from the PIE CHART below. This is one of the main reasons for the High Inventory holding and from the Pie chart it may be seen that more than 80% of the items are either equal to or more than MAX LEVEL



SI.No	Statement of Analysis	Count
1	Number of Materials with combination of SAP# & Plant	16,947
2	Number of Materials has less than Max. Stock Level	1,977
3	Number of Materials has more than Max. Stock Level	3,261
4	Number of Materials has equal to Max. Stock Level	11,709

SI.No	Statement of Analysis	Count	Value
1	Number of Materials has less than Max. Stock Level	1,977	2,257,583.44
2	Number of Materials has more than Max. Stock Level	3,261	20,891,237.29
3	Number of Materials has equal to Max. Stock Level	11,709	23,220,862.21



### Recommendation

The areas of concern above are at serial numbers 2 and 3 above.

Both the above put together make up nearly 90% of the Inventory on hand. So there is a serious need to reduce this level by restructuring the RE-ORDER LEVEL using the classification and criticality analysis suggested earlier.

The categories of "VITAL-V" "A" and "F" Fast moving may only be replenished to the Max level and the others can be replenished with a combination of RE-ORDER LEVEL and SAFETY STOCK as shown in the graph above.

### 1.9.3. Observation IM-03

<b>Observation Number</b>	<b>IM-03</b>
Observation	Criticality analysis ratings for equipment spares - "Vital Essential and Desirable" not done
Implication / Risk	
Recommendation	Criticality analysis for all equipments to be done.
Benefits	Reduction in down time and optimized inventory holdings
Acceptance / Response	

## VED Analysis - Classification Based on Criticality

Several factors contribute to the criticality of a spare part. If a spare is for a machine on which many other processes depend, it could be of very vital importance. Also if a spare is, say, an imported component for which procurement lead time could be very high it's non-availability may mean a heavy loss. Similarly spares required for fighter aircraft at the time of war could be of great value in terms of fighting capability. In general, criticality of a spare part can be determined from the production downtime loss, due to spare being not available when required.

Based on criticality, spare parts are conventionally classified into three classes, viz. vital, essential and desirable

SIPCHEM INVENTORY	A	B	C	
V-VITAL				F
E-Essential				S
D-Desirable				N

**VITAL (V):** A spare part will be termed vital, if on account of its non-availability there will be very high loss due to production downtime and/or a very high cost will be involved if the part is procured on emergency basis. In a process industry, most spare parts for the bottleneck machine or process will be of vital nature. For example, bearings for a kiln in a cement plant will be considered vital.

Insurance spares could also be sub category in the "VITAL" class.

**ESSENTIAL (E):** A spare part will be considered essential if, due to its non-availability, moderate loss is incurred. For example, bearings for motors of auxiliary pumps will be classified as essential.

**DESIRABLE (D):** A spare part will be desirable if the production loss is not very significant due to its non-availability. Most of the parts will fall under this category. For example, gaskets for piping connection.

The VED analysis helps in focusing the attention of the management on vital items and ensuring their availability by frequent review and reporting. Thus, the downtime losses could be minimized to a considerable extent.

### 1.9.4. Observation IM-04

<b>Observation Number</b>	<b>IM-04</b>
Observation	Analysis of Fast Slow and Non-Moving not done
Implication / Risk	Selective control of inventory
Recommendation	FSN analysis needs to be done
Benefits	Reduction in down time and optimized inventory holdings
Acceptance / Response	

## Recommendations

As mentioned above and in the earlier observations the third critical analysis is the analysis for identifying the “FAST-F” “SLOW-S” and “NON-MOVING-N” items. These are mainly done based on the number of issues for each item

By doing FSN analysis materials can be classified based on their movement from inventory for a specified period. Items are classified based on consumption and average stay in the inventory. Higher the stay of item in the inventory, the slower would be the movement of the material

F - Fast Moving  
 S - Slow Moving  
 N - Non moving

The following steps in doing the FSN analysis

Calculation of average stay and the consumption rate of the material in warehouse  
 FSN Classification of materials based on average stay in the inventory  
 FSN Classification of the material based on consumption rate  
 Finally classifying based on above FSN analysis.

Hence once all the three analysis as described above “ABC”, “VED” and “FSN” is done the same can be combined in a matrix below

<b>SIPCHEM INVENTORY</b>	<b>A</b>	<b>B</b>	<b>C</b>	
<b>V-VITAL</b>				<b>F</b>
<b>E-Essential</b>				<b>S</b>
<b>D-Desirable</b>				<b>N</b>

The replenishment levels can be maintenance as under

1. All items in the top row only to Max. Level
2. All items in second and third rows to ROP Safety Stock

### 1.9.5. Observation IM-05

<b>Observation Number</b>	<b>IM-05</b>
Observation	Reported Variations In Lead Time Vs Planned Lead Time
Implication / Risk	Increase in stock out and MMTR-MTTF
Recommendation	Analyze Internal and External lead times
Benefits	Better MRP Planning results
Acceptance / Response	

One of the secondary factors that affect the inventory build up the erratic delivery time from the vendors of the various spares for the equipments.

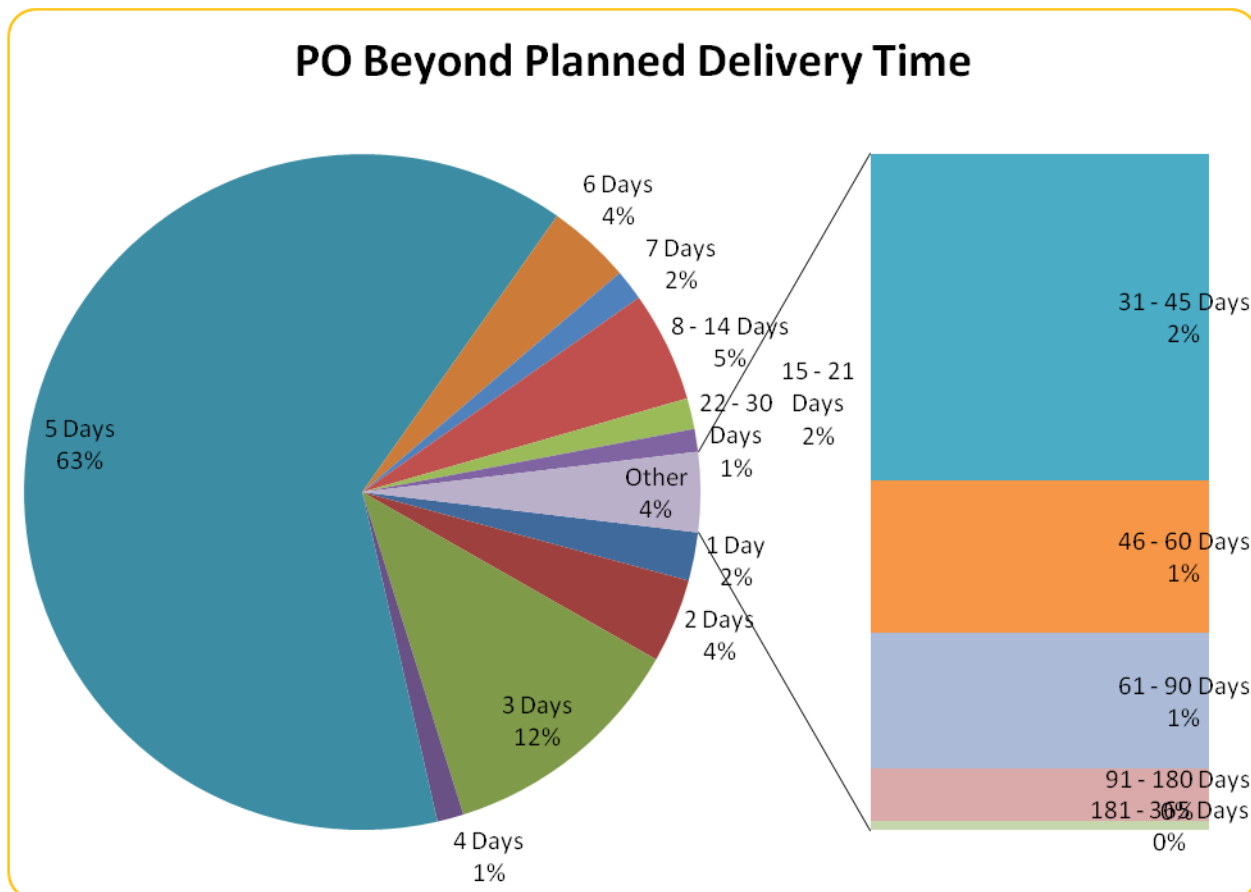
SIPCHEM has standard or planned delivery time of 40 days entered in the SAP Master data for the purpose of the MRP run.

However it is noticed as per the analysis below that there is variation in the actual delivery time against the planned delivery time leading to stock outs and consequent down time of the equipments.

It is necessary to enter realistic delivery times in the SAP System both from the supplier and internal processing time. Also the GR Processing should be properly estimated right from shipment to port clearances, inspection time etc.

SI.No	Statement of Analysis	Count
1	Number of PO	16,346
2	Number of PO Beyond Planned Delivery Time	9,430

SI.No	Statement of Analysis	Count
1	1 Day	218
2	2 Days	380
3	3 Days	1,124
4	4 Days	119
5	5 Days	5,973
6	6 Days	377
7	7 Days	139
8	8 - 14 Days	498
9	15 - 21 Days	139
10	22 - 30 Days	103
11	31 - 45 Days	174
12	46 - 60 Days	81
13	61 - 90 Days	72
14	91 - 180 Days	28
15	181 - 365 Days	5



#### 1.9.6. Observation IM-06

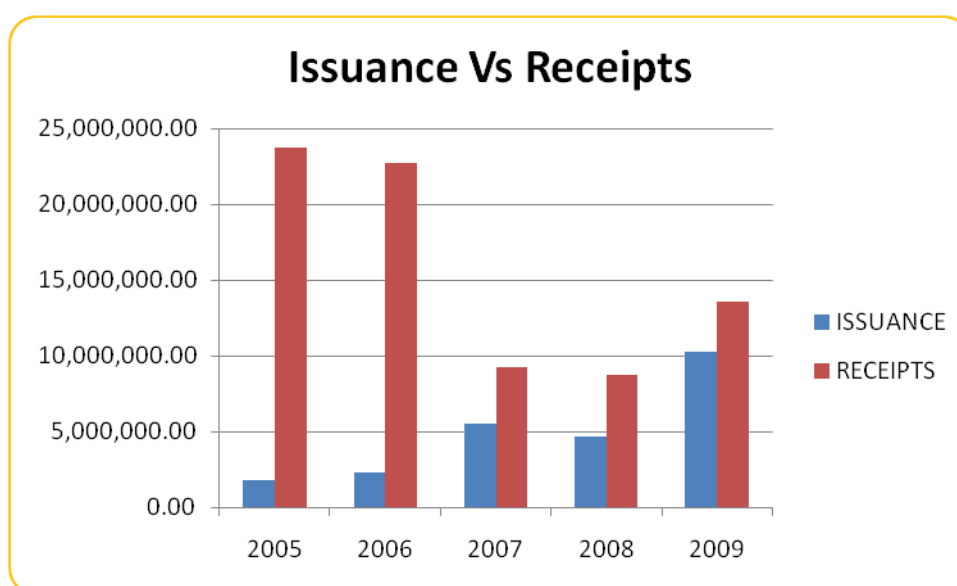
<b>Observation Number</b>	<b>IM-06</b>
Observation	No correlation between consumption and Purchasing over the last 5 years as shown in the analysis below
Implication / Risk	Continued increase in Inventory value
Recommendation	Category and Criticality analysis of Inventory
Benefits	Overall reduction in Inventory
Acceptance / Response	

#### Comments

On analysis of the consumption data for the last 4 years from 2005 onwards shows that there has been continuous increase in the purchasing over the last 5 years in comparison to the usage-consumption as per the charts shown below. This is also one of the reasons for the high inventory holdings.

Proper classification of Inventory both for spares – equipments and consumables as suggested above would appropriately reduce the inventory holdings.

Year	ISSUANCE	RECEIPTS
2005	1,774,041.39	23,745,382.76
2006	2,271,027.19	22,739,808.79
2007	5,500,475.13	9,243,968.97
2008	4,657,604.98	8,691,038.44
2009	10,223,880.46	13,519,949.61



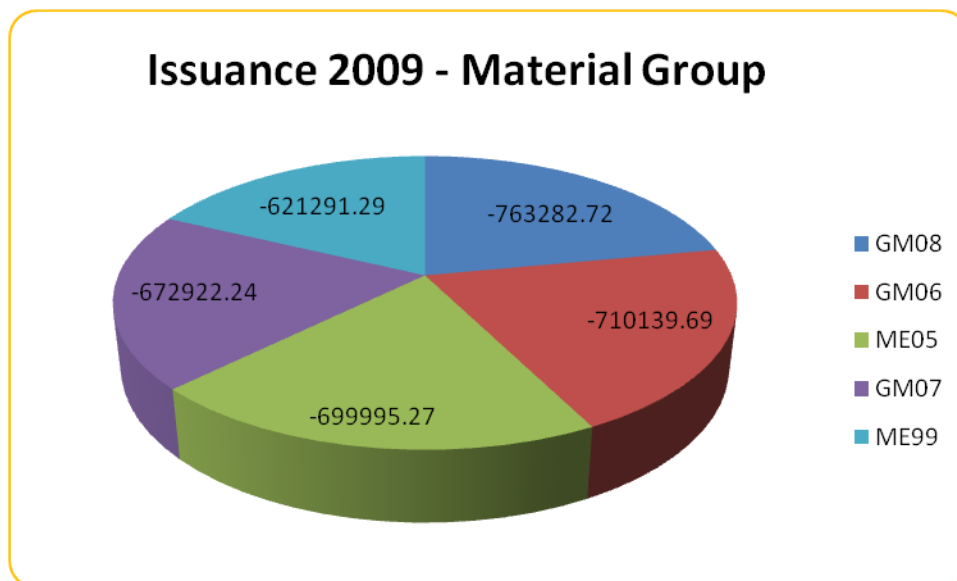
### 1.9.7. Observation IM-07

<b>Observation Number</b>	<b>IM-07</b>
Observation	Analysis done for consumption based on materials group of SIPCHEM
Implication / Risk	Understand the consumption pattern of each Materials Group
Recommendation	Spend Analytics for purpose of concluding long term purchase agreements
Benefits	
Acceptance / Response	

As per the request of General Manager-Mr Khalid Saeed. Al-Dossary we have conducted a Spend Analysis for Issuance of years 2009 of the various MATERIALS GROUP of SIPCHEM and the results are given below. The consumption value (Unit cost X Annual consumption in units) has been arranged in descending order of consumption value.



ISSUANCE	
MATGRP	AMOUNTINLC
GM08	-763282.72
GM06	-710139.69
ME05	-699995.27
GM07	-672922.24
ME99	-621291.29



### 1.9.8. Observation IM-08

Observation Number	IM-08
Observation	Observation handling of spares common across plants such spares purchased separately for each plant, stored in common warehouse
Implication / Risk	Instances where same item has different prices for different plants
Recommendation	Since SIPCHEM has centralized purchasing and storage it would be easier to have a spares bank
Benefits	Selective control of inventory for high consumption items
Acceptance / Response	

## **Business Scenario in SIPCHEM**

It is observed that in the above ceases the spares are procured individually Plant wise against their MRP runs on re-order point.

Once it is received it is stored in the common warehouse and the SAP systems show the break up for the plants of the total quantity.

For e.g.: Material “A” may have 5 for Plant 2000 and 4 for Plant 2001

The problem arises when one of the plants run out of stock and are forced to borrow from the other’s stock.

## **Recommendations**

We recommend setting up of a “SPARES BANK” for such items for the reasons as below:

1. SIPCHEM has already a central Purchasing Organization servicing all the companies and plants thereof.
2. SIPCHEM has a common central warehouse for all the plants
3. It will eliminate instances of same item having different prices for the different plants as shown in the example below
4. It will be necessary to identify items from the Materials Master which are common across plants
5. Every Organization is interested in reducing the working capital requirements particularly in locking up funds in non moving spares. The concept of “SPARES BANK” is a positive step in this direction particularly for common spares, insurance spares and slow moving items. The procedure consists in pooling of the resources by having a common bank of spares instead of each plant carrying its own stock of insurance and other fast and common spares. If the equipments are standardize across plants the Vendor himself may be asked to stock the spares on a “Consignment model” thereby totally freeing the organization from an inventory costs.

## Variations in Unit Prices across Plants for the Same Item

SAP NO	DESCRIPTION	Plant - 2000		Plant - 2001	
		Moving Price	On-Hand QTY	Moving Price	On-Hand QTY
1000000004	ASSEMBLY,STEM&PLUG/SPRL PIN,CNTRL VLV	6,020.70	1	5,659.36	1
1000000005	GASKET,SPRLWND,FLEXICARB,GRPHT,57.5X75.5	107.82	2	107.81	0
1000000006	PACKING,DSPRHTR,GRAFOIL#C15971-BPP	218.05	5	215.64	0
1000000007	GASKET,SPRLWND,FLEXICARB,#C26896-BPP	27.71	3	20.00	1
1000000008	RING,PISTON,SSTL,32 MM DIA,#C31356-BPP	898.82	7	898.82	1
1000000009	ASSEMBLY,LWR CAGE & NZL DISC,#C97311WAQA	9,506.92	1		
1000000010	CAP,DSPRHTR,316SS,41MMX13MM,#C29798-XSH	620.01	4	478.29	1
1000000011	TAB,LOCK,14MMLGX14MMWD,STL,#C29772-ZXC	413.34	4	318.83	1
1000000012	PIN,CLEVIS,3.2MM,16MM,SS400,#U20-112	7.19	3	7.19	1
1000000013	DIAPHRAGM,ACT,BUNAN,455MMDIA,#S185990BPP	1,463.26	4	1,128.65	1
1000000014	ASSEMBLY,STEM/PLUG & SPRL PIN,VLV	4,300.00	1		
1000000015	ASSEMBLY,LWR CAGE&NZL DISC,#C97310LAQA	7,912.00	0		
1000000016	ASSEMBLY,LWR CAGE&NZL DISC,#C97312AAQA	10,711.27	1	10,999.84	1

Both the above situations are ideal for a “SPARES BANK” or “SPARES POOL”

This is one the basic objectives of OPTMIZATION –namely effective utilization of common requirements with the overall objective of reducing Total Cost of Acquisition and Storage.

### 1.9.9. Observation IM-09

<b>Observation Number</b>	<b>IM-09</b>
Observation	Variety Reduction-Standardization
Implication / Risk	Wide Range of Sizes Stocked with No Movement
Recommendation	Study the Detailed Master for Reduction in Varieties
Benefits	Optimization of Inventory from Perspective of SKU's
Acceptance / Response	

### Business Scenario in SIPCHEM

One of the primary objectives of “INVENTORY OPTIMISATION” is also “VARIETY REDUCTION” in number of “STOCK KEEPING UNITS” by way standardization of sizes. This is particularly true in the case of fast moving engineering consumables such as ‘Belts, Gaskets, bearings” etc. After going through the item Master it is seen that there is scope for reduction in numbers of sizes stored for a particular product for e.g. “Gaskets”

Inventory Optimization also implies “REDUCTION IN VARIETIES OF MATERIALS STOCKED” and which leads to overall reduction of Inventory holdings.

For example we may holding a number of sizes of “Gaskets” in intervals of 0.5 cm, some of which may not have any issues over the years leading to

1. Unnecessary blocking of storage space which is limited in SIPCHEM
2. Consequent blocking of capital in unnecessary inventory holdings which may have been used for storing essential spares.

## **Recommendations**

1. Form a team of Maintenance and Inventory specialists to analyze such items with the objective of Standardization and variety reduction.

## 1.10. Road Map for SIPCHEM - Inventory Optimization Project

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- Split Exclusive spares –Equipment spares from Common item such as primarily Material Groups – GM-01-99, and other groups identified jointly by Maintenance – Procurement - Inventory
- Reclassify ABC category as per SAP and Industry Best Practice on consumption value for exclusive spares conduct Criticality analysis namely VED jointly with Maintenance, Purchase, and Inventory Teams
- Conduct FSN –Fast Slow and Non Moving based on movement-issue analysis for the last 5 years of spares & consumables
- Develop VED, ABC, FSN and Matrix for the complete inventory items.
- Separate INSURANCE SPARES from the list and stock them separately.
- Re-work inventory levels from Max Level to ROP for the above matrix
- Use Max Stock Level only for “V” “A” and “F” category for others use a combination of Safety Stock and ROP. This will reduce overall inventory Holdings and Improve equipment downtime.

## 1.11. Appendix 1 – Glossary of Abbreviations

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GI – Goods Issue – a transaction done in SAP when materials are issued from the warehouse  
GR – Goods Receipt – a transaction done in SAP when Materials are received into the warehouse

PO – Purchase Order – a document created in SAP to be sent to the Vendor for procurement of materials or services

PPM WO – Planned Predictive/Preventative Maintenance WO – a WO created in SAP (normally on a regular basis by the system) to detect the condition of equipment and try to identify failures before they become serious or before they start effecting performance

PR – Purchase Requisition – a document created in SAP when someone wants to request materials or services from a Vendor

Reservation – a document created in SAP when someone wants to take items from the warehouse. Items are Gled (goods issued) to reservations. Reservations are most often generated from WO.

WO – Work Order – a document created in SAP to record details of work that is done on equipment in the plant

MRP – Materials Requirements Planning – a methodology used to try to automate the re-ordering of materials for inventory in the warehouse based on a set of rules and settings entered into SAP

PD – a setting which indicates that MRP is applicable to this material

ND - a setting which indicates that MRP is NOT applicable to this material

MB – a setting which indicates that MRP should group all reservation requirements for a month into one requisition.

SSL – Safety Stock Level – a setting in SAP indicating the level of inventory which has been set aside to cater for Unplanned Usage, variations in usage or delivery times by vendors (please note this not how RasGas is currently using this setting in SAP)

EAM – Enterprise Asset Management – the overall processes required to manage the physical assets of an enterprise. They typically focus around the maintenance processes but have links to finance, procurement, inventory and HR processes.

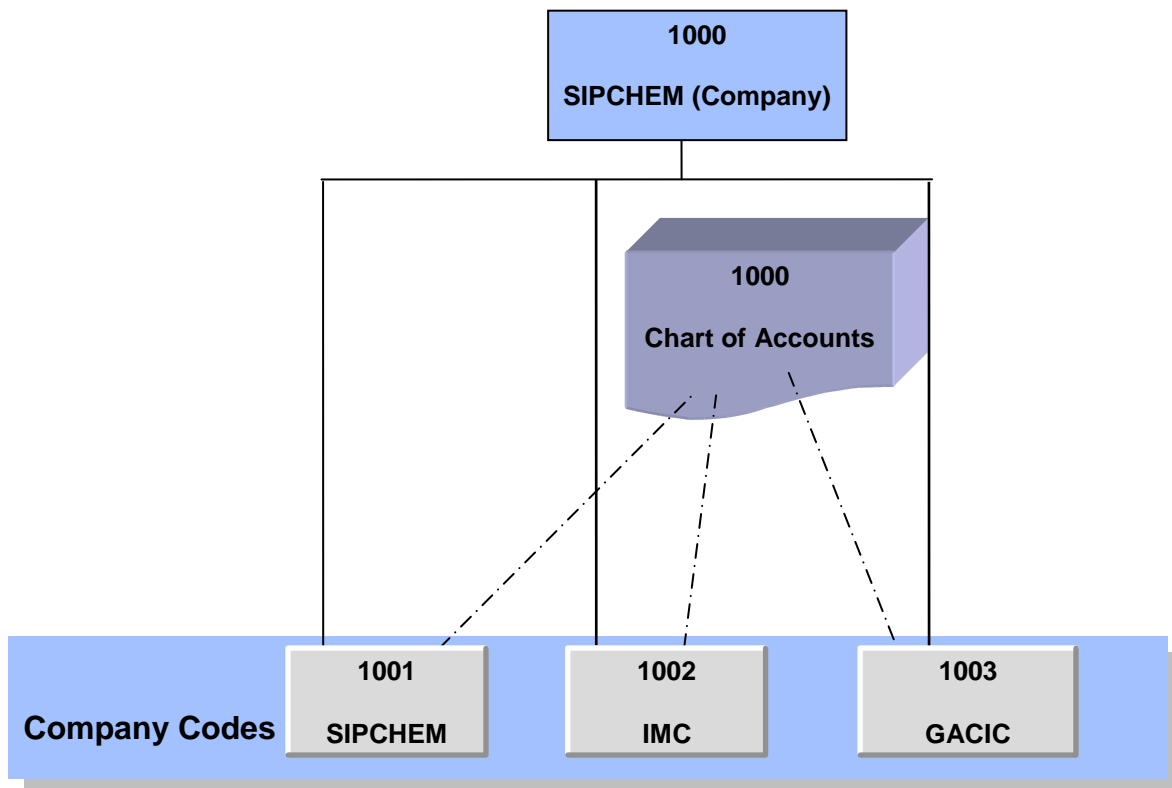
## 2. Part 2 - Asset Accounting

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### 2.1. Snap Shot of Asset Accounting at SIPCHEM

As at Present	After this Exercise
<p><b>1. Assets created lack clarity</b></p> <ul style="list-style-type: none"> <li><b>i. Fixed Assets created not as per SAP norms or guidelines</b></li> <li><b>ii. No Proper asset registers</b></li> <li><b>iii. Identification of assets not possible</b></li> <li><b>iv. No Verification of assets</b></li> </ul>	<p><b>1. We could bring value and make the assets complete with our strategy</b></p> <ul style="list-style-type: none"> <li><b>i. Assets can be identified</b></li> <li><b>ii. Assets can be verified</b></li> <li><b>iii. We have gathered adequate data and the sample tests carried out are successful</b></li> <li><b>iv. The details are shared with the core member's</b></li> <li><b>v. Also demonstrated on 28th meeting with the real-time data in the 'System Walk-through'</b></li> <li><b>vi. Quantum leap in the SIPCHEM end user knowledge base</b></li> </ul>
<p><b>2. Maintenance Equipment masters are done well</b></p> <ul style="list-style-type: none"> <li><b>i. No linkages between equipment masters and asset masters</b></li> <li><b>ii. No integration with other modules</b></li> </ul>	<p><b>2. Equipments and assets can be linked and can be managed efficiently</b></p> <ul style="list-style-type: none"> <li><b>i. It is laborious and voluminous process</b></li> <li><b>ii. In the demo, linked the equipments with the assets 300132 and drilled down to the BOM and material master</b></li> <li><b>iii. The benefits of integration which is the essence of SAP.</b></li> </ul>

## 2.2. SIPCHEM Technical Organization Structure – Financial Accounting Organization Structure



The purpose of this structure is to map the organizational entities of SIPCHEM in to SAP for recording the financial accounting transactions

- The following are defined as Company Codes, where individual balance sheet and profit and loss accounts are drawn:
  - 1001 SIPCHEM as an individual legal entity.
  - 1002 International Methanol Company (IMC)
  - 1003 Gulf Advanced Chemical Industries (GACIC)
- All these company codes use the same Chart of Accounts 1000 and have the same fiscal year that is January to December, with calendar month-end as period ending. The currency of these company codes is Saudi Riyal (SAR).
- 1000 is a consolidation entity, for SIPCHEM as group, where balance sheet and profit and loss accounts of Company Codes 1001-1003 are consolidated. Hence, they are assigned to 1000. The consolidation currency is in Saudi Riyal (SAR).
- For convenience we are using Co Code 1002 – IMC data for our analysis.



## 2.2.1. Stakeholders

Department	Interest
Asset accounting Department	Asset data management, identification etc
Equipment Maintenance Department	Equipment data management, identification etc
Finance Department	Accounting of all transactions that have financial implications
Management	Timely reporting for financial and controlling analyses

## 2.2.2. Vision

To achieve the maximum value of the SAP best-practices under Enterprise Asset Management and Spare part Inventory and thereby reducing costs and risks, and for proper upkeep of machinery and spare parts.

## 2.2.3. Process Architecture

### Phase 1

- Understanding the present practices in Asset and Inventory modules
- Understanding of critical assets and equipment architecture
- The roadmap for Optimization

### Phase 2

- Finalize the proper strategy for linking Assets and Equipments
- The required change management
- The required configuration changes
- The required roadmap for such changes
- Data cleaning and data Updation
- Creation of new asset and Equipment masters, if needed
- Unit testing and integration testing by process owners
- End user training – on the process change
- Data Migration and Go Live
- Hand-holding and Support

The data provided for

- The asset balances for co codes 1001 to 1006.
- Asset master record of few assets like 300101, 300131-136, 300139, 300144
- Equipment master list

## 2.3. Present Practices

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1. The Asset creation process as at present:  
 The user requests approval for the purchase of asset from the concerned authority using  
 The Asset request form - the copy is attached herewith. On approval by the concerned authorities, the Asset is created in the system using T Code AS01 and the asset number is allotted to the proposed purchase of the asset. The Purchase cycle is performed – from RFQ, -> Po -> GR -> Invoice -> Payment. The AP team fills the purchase price and Asset is commissioned.
2. The asset 300132  
 This asset “Plant & Equipment -IMC” The description is very vague and could not be identified.
3. The asset verification  
 The asset verification is not done in the recent past.
4. The major reason may be that the asset could not properly be identified for want of details
5. Various fields are left blank in Asset master and SAP facilities like linkages to other modules etc are not done.
6. The Depreciation area – 01 –Book depreciation method alone is used but some 6 Dep. Areas are defaulted
7. They do the monthly Depreciation Run
8. Maintenance activities are carried out by PM module using the Notification -> Work order -> execution.
9. The breakdown maintenance could not be explained as the Power users are on leave.
10. The capital spares are maintained through 3. Number range with Zero value which is a standard process
11. The Equipment Masters are created on a stand-alone basis and the BOM structure and the necessary documents are stored though details like location, identification, criticality etc are missing.
12. The reports in both Assets and Plant maintenance are generated outside the system using XL etc
13. I have analyzed the asset 800046 which is office equipment. I drilled down 2004 data to find that this asset has 58 items.

14. They are not using any of the SAP standard reports which will give lots of info. They generate reports using excel
15. Most of the assets are combined or not classified properly
16. They are not using any of the SAP standard reports which will give lots of info. They generate reports using excel.

SL.No	Asset	Description	Observations
1	200001	Roads IMC , U&O	Asset fields are mostly empty and no clarity on asset
2	500001-03	Toyota car etc	Zero value and has to be identified
3	500007	Vehicles	No clarity
4	800063	Coffee maker	Should have fully depreciated. Linked to asset 800121 which is a Video cameras
5	300131	Licensing	Description inadequate
6	300132, ..33	Plant & machinery- IMC	Location, Quantity, other details, department areas not done properly. Description incomplete
7	2200123	EXTERNAL TURNING TOOLS PCLNR 252M12 WITH SPARES	As above
8	2200184	Thermal monitor	Value is >6000 and not classified as Low value
9	2200174	Breathing Air Station - AUC# 1600177	It is machinery and equipment master should also be there.
10	800046	Office equipment	It contains more than 60 small assets and TE
11	210030	Catalyst	It is consumable item. Again cannot be identified.
12	210034	Catalyst	Fully depreciated in 11 months and no need to be asset
13	140008	Financial charges	Financial charges etc are capitalized here
14	300136	Plant & Equipment ( Commercial Loan Cost )	Machinery details are not there
15	1300007	Cisco IP phones -11 units	Quantity field shows "Zero" Location, Vendor, the details of the machinery are not captured
16	1300022	Demin PLC Serial Communi.	Quantity, location, vendor fields are empty. Identification is difficult
17	1200021	SAP licenses	Origin asset is 1200040 which is no way connected to this and other details are missing.
18	1000014	Computers and Peripherals - U&O	The description is very vague and the details of the asset are missing
19	2200074	UNIVERSAL CENTRE LATHE	Though it is a "0" value asset, it has to be identified but the details provided in the asset master is far from satisfactory. The origin is from 2200077 which is not related to this asset.
20	800059	Laboratory and Safety - U&O	Original value is 2,863,084. Classified under Office Equipment. Other details are not there.

## 2.4. Fixed Assets Management - Challenges and Opportunities

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To manage asset operations with business strategy, organizations must be able to answer fundamental questions about their fixed assets, such as:

1. What assets do we have, what condition are they in, what function do they perform, and what is their contribution to production?
2. Do we have sufficient capacity (or under- or over-capacity) in our asset portfolio? Are some assets redundant, underutilized, unprofitable or burdensomely expensive?
3. Are the risks of our assets causing harm to people and/or the environment at legally and organizationally acceptable levels?
4. Can we accurately evaluate the performance, risk reduction, compliance and/or sustainability benefits of proposed work or investments; and likewise the impact of delaying or not performing the proposed actions?
5. Can we confidently address these lines of inquiry and provide answers to stakeholders with a clear audit trail and reliable data?

Asset intensive businesses like Chemical, Oil & Gas, are well aware of the value of best-practiced asset management for reducing costs and risks, and for facilitating regulatory compliance. Nearly every asset-intensive operation is under increasing pressure to control costs and maximize return on assets, while providing high service quality and continuing to protect the safety of employees and the public. “Green” initiatives are likewise growing in importance with regulators, stockholders and consumers, and will continue to do so.

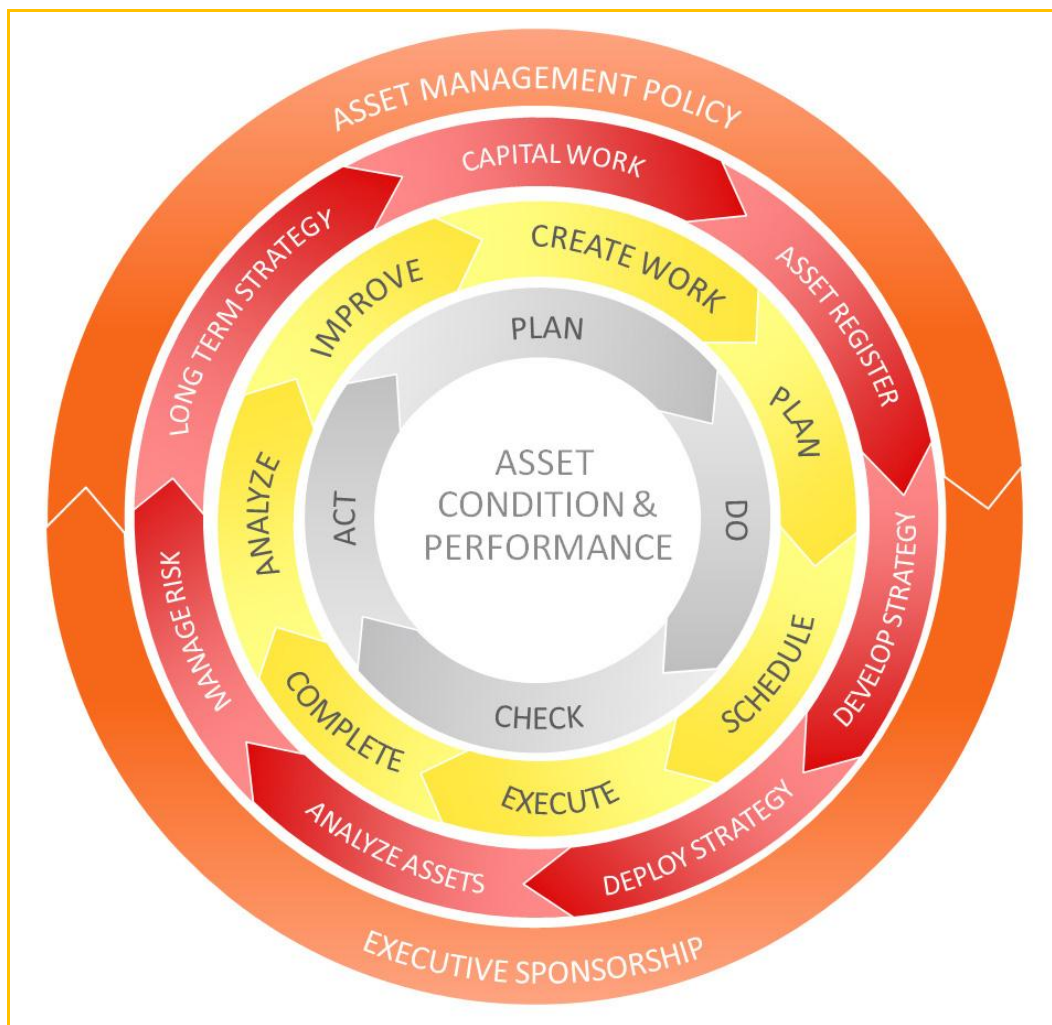
In contrast to some other standards, which can sometimes be met simply by generating extensive paperwork, SAP specifically requires evidence of alignment between good intentions and the actual, day-to-day activities of capital project implementation, operations, and maintenance. Thus it is a valuable mechanism to ensure confidence in results and support good governance, long-term planning and sustainable performance. The ability to demonstrate compliance with SAP requirements not only reduces operational and compliance costs and risks, but also can drive competitive advantage through improved service and greater operational proficiency.

Embracing the SAP standard supports asset intensive businesses to:

- Align the asset management strategy and approach with the overall business strategy
- Improve the integration between asset management and financial management processes
- Maximize return on assets
- Maximize asset uptime
- Foster an organizational culture focused on quality, safety, and continuous improvement

SAP is most relevant to asset intensive businesses like mining, oil and gas, energy/utilities, and public infrastructure including roads, rail and ports. For these organizations, the optimal sustainable productivity and performance of assets is central to the business objective. Significant investment and ongoing expense and risk are associated with the acquisition/creation, utilization, maintenance, and renewal/disposal of asset portfolios in such enterprises. Strong regulatory accountability for the safe management of assets and related services is a further driver for the adoption of SAP.

Optimal management of assets and related costs, risks and performance requires a pragmatic, lifecycle approach. You need to determine what assets to build or obtain, how best to maintain and use them, and how best to renew, recondition and/or dispose of them.



- Manage risk before it becomes a problem
- Know the condition of every asset
- Standardize the Asset Registry business process

Optimizing asset management processes takes not only technology but also people and processes. The goal of these engagements is to help customers understand where they are today, and to chart a course to become a top-flight maintenance management organization through alignment

Our Asset Management Strategy, Objectives and Plans. Enable the business to detect potential defects before they escalate into incidents that might impact safety, environment or operational performance and/or increase the cost of initiating maintenance.

## 2.5. Observations

### 2.5.1. Observation AA-01

<b>Observation Number</b>	<b>AA-01</b>
Observation	Asset master creation: The user requests approval for the purchase of asset from the concerned authority using the Asset request form - the copy is attached herewith. On approval by the concerned authorities, the Asset is created in the system using T Code AS01 and the asset number is allotted to the proposed purchase of the asset. The Purchase cycle is performed – from RFQ, -> Po -> GR -> Invoice -> Payment. The AP team fills the purchase price and Asset is commissioned
Implication / Risk	No details of the asset are available in AA
Recommendation	Asset Creation process is okay but the Asset acquisition has to be done by the Asset Manager using various transaction codes like F-90, ABZON etc as per need on commissioning of the asset or fill the necessary details using AS02. The current process leaves most of the fields are not filled properly or left blank like location, proper description is not given, vendor details are not provided etc. Of course it requires change management process as it is a live system.
Benefits	A complete and error-free asset is created.
Acceptance / Response	

### 2.5.2. Observation AA-02

<b>Observation Number</b>	<b>AA-02 - Asset Verification Process</b>
Observation	No Asset verification process and physical verification of assets are not done in the last 5 years
Implication / Risk	We don't have a right info about the assets availability. This leads to in a few cases that the asset is not purchased at all leaving the assets created in the system
Recommendation	Asset verification at least once an year is must and that will help us to clean and update the asset records. We also recommend that the asset has to be verified by the Asset manager on commissioning the asset.
Benefits	An updated assets process which will give clarity for better management and right decisions. Will avoid unnecessary purchases
Acceptance / Response	

### 2.5.3. Observation AA-03

<b>Observation Number</b>	<b>AA-03 – Identification of the asset 300132</b>
Observation	This asset “Plant & Equipment -IMC” is very vague and could not be identified
Implication / Risk	Clarity in asset management is the first causality
Recommendation	
Benefits	
Acceptance / Response	

### 2.5.4. Observation AA-04

<b>Observation Number</b>	<b>AA-04 Dep. areas in multi-currency</b>
Observation	The Asset master records provide Dep. areas in multi-currency. It is informed that they are using only 01 and as such it is okay
Implication / Risk	Currency fluctuations will have to be accounted
Recommendation	These Dep. areas need not be included in the Future assets
Benefits	Asset will be more transparent and not loaded with more Dep. areas.
Acceptance / Response	

### 2.5.5. Observation AA-05

<b>Observation Number</b>	<b>AA-05</b>
Observation	The key informative fields like quantity, vendor details etc left blank or Zero.
Implication / Risk	
Recommendation	In an integrated environment, such info play a major role
Benefits	A complete view of the asset is available
Acceptance / Response	

### 2.5.6. Observation AA-06

<b>Observation Number</b>	<b>AA-06</b>
Observation	The cost center allocation for assets are not proper
Implication / Risk	Cost analysis will have distorted info
Recommendation	Analyze and change the cost center
Benefits	
Acceptance / Response	

### 2.5.7. Observation AA-07

<b>Observation Number</b>	<b>AA-07</b>
Observation	Low value assets are not classified as per directions – currently 10,000 SAR per asset
Implication / Risk	Wrong classification and higher depreciation
Recommendation	To check and reclassify
Benefits	Avoids unnecessary depreciation
Acceptance / Response	

### 2.5.8. Observation AA-08

<b>Observation Number</b>	<b>AA-08</b>
Observation	Asset verification is not done in the recent past
Implication / Risk	No clarity on the asset number and value
Recommendation	To do immediately
Benefits	Manifold benefits
Acceptance / Response	



### 2.5.9. Observation AA-09

<b>Observation Number</b>	<b>AA-09</b>
Observation	Equipments are not linked to the Assets
Implication / Risk	Under utilization of SAP data
Recommendation	Equipments to be linked to Asset
Benefits	
Acceptance / Response	

### 2.5.10. Observation AA-10

<b>Observation Number</b>	<b>AA-10</b>
Observation	Some assets are created as Capital Spare parts and stored under Inventories. No identification from Asset side is available
Implication / Risk	Up keep cost and identification issues in case of need
Recommendation	Proper asset identification numbers to be given
Benefits	Proper Asset identification and verification at periodic intervals
Acceptance / Response	

### 3. Part 3 – Benefits & Road map to SIPCHEM

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#### 3.1. Work Plan

1. Asset Identification
2. Asset verification
3. Asset data cleaning
4. Indexing or Tagging
5. Asset structure and grouping
6. Equipment Identification with asset
7. Linking Equipments to Asset
8. Necessary Change Management
9. Testing, Training and Go Live.

This will be done for company codes –1002 and 1003

Fixed Assets - Utopia will use 3 consultants besides the Principal consultant Krish - all Onsite and a dedicated team from SIPCHEM. Utopia hopes to complete the exercise in 6 months time primarily for company codes 1002 and 1003. The actual time frame may vary according to the real time exigencies.

## The volume of workload

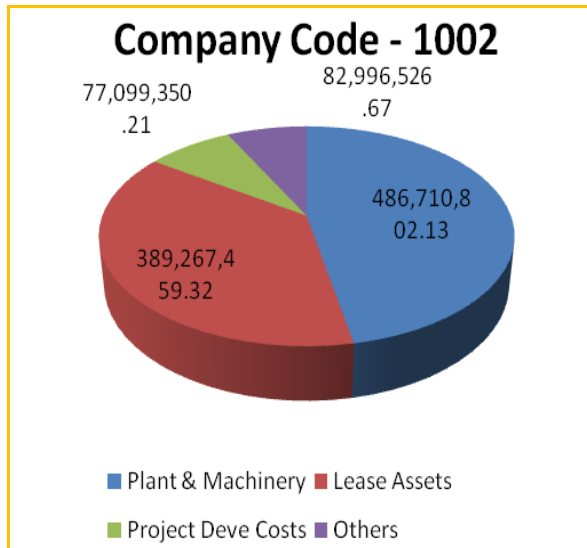
### 1. The Co code 1002

The No of assets= 1007

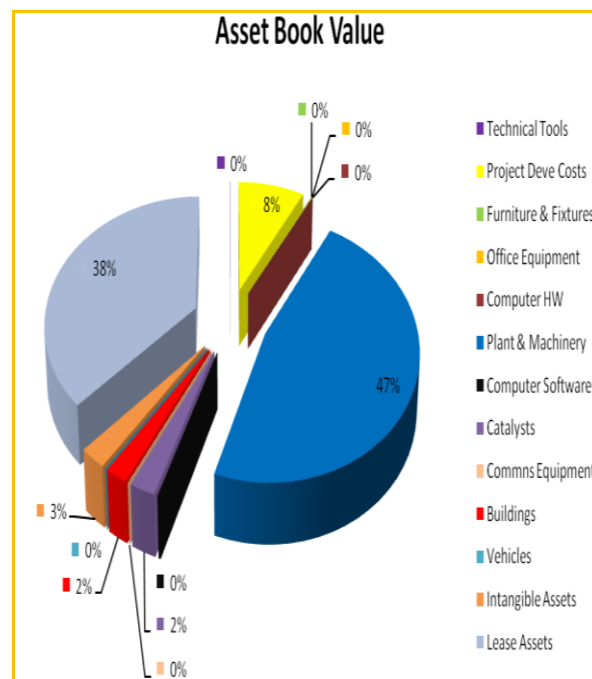
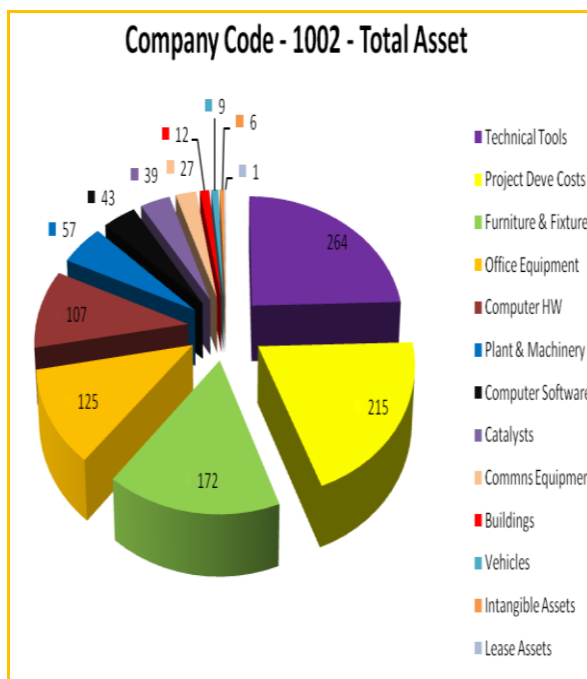
The value of Assets= SAR 875,978,261.45

The number of equipments: 7280

The Plant & Machinery and leased assets account for 88% of the total asset value



Asset Class	Book Value
Technical Tools	412,978.42
Project Deve Costs	82,996,526.67
Furniture & Fixtures	1,141,058.99
Office Equipment	220,088.57
Computer HW	347,897.00
Plant & Machinery	486,710,802.13
Computer Software	2,056,509.50
Catalysts	24,822,080.12
Commns Equipment	113,985.17
Buildings	21,703,214.28
Vehicles	0.00
Intangible Assets	26,281,538.16
Lease Assets	389,267,459.32

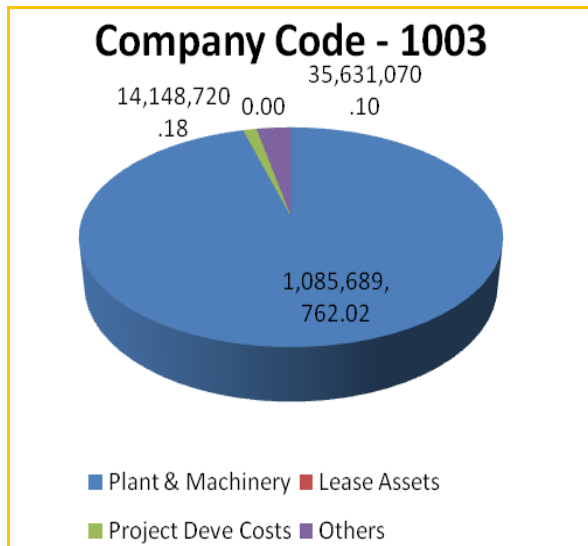


**2. The Co code 1003:**

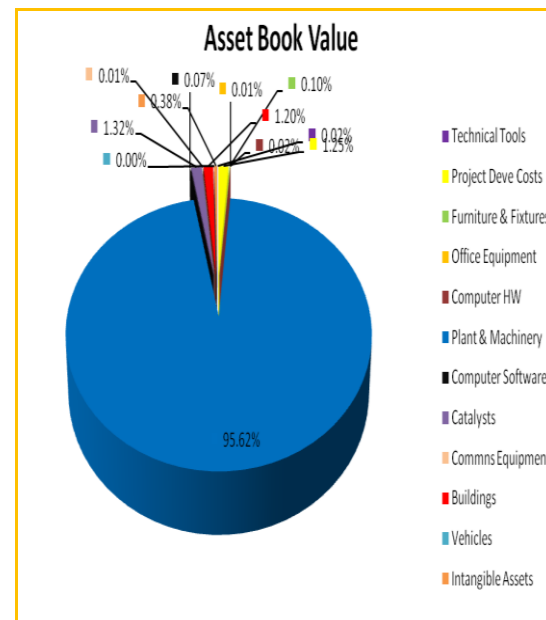
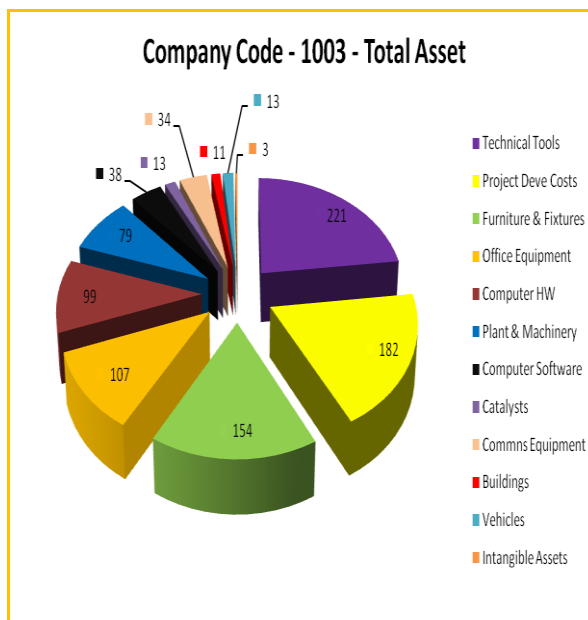
**The No of assets= 954**

**The value of Assets= SAR 1,135,469,552**

**The Plant & Machinery accounts for 95.60% of the total asset value.**



Asset Class	Book Value
Technical Tools	219,118.55
Project Deve Costs	14,148,720.18
Furniture & Fixtures	1,106,303.78
Office Equipment	166,837.78
Computer HW	239,330.57
Plant & Machinery	1,085,689,762.02
Computer Software	831,118.44
Catalysts	15,036,735.29
Commns Equipment	93,979.39
Buildings	13,669,934.37
Vehicles	0.00
Intangible Assets	4,267,711.93



The Benefits that SIPCHEM may derive out of this exercise are as follows:

1. The asset data will be more informative and communicative.
2. The identification and verification of assets could be possible
3. The machinery component of the asset will be more meaningfully defined
4. The asset creation and Acquisition processes will be streamlined and will make the assets to be created in future, more comprehensive.
5. The Equipment masters will be linked with the Asset wherever necessary and will play a vital role in managing the asset and the equipments
6. In short Clarity and Integration benefits which are the primary benefits of SAP will be derived.
7. The Capital spares will be optimally utilized.

We also assume full co operation from the SIPCHEM team and timely production of required info like Invoices, rates charts, quotations etc and help us to identify the assets and Equipments on a war footing.

## 3.2. Manpower Requirements

### Functional Consultants

Fixed Assets	Count
Principal Consultant FI (Krish)	1
FI- AA	2
PM	1

Inventories	Count
Principal Consultant MM (Chandra)	1
MM	1
PM	1

### Technical Consultants (as per need)

Profile	Count
ABAP Programmers [Offshore]	2

We hope to optimize the usage of consultants with due care and diligence.

### Time Schedule (Planned) – 6 Months

Description	Month 1	Month 2	Month 3	Month 4	Month 5	Month 6
Setting up of Team and Define roles and Responsibilities						
2. Realization						
3. Testing and Go Live						
4. Post Go Live - Support						

LET US CONCLUDE THE REPORT WITH THE FOLLOWING PROVERB:

**"Many things worth doing in this world are declared  
IMPOSSIBLE  
before they are done"**

### 3.3. Annexure

---

#### 1. The details of “Walk through” done on 28th ultimo at Jubail.

Our approach to find asset value: From the asset master.

The pictorial description of an asset – 800046 with value SAR 51,072. Its origin is from asset 800000. But it does not throw any light. So I went to 800046 only.



The screenshot shows the SAP 'Display Asset: Master data' form. The asset number is 800046, and the class is 12700000. The description is 'Office Equipment'. The form is divided into several sections: General data, Inventory, and Posting information.

Asset values	
Asset:	800046 0
Class	12700000
Office Equipment	Office Equipment
Company Code	1002

General data	
Description	Office Equipment
Asset main no. text	Office Equipment
Acct determination	12700000 Office Equipment
Serial number	
Inventory number	
Quantity	0.000
<input type="checkbox"/> Manage historically	

Inventory	
Last inventory on	<input type="checkbox"/> Include asset in inventory list
Inventory note	

Posting information	
Capitalized on	01.12.2004
First acquisition on	01.12.2004
Acquisition year	2004 012
Deactivation on	



**Display Asset: Master data**

Asset values

Asset: 800046 0 Office Equipment  
 Class: 12700000 Office Equipment Company Code: 1002

General Time-dependent Allocations Origin Leasing Deprec. areas

**Origin**

Vendor: \_\_\_\_\_  
 Manufacturer: \_\_\_\_\_  
 Asset purch. new  
 Purchased used  
 Trading Partner: \_\_\_\_\_  
 Country of origin: \_\_\_\_\_  
 Type name: \_\_\_\_\_

**Internal specifications**

Original asset: 800000 0 Acq. on: 24.04.2000  
 Org. acquisition year: \_\_\_\_\_  
 Original value: 0.00 SAR  
 In-house prod. perc.: 0.00

**Account assignment for investment**

Investment Order: \_\_\_\_\_

The asset value comprises of various assets as detailed in Transactions screen:

Asset 1002-800046/0000 Company Code: 1002 International Methanol Co  
 Depreciation Areas: 01 Book depreciation, 15 Tax bal. sht., 20 Cost-accounting de, 30 Consolidated balar, 31 Consolidated balar, 32 Book depreciation  
 Asset: 800046 0 Office Equipment  
 Fiscal year: 2004

Planned values Posted values Comparisons Parameters

**Planned values Book depreciation**

	Fiscal year start	Change	Year-end	Crcy
APC transactions		51,072.18	51,072.18	SAR
Investment support				SAR
Acquisition value		51,072.18	51,072.18	SAR
Ordinary deprec.		648.90-	648.90-	SAR
Unplanned dep.				SAR
Write-up				SAR
Value adjustment		12,266.75-	12,266.75-	SAR
Net book value		38,156.53	38,156.53	SAR
Down payments				SAR

**Transactions**

AsstVal date	Amount	Tty	Transaction type name	Σ Ord. dep.	Σ Ord. dep.	Σ Ord. dep.	Crcy
01.12.2004	1,525.00	310	Acquir transfer of prior-yr acquis. frm cap.asset	19.38-	839.80-	209.38-	SAR
01.12.2004	1,170.00	310	Acquir transfer of prior-yr acquis. frm cap.asset	14.86-	424.57-	160.64-	SAR
01.12.2004	280.00	310	Acquir transfer of prior-yr acquis. frm cap.asset	3.56-	94.59-	38.44-	SAR
01.12.2004	287.50	310	Acquir transfer of prior-yr acquis. frm cap.asset	3.65-	93.46-	39.47-	SAR
01.12.2004	3,846.25	310	Acquir transfer of prior-yr acquis. frm cap.asset	48.87-	1,202.88-	528.07-	SAR
01.12.2004	2,075.00	310	Acquir transfer of prior-yr acquis. frm cap.asset	26.36-	622.50-	284.89-	SAR

Transactions details are downloaded to spreadsheet and the total is

Ast.val.dt	Amount	TTY	Transaction type name
01.12.2004	1,525.00	310	Acquirg transfer of prior-yr acquis. frm cap.asset
01.12.2004	1,170.00	310	Acquirg transfer of prior-yr acquis. frm cap.asset
01.12.2004	280	310	Acquirg transfer of prior-yr acquis. frm cap.asset
01.12.2004	287.5	310	Acquirg transfer of prior-yr acquis. frm cap.asset
01.12.2004	3,846.25	310	Acquirg transfer of prior-yr acquis. frm cap.asset
01.12.2004	2,075.00	310	Acquirg transfer of prior-yr acquis. frm cap.asset
01.12.2004	350	310	Acquirg transfer of prior-yr acquis. frm cap.asset
01.12.2004	312.5	310	Acquirg transfer of prior-yr acquis. frm cap.asset
01.12.2004	312.5	310	Acquirg transfer of prior-yr acquis. frm cap.asset
01.12.2004	312.5	310	Acquirg transfer of prior-yr acquis. frm cap.asset
01.12.2004	312.5	310	Acquirg transfer of prior-yr acquis. frm cap.asset
01.12.2004	312.5	310	Acquirg transfer of prior-yr acquis. frm cap.asset
01.12.2004	312.5	310	Acquirg transfer of prior-yr acquis. frm cap.asset
01.12.2004	312.5	310	Acquirg transfer of prior-yr acquis. frm cap.asset
01.12.2004	312.5	310	Acquirg transfer of prior-yr acquis. frm cap.asset
01.12.2004	312.5	310	Acquirg transfer of prior-yr acquis. frm cap.asset
01.12.2004	312.5	310	Acquirg transfer of prior-yr acquis. frm cap.asset
01.12.2004	312.5	310	Acquirg transfer of prior-yr acquis. frm cap.asset
01.12.2004	312.5	310	Acquirg transfer of prior-yr acquis. frm cap.asset
01.12.2004	440	310	Acquirg transfer of prior-yr acquis. frm cap.asset
01.12.2004	749.75	310	Acquirg transfer of prior-yr acquis. frm cap.asset
01.12.2004	507	310	Acquirg transfer of prior-yr acquis. frm cap.asset
01.12.2004	2,174.75	310	Acquirg transfer of prior-yr acquis. frm cap.asset
01.12.2004	850	310	Acquirg transfer of prior-yr acquis. frm cap.asset
01.12.2004	4,349.50	310	Acquirg transfer of prior-yr acquis. frm cap.asset
01.12.2004	249.75	310	Acquirg transfer of prior-yr acquis. frm cap.asset
01.12.2004	330.5	310	Acquirg transfer of prior-yr acquis. frm cap.asset
01.12.2004	4,282.50	310	Acquirg transfer of prior-yr acquis. frm cap.asset
01.12.2004	3,500.00	310	Acquirg transfer of prior-yr acquis. frm cap.asset
01.12.2004	318.75	310	Acquirg transfer of prior-yr acquis. frm cap.asset
01.12.2004	550	330	Acquiring transfer of curr-yr acquis.
01.12.2004	532.5	330	Acquiring transfer of curr-yr acquis.
01.12.2004	187.5	330	Acquiring transfer of curr-yr acquis.
01.12.2004	287.25	330	Acquiring transfer of curr-yr acquis.
01.12.2004	450	330	Acquiring transfer of curr-yr acquis.
01.12.2004	495	330	Acquiring transfer of curr-yr acquis.
01.12.2004	150	330	Acquiring transfer of curr-yr acquis.
01.12.2004	1,008.75	330	Acquiring transfer of curr-yr acquis.
01.12.2004	156.25	330	Acquiring transfer of curr-yr acquis.
01.12.2004	2,088.75	330	Acquiring transfer of curr-yr acquis.
01.12.2004	4,900.00	330	Acquiring transfer of curr-yr acquis.
01.12.2004	267.33	330	Acquiring transfer of curr-yr acquis.
01.12.2004	212.5	330	Acquiring transfer of curr-yr acquis.
01.12.2004	125	330	Acquiring transfer of curr-yr acquis.
01.12.2004	1,004.01	330	Acquiring transfer of curr-yr acquis.
01.12.2004	826.71	330	Acquiring transfer of curr-yr acquis.
01.12.2004	1,300.00	330	Acquiring transfer of curr-yr acquis.
01.12.2004	1,348.88	330	Acquiring transfer of curr-yr acquis.
01.12.2004	372.5	330	Acquiring transfer of curr-yr acquis.
01.12.2004	372.5	330	Acquiring transfer of curr-yr acquis.
01.12.2004	360	330	Acquiring transfer of curr-yr acquis.
01.12.2004	490	330	Acquiring transfer of curr-yr acquis.
01.12.2004	1,037.50	330	Acquiring transfer of curr-yr acquis.
01.12.2004	150.5	330	Acquiring transfer of curr-yr acquis.
01.12.2004	1,012.50	310	Acquirg transfer of prior-yr acquis. frm cap.asset
	<b>51,072.18</b>		

So these line items are various other assets transferred and the details can be had from each line item by drilling down and the details to be mapped for the asset i.e are 800046. On collecting this info and identifying the assets, we need to locate them and assign to the asset. We need not create separate assets and these details can be maintained in the asset 800046 as summary details in the asset master.

2. The analysis of Invoice of SMJ-INV-Koo1A-030 in Project Service payment A/c 80900000 for identifying the underlying assets.

**Document Overview - Display**

Doc.type : KR ( Vendor invoice ) Normal document  
 Doc. Number 1900000431 Company code 1002 Fiscal year 2004  
 Doc. date 08.01.2005 Posting date 31.12.2004 Period 12  
 Calculate Tax   
 Ref.doc. SMJ-K001A-030  
 Doc.currency USD  
 Doc.head.text Methanol Facilities

Itm	PK	Account	Account short text	Cost Ctr	Amount	Text
1	31	200001	CHIYODA CORPORATION		535,563.00	Methanol Facilities
2	40	80900000	Project Services		535,563.00	Methanol Facilities

Double click the debit item - 80900000

**Display Document: Line Item 002**

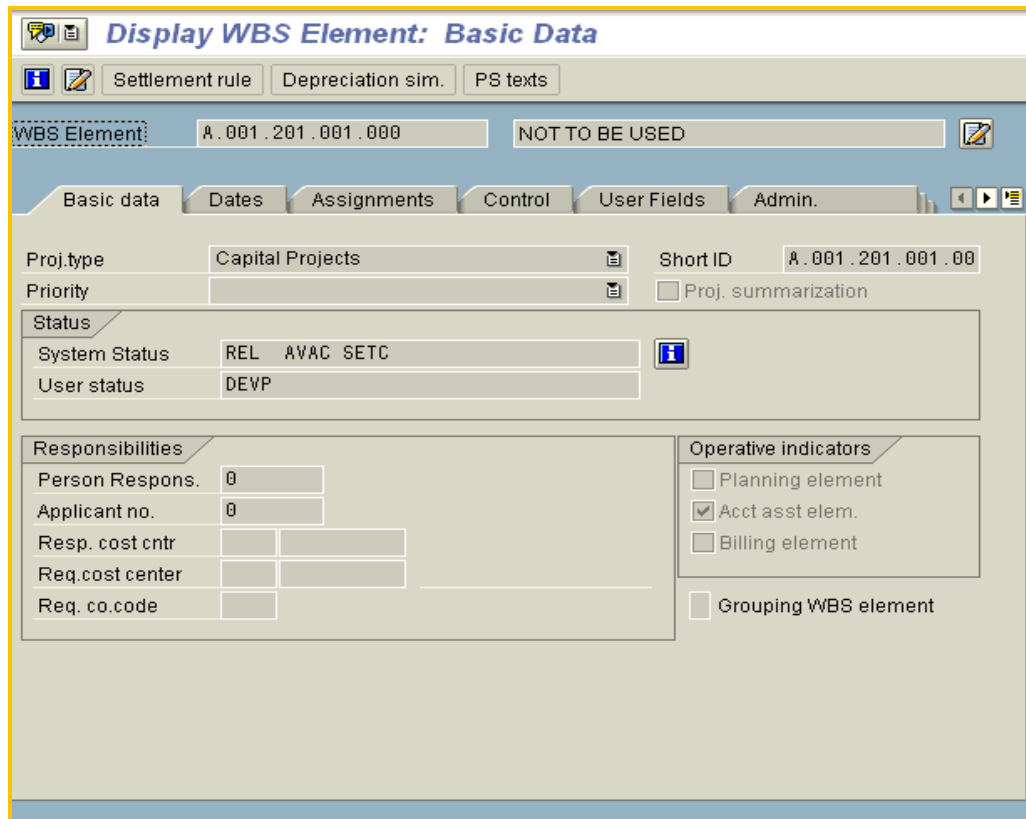
G/L Account: 80900000 Project Services  
 Company Code: 1002 International Methanol Co  
 Doc. no. 1900000431

Line Item 2 / Debit entry / 40  
 Amount 535,563.00 USD Amt.in loc.cur. 2,008,361.25 SAR  
 Tax Code V0

**Additional Account Assignments**

Cost Center \_\_\_\_\_ Order \_\_\_\_\_  
 WBS Element A.001.201.001.000 Profit Segment   
 Network \_\_\_\_\_ Real Estate Obj   
 Asset \_\_\_\_\_ Sales Order \_\_\_\_\_  More  
 Purchasing Doc. \_\_\_\_\_ 0  
 Assignment \_\_\_\_\_  
 Text Methanol Facilities

Click the WBS element (to view the WBS details – Tcode cji3)



**Display WBS Element: Basic Data**

Settlement rule: Depreciation sim. PS texts

WBS Element: A.001.201.001.000 NOT TO BE USED

Basic data | Dates | Assignments | Control | User Fields | Admin.

Proj.type: Capital Projects Short ID: A.001.201.001.00

Priority: Proj. summarization:

Status

System Status: REL AVAC SETC

User status: DEVP

Responsibilities

Person Respons.: 0

Applicant no.: 0

Resp. cost cntr:

Req. cost center:

Req. co.code:

Operative indicators

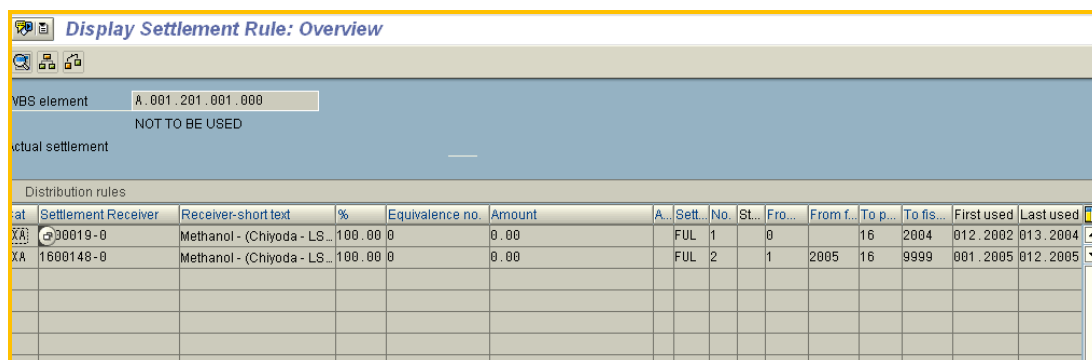
Planning element

Acct asst elem.

Billing element

Grouping WBS element

Click Settlement rule



**Display Settlement Rule: Overview**

WBS element: A.001.201.001.000 NOT TO BE USED

Actual settlement:

Distribution rules

at	Settlement Receiver	Receiver-short text	%	Equivalence no.	Amount	A.	Sett.	No.	St...	Fro...	From f...	To p...	To fis...	First used	Last used
XA	00019-0	Methanol - (Chiyoda - LS...	100.00	0	0.00	FUL	1	0				16	2004	012.2002	013.2004
XA	1600148-0	Methanol - (Chiyoda - LS...	100.00	0	0.00	FUL	2	1	2005	16	9999		001.2005	012.2005	

Click first line item

**Display Settlement Rule: Distribution Rules**

Settlement sender

WBS element: A.001.201.001.000  
NOT TO BE USED

Company code: 1002

Actual settlement: \_\_\_\_\_

---

Settlement receiver

Business Area: \_\_\_\_\_

Cost Center: \_\_\_\_\_

Order: \_\_\_\_\_

Asset: 1600019 0

WBS Element: \_\_\_\_\_

Company Code: 1002 [More](#)

---

Distribution rule

Number: 1

Settlement type: FUL

Percent: 100.00 %

Equivalence no.: 0

Amount in SAR: 0.00

Valid from: 0 to 16 2004

Amt rule type:  Settle Each Period

Strategy:

Click the asset 1600019

**Display Asset: Master data**

Asset values

Asset: 1600019 0 Methanol - (Chiyoda - LSTK) - Out of Kingdom

Class: 13300000 Project Development Company Code: 1002

General | Time-dependent | Allocations | Origin | Net worth tax | Deprec. areas

**General data**

Description: Methanol - (Chiyoda - LSTK) - Out of Kingdom

Asset main no. text: Methanol - (Chiyoda - LSTK) - Out of Kingdom

Acct determination: 13300000 Project Development Costs

Serial number: \_\_\_\_\_

Inventory number: A.001.201.001.000

Manage historically

---

**Inventory**

Last inventory on: \_\_\_\_\_  Include asset in inventory list

Inventory note: \_\_\_\_\_

---

**Posting information**

Capitalized on: 31.12.2002

First acquisition on: 31.12.2002

Acquisition year: 2002 012

Deactivation on: 31.12.2004

Ordered on: \_\_\_\_\_

Go to the Asset values.

Go to the planned values for the year 2004 and select the amount under Transactions.

Click the line item and that will take you to the Transaction details which is equals the invoice amount.

**Asset Explorer**

Asset 1002-1600019/0000

Company Code 1002 International Methanol Co  
 Asset 1600019 0 Methanol - (Chiyoda - LSTK) - Out of Kingdom

Fiscal year 2004

Planned values Book depreciation

	Fiscal year start	Change	Year-end	Crcy
APC transactions	280,720,396.00	280,720,396.00-		SAR
Investment support				SAR
Acquisition value	280,720,396.00	280,720,396.00-		SAR
Ordinary deprec.				SAR
Unplanned dep.				SAR
Write-up				SAR
Value adjustment				SAR
Net book value	280,720,396.00	280,720,396.00-		SAR
Down payments				SAR

Transactions

AsstVal date	Amount posted	TTY	Transaction type name	Crcy
30.09.2004	22,951,785.23	116	Acquisition - internal settlement to AuC	SAR
30.09.2004	19,559,263.19-	116	Acquisition - internal settlement to AuC	SAR
31.10.2004	89,190.00	116	Acquisition - internal settlement to AuC	SAR
30.11.2004	7,039,139.66	116	Acquisition - internal settlement to AuC	SAR
31.12.2004	5,399,613.89	116	Acquisition - internal settlement to AuC	SAR
31.12.2004	2,008,361.25	116	Acquisition - internal settlement to AuC	SAR

Click on the amount 2008361.25

**Document Overview - Display**

Doc.type : SA ( G/L account document ) Normal document

Doc. Number 100002507 Company code 1002 Fiscal year 2004  
 Doc. date 31.01.2005 Posting date 31.12.2004 Period 13  
 Calculate Tax   
 Doc.currency SAR

Itm	PK	Account	Account short text	Cost Ctr	Amount	Text
1	50	809000000	Project Services		2,008,361.25-	WBS A.001.201.001.000
2	70	133000000	000001600019 0000		2,008,361.25	WBS A.001.201.001.000

This amount is equals to \$ 535,563.00

Once this identification of document is done, we can get the details of the Invoice which generally details the machinery and tools covered under the invoice. In this particular case, the Invoice comprises of 4 spare parts components plus shipment charges totaling to \$ 535 563.00.