P-3640

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BONAFIDE CERTIFICATE

Certified that this project report titled **"A study on the breakdown maintenance management in sakthi sugars(soya division), Pollachi"** is the bonafide work of **Ms. N.Gokilavani, Reg No: 1020400017,** who carried out the 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.

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Submitted for the Project Viva-Voce examination held on 18/11/11

Internal Examiner

External Examiner

ACKNOWLEDGEMENT

ACKNOWLEDGEMENT

I express my sincere gratitude to our beloved Chairman **Arutchelvar Dr. N.Mahalingam and Management** for the prime guiding spirit of Kumaraguru College of Technology.

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I am grateful to **Mr. C.Arthanareeswaran,** Personal Officer, Sakthi Sugars Limited(Soya Division), for their encouragement and constructive comments during the course of my study and preparation of this project.

SAKTHI SUGARS LIMITED
Soya Division

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Soya / Per / /265 /2011 13.08.2011

CERTIFICATE

This is to certify that **Ms.N.Gokila Vani (10MBA17), MBA** student of KCT Business School, Kumaraguru College of Engineering and Technology, Coimbatore, had successfully completed the Project work in our Company, for the period from 26th June 2011 to 06th August 2011, she has done the project work on the topic of " **A STUDY ON MAINTENANCE MANAGEMENT IN SOYA PROCESSING**". During this period her conduct and character are good.

For Sakthi Sugars Limited
(Soya Division)

(C.Arthanareeswaran)
PERSONNEL OFFICER

Sakthi Sugars Limited - Soya Division * Pollachi - 642 103 *

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INTRODUCTION

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1.1 Introduction about the study:

In recent years advanced manufacturing systems and technologies have continued to gain interest in the increasingly competitive business environment. Enterprises have realized that engineering alone is insufficient for an effective manufacturing system; an advanced management system is essential as well. In a highly automated manufacturing environment, equipment is an important asset since its conditions seriously affect the production capacity, product quality and process yield.

As a result, effective equipment management becomes one of the essential tasks for enterprises in order to keep their competitive advantage in the dynamic business environment. maintenance personnel responsible for these facilities are required to develop key performance indicators for monitoring.

As information and Internet technologies have become more accessible and powerful, enterprise data and information have dramatically increased and have become more vital in decision-making. These rapid advancements accelerate the massive information flow in intra-enterprise and supply chains. With e-manufacturing the manufacturing information can be incorporated with enterprise information systems (EIS) to support decision-making for business management.

Equipment management system (EMS) with e-maintenance and e-diagnostics effectively support the equipment monitoring and control, efficiency analysis and failure prediction. In EMS information from a large set of manufacturing facilities to support e-maintenance and e-diagnostics. Extracting data directly from one or more operational and transactional databases provides an opportunity for aggregating data and information for decision-making purposes.

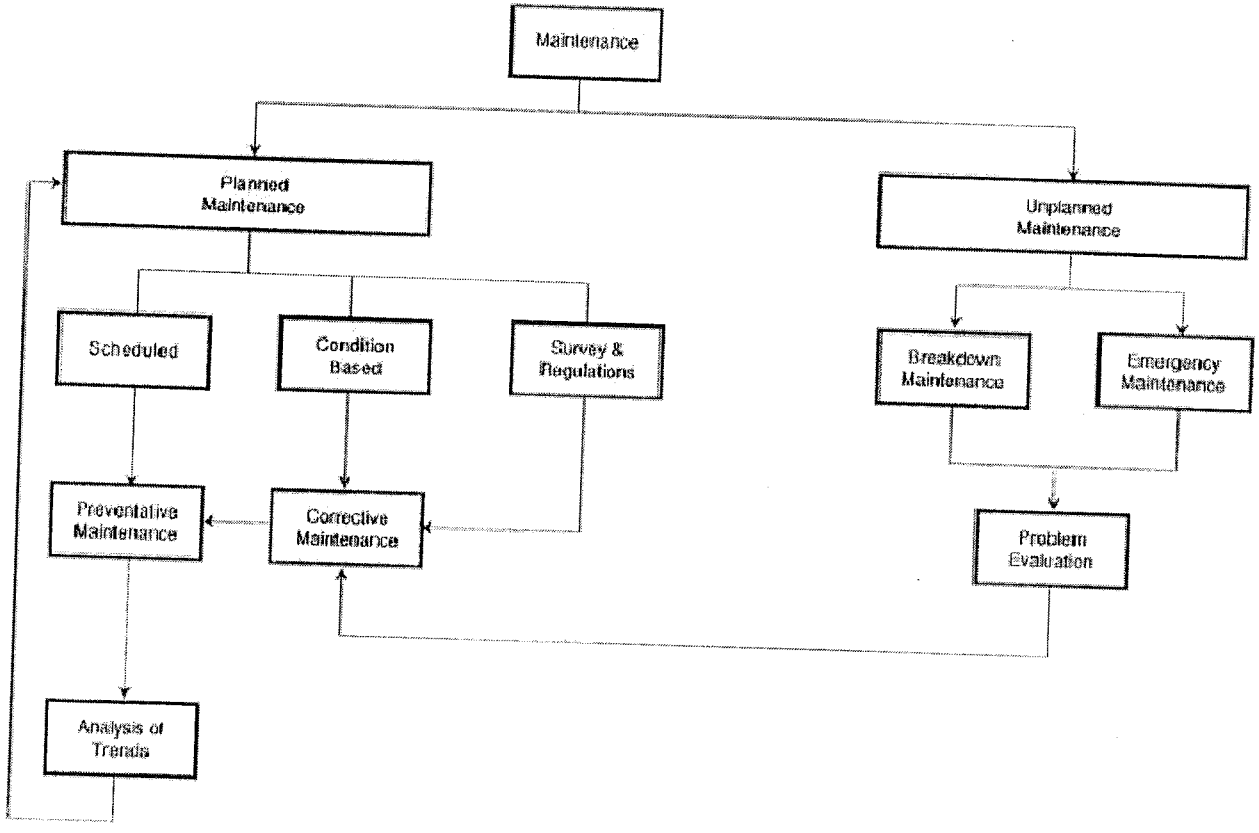
Equipment management involves decision-making on what work is to be done, when the work should be done, how long it should take, what materials, labour skills

and tools are needed and are available. Proper decisions require timely, coherent and accurate data in terms of many factors such as system configuration, equipment operation and repair/maintenance history, cost, availability and requirement of resources, the production schedule, spare parts inventory, etc. However, some of these data may not be available in the maintenance department but may be accessed through a distributed information system. As the scale and complexity of both the manufacturing system and the equipment management system expands, it is obvious that all the relevant information cannot be effectively managed without a well-designed database.

EMS aims at reducing equipment maintenance cost and production loss caused by machine breakdowns while assisting equipment engineers to make the right maintenance decisions at the right time, and at the right shop floor. The decision support system can be applied to assist diagnosis, maintenance planning, and scheduling of manufacturing systems The real-time equipment monitoring and control, data collection and failure analysis are achieved through e-maintenance, which attempts to realize the objective of near-zero downtime in manufacturing systems . Equipment engineers can repeatedly acquire massive amounts of equipment data from the automated manufacturing system.

However, the detailed and tedious operational data may not be directly used to support decision-making for equipment management. The breakdown of this data into succinct useable units is required. Provided that these data are adequately collected and explored, It can improve the productivity by reducing equipment breakdown, increasing spare part availability and optimizing resource allocation.

Maintenance Sequence



1.2 INDUSTRY PROFILE:

A cream-coloured oval bean about the size of a common pea, Soy Beans belong to the legume family and are native to East Asia. It is an important protein source for millions of people for over five thousand years. It can be grown on a variety of soils and a wide range of climates.

In India Madhya Pradesh, Maharashtra, Rajasthan and Andhra Pradesh are the major producers of soybeans. Madhya Pradesh tops the list. Nearly 88% of soyabean is produced in the state. During 1997-98 total soyabean production in the state was 49.19 metric tonnes which was about 84.2% of the total produce.

Main varieties:

- Punjab-1
- Braig
- Ankur
- Gaurav
- Jawahar

Mostly, soybeans are yellow, but there are also rare varieties of black, brown and green. Soyabeans mature in the pod, they ripen into a hard, dry bean then.

Factors Influencing Soybean Markets:

- Weather at all the producing centers, domestic and international. The pod bearing period, being the most crucial.
- The area planted, determined by the price of soybean against that of competitive crops, viz., maize, jowar, bajra.
- International price movement, the futures market at CBOT being the major international reference market.
- Pests and diseases.
- The supply-demand and price scenario of competitive oils, viz., palmoil.

- Demand for soymeal from the feed sector and the entire fundamentals of this sector.
- The crush margin between meal, oil and seed.

Soya bean crop cycle:

The crop cycle is of about 3 months. In some part of M.P. the soya crop is grown twice a year (during winter and during summer). One has the option of either growing wheat or gram followed by the soya crop. In Hoshangabad District of Madhya Pradesh, around 70-80% land is irrigated.. In Maharastra, the crop has picked up this year.

Geographic percentage breakup in India:

In Madhya Pradesh, the total production is around 62%, while Maharashtra contributes around 27%. 8% comes from Rajasthan and balance from of the States.

Companies involved in trading:

There are number of companies involved in soya trading. ITC have launched their e-choupals in various districts of M.P.

How big is the market in India for soya meal and soya oil?

The domestic market is improving a lot. Some years back, the (DOC) De-oiled Cake consumption of the soybean was 10% of the total production. But now it is 25%. It is increasing because of the rise in cattle population in the country, which in turn results in high consumption. The remaining 75% is exported and the industry is earning nearly Rs 3,000 crore annually through exports. The Refined Soya oil is fully consumed domestically and exports are not permitted in bulk, but only in consumer packs. Even that is not feasible, as oil prices are quite high in India. Therefore, imports are higher than exports in India. The recent Government policies are in favour of the Indian manufacturer and farmers.

What's the export potential for soya meal?

Exports of soya meal have 100% potential. For about 75% of production of soyameal, there is a ready market available in countries like Indonesia, China, Japan, Korea, and to a lesser extentsome European nations. There is a difference of around US$5-15 when the sell is directly to the customers in abroad rather than selling through traders in Singapore.

Advantages of Indian Soya in world market:

India has price advantage as Indian soya meal is still cheaper when compared with the American or Brazilian soya meal which costs about US$275-300 per metric ton. The Indian soya meal costs around US$260-270 per metric ton. No other country produces cheaper soya meal than India, which contains high protein content of around 48%. Moreover, it is not Genetically Modified (GM). Only India supplies non-GM soya meal while the U.S., Argentina and Brazil manufactures only/ mainly GM soya meal.

Soya is a first-sensitive summer annual, and it takes about 75-80 days for the beans to fully mature; plants may reach 1 metre high. Seeds are borne in hairy pods which grow in clusters of three to five; each pod contains two or three seeds, which resemble peas. When the seeds are mature, the upright vine and foliage begin to shrivel and the leaves fall away.

Soya is now a global staple food and about 110 million tonnes of beans are produced, mainly in the United States (50 %+), Brazil (20%), Argentina (10%) and China (8%). Individual farmer's crops are bulked before export. European oil mills process about 15 Mt of soya beans annually, mainly imported from the USA. Soya beans and their products account for 25% of US agricultural exports to the EU and were worth more than $2 bn last year.

The domestic production of soya is 5.0-5.4 million tons and is not sufficient to cater to the edible oil requirement of the country. Hence, soyabean export from India is not allowed. At the same time, bean imports are also not allowed so as to encourage domestic production.

Competitors in soya industry and their market price:

Name	Last Price	Market (Rs. cr.)	Cap.Sales Turnover	Net Profit	Total Assets
Ruchi Soya	106.90	3,559.97	16,708.31	201.59	5,623.64
Gokul Refoils	89.80	1,184.42	4,534.05	61.98	822.92
Agro Tech Foods	389.75	949.79	720.71	31.78	177.49
Sanwaria Agro	17.25	600.39	1,590.74	53.44	643.31
Ruchinfra	21.00	431.00	1,745.37	21.43	507.82
KS Oils	7.95	338.19	4,661.54	188.18	2,929.81
Guj Amb Exports	21.70	300.22	1,951.02	94.10	739.76
AVT Natural	394.15	300.11	138.41	10.69	107.57
Murli	20.80	149.98	734.07	-196.19	1,448.36
Anik Industries	32.50	90.20	1,272.23	11.23	474.08
KSE	235.00	75.20	454.36	4.50	58.62
Raj Oil Mills	13.15	47.35	469.49	20.32	361.88
Kriti Industrie	5.00	24.80	398.98	9.11	68.35

Strengths and weakness:

Strengths, Weaknesses, Opportunities (growth potential) and Threats (competition). Strategic and operational business information is objectively reported. The profile contains business operations, the company history, major products and services, prospects, key competitors, key employees, locations and subsidiaries.

Strength of agricultural soyabean: Being that Paraguay is the 6th. largest producer of soy beans, the demand for this product is always consistent.40% of population relies on agriculture for a living. Weakness: Seasonal droughts can temporarily put product this product out of

commission. This causes the agricultural exports to decrease which will make the economy drop as well. (3.5% drop in GDP after 2008 drought)

About the strengths of competitive product Ruchi:

The extensive distribution network, built over the years, is a major strength for Ruchi Soya Industries Limited. Catering nationally through over 6.25 Lac retail stores, with 96 Company depots, over 3200 distributors and a sales staff of over 200, Ruchi has attempted to penetrate depth wise, along with opening new markets. With its emphasis on providing value goods to consumers, dual strategy of Ruchi on popular and premium range works well. 'Ruchi Gold' and 'Sunrich' are our value for money offering but with no compromise in quality. This positioning helps generate large sales volumes for the products. Our Nutrela series is more premium, and offers healthy options in soya foods and edible oils. This dual strategy is based on our cultivated understanding of the Indian consumer psyche.

With undivided focus on new channels of distribution, we have a firm footing in modern retail and prestigious hotel chains. With our alliances with players like Pantaloon and visible presence in all leading national and regional supermarkets, we hope to grow our consumer base and product portfolio.

 Global Scenario • Soybean is one of the major oilseed World Soybean Production crops in the world Quantity in Million Tonnes 250 236.05 • It is cultivated extensively in south 221.62 220.56 215.72 200 186.53 Asian countries and U.S.A. 150 100 • Account 57% of total oilseed 50 production in the world 0 2003-2004 2004-2005 2005-2006 2006-2007 (Projection) 2007-2008 • 85% of the world's production is crushed for oil Years • oil recovery is 17-18% Major Soybean producing Countries • the meal forms around 80% • Major players include: • Ruchi Soya (India) • J-Oil Mills Inc (Japan) • Cargill Inc (Belgium) • Heilongjiang Jiusan (China) • Bunge (US) • Bianchini SA Indústria (Brazil) .

Global Soybean Crop Calendar Indian Soybean Crop Calender • Mainly grown in Kharif season – Monsoon • Sowing – June – July • Harvest – October – December 9 .

Global Supply Demand Estimates . The global trade of soybean meal is about 48 million tons The leading soybean meal producing country is US in the 1st place and China, Brazil in the 2nd & 3rd place respectively • The leading soy meal exporting countries are: - • Argentina (20 million tons) • Brazil (15 million tons) • USA (6 million tons) • India (4 million tons) • European Union (2 million tons) • The major importers of soybean meal are: - • European Union (22 million tons) • Central Europe (3.5 million tons) • Thailand (2 million tons) • South Korea (1.5 million tons) • Indonesia (1.5 million tons) • Japan (1 million tons) • Philippines (1 million tons) • Canada (1 million tons) 10 .

Indian Scenario • India is 5th largest producer of soybean in the world, with average production of 4,809 TMT (Thousand Metric Tonnes) of soybeans • Average consumption in India is 4,812 TMT of soybeans • India presently produces about 6 MMT (Million Metric Tonnes) of soybean per annum • Soybean output has more than doubled in the last 10 years • is expected to reach a level of 8.6 million tons in 2007-08, making available around 6.2 MMT of Soybean Meal with 4 MMT for exports • With current international prices as high as US $300+ per MT, exports of Indian Soymeal earning close to US$ 1 billion or over Rs.4000 crores • Uses – • Seeds are eaten whole, split & spouted • Oil used for paints, linoleum, oil cloth, printing inks, soap, insecticides, disinfectants apart from culinary • Meal (remnant after oil extraction), Soya Flour, Soya Milk, Soya curd, tofu (Soya Paneer) There are intellectual property rights (IPR) issues in soybean. Genetically Modified (GM) soybean may not be viable for India unless the IPR issues are addressed through appropriate models as in say, Brazil 11 .

Soybean Growing Areas in India According to a statement from the ministry of agriculture in New Delhi on Friday, the area under cultivation for soybean crop increased from 8.7 million hectare in 2007 to 9.5 million hectare this year 12 .

Soybean Cultivation & Production in India Source: Multi Commodity Exchange of India Ltd Soybean output has more than doubled in the last 10 years and is expected to reach a level of 8.6 million tons in 2007-08, making available around 6.2 MMT of Soybean Meal with 4 MMT for exports. With current international prices as high as US $300+ per MT, this year would well turn into a record year of highest ever exports of Indian Soymeal earning close to US$ 1 billion or over Rs.4000 crores.

1.3 ORGANISATION PROFILE:

Sakthi Soyas is one of the best soya processing plants in Asia. Combining the world's best technology from Switzerland and Germany, it uses the innovative flash desolventising system to manufacture high-protein soya flour. The plant has a capacity to process 300 tonnes of Soya per day. Sakthi Soyas High Protein Soya Meal, Soya Flour and Soya Chunks are exported to Srilanka, Thailand, Singapore, Malaysia,UK, South Korea and Taiwan.

Soya Products:

1.Soya Flour
2.Soya Chunks
3.TVP Minced
4.Hypro Soya Flakes
5.Soya Refined Oil
6.Lecithin
7.Weaning Food

Sakthi soyas, a Division of Sakthi Sugars Limited is the Pioneer in Soya products in South India having a sophisticated factory of 300 TPD at Marchinaickenpalayam, Ambarampalayam p.o, Pollachi Taluk, Tamilnadu.

Established in the year 1989, the Soya Division is having Seed Preparation Technology of Buhler Brothers, Switzerland and Solvent extraction / Deoiled products through an innovative system namely "Flash Desolventising System" and DTDC technologies of Extraction technique, West Germany.

The Oil refinery is of 60 TPD with technology of westfalia Separators, Germany and Micro filtration techniques of Ama Filters, Holland.High grade fine Soya flour is being produced with a milling capacity of 200 TPD equipped with ACM pulverizer, Bubler Mills and Roller mills.

The Texturised products are manufactures with the patented Anderson Extruder of USA.The products manufactured at Sakthi Soyas are – Soya Flakes / Flour – both defatted and

full-fat, Refined Soya Oil, Soya Meal, TVP Chunk, TVP Grits, TVP Flakes, Acid Oil, Lecithin and Weaning food.

Defatted High PDI white soya flour have wide applications in confectionery, baking, pharmaceuticals and down stream products like protein isolate, protein concentrates etc.... It is being exported widely to other countries. The soya chunks under the brand name "Sakthi Soya Bite" is a widely acclaimed food nourisher among South Indian populace. Besides, the products are also exported to South East Asian countries.

The factory is equipped with Modern Quality control Laboratory with facilities of latest instruments like Dicky John NTR Analyzer, Lovibond tintometer, spectrophotometer etc. It is also attached with microbiological testing equipments.

Sakthi Soyas is also engaged in group R & D like soybean varietal maintenance, varietal multiplication, varietal comparison and need based Agronomy, entomology and plant pathology experiments. The Biometric observations are made with statistical analysis. We have a modern seed processing unit to supply high quality Soya seeds for sowing purpose.

Sakthi group in its own interest has been expanded in to various spheres viz..,

→Sugar
→Industrial alcohol
→Textiles
→Automobile parts
→Bus transport
→Parcel service
→Sales & Service of Automobiles
→Soya products
→Fruit Beverages
→Synthetic Gems Manufactures
→Education & IT Training
→Soft drinks
→Finance

A division of Sakthi Sugars Ltd., Sakthi Soyas owns one of the best plants in Asia.

→Combining the world's best technology from Switzerland and Germany, it uses the innovative flash desolventising system to manufacture high-protein soya flour. The plant has a capacity to process 300 tonnes of Soya per day.

→The company's High Protein Soya Meal, Soya Flour and Soya Chunks are exported to Srilanka, Thailand, Singapore, Malaysia,UK, South Korea and Taiwan. Sakthi Soya division

→Sakthi Soya is the pioneer in introducing Soya Beans (Non-Genetically Modified) in the southern part of India. It has the capacity to process 90,000 tonnes Soya Beans per annum. The Soya Beans processing complex was comissioned in the year 1990 with imported machinery and know how from Extechnik, Germany and Buhlers, Switzerland. It is Asia's best Soya Processing Complex with the innovative Flash Desolventising System (FDS) for food grade Soya Flour Production.

1.4 COMPANY PROFILE:

PARTICULARS OF THE COMPANY

Name of the Company	:	SAKTHI SUGARS LIMITED
		SOYA DIVISION
Registered Office	:	SAKTHI NAGAR – 638 315
		BHAVANI TALUK
		ERODE DIST.
Telephone	:	04259 253256, 253257, 253355
Fax	:	04259 253354
Email Address	:	soya@sakthisoyas.com
Registration of Company	:	TAMILNADU
Status	:	PRIVATE LIMITED COMPANY
Grams	:	SUGAR KINGS
Branch Office	:	SAKTHI SUGARS LIMITED
		SOYA DIVISION
		MARCHINAICKENPALAYM
		AMBARAMPALAYAM (PO)
Registration No	:	TNGST NO: 1880113
		ICA NO : 099
		CST NO : 299575

DATE : 1.4.1983

Date if Commencement	:	31.10.1990
Business	:	MANUFACTURING OF SOYA
Type of Industry	:	MANUFACTURING
Financial Year	:	MARCH – APRIL
Producing Year	:	NOVEMBER TO OCTOBER

INTRODUCTION ABOUT THE PRODUCT

SOYA BEAN

A cream – coloured oval been about the size of a common pea, Soya beans belongs to the legume family and are native to East Asia. It is an important source for millions of people for over five thousand years. It can be grown on a variety of soils and a wide range of climate.

Soya was introduced in the USA in the early 19th century, the farming only expanded dramatically after World War II, when production in China was devastated. Soya bean has been an important food ingredient of China, Manchuria, Japan, Korea, Malaysia over centuries.

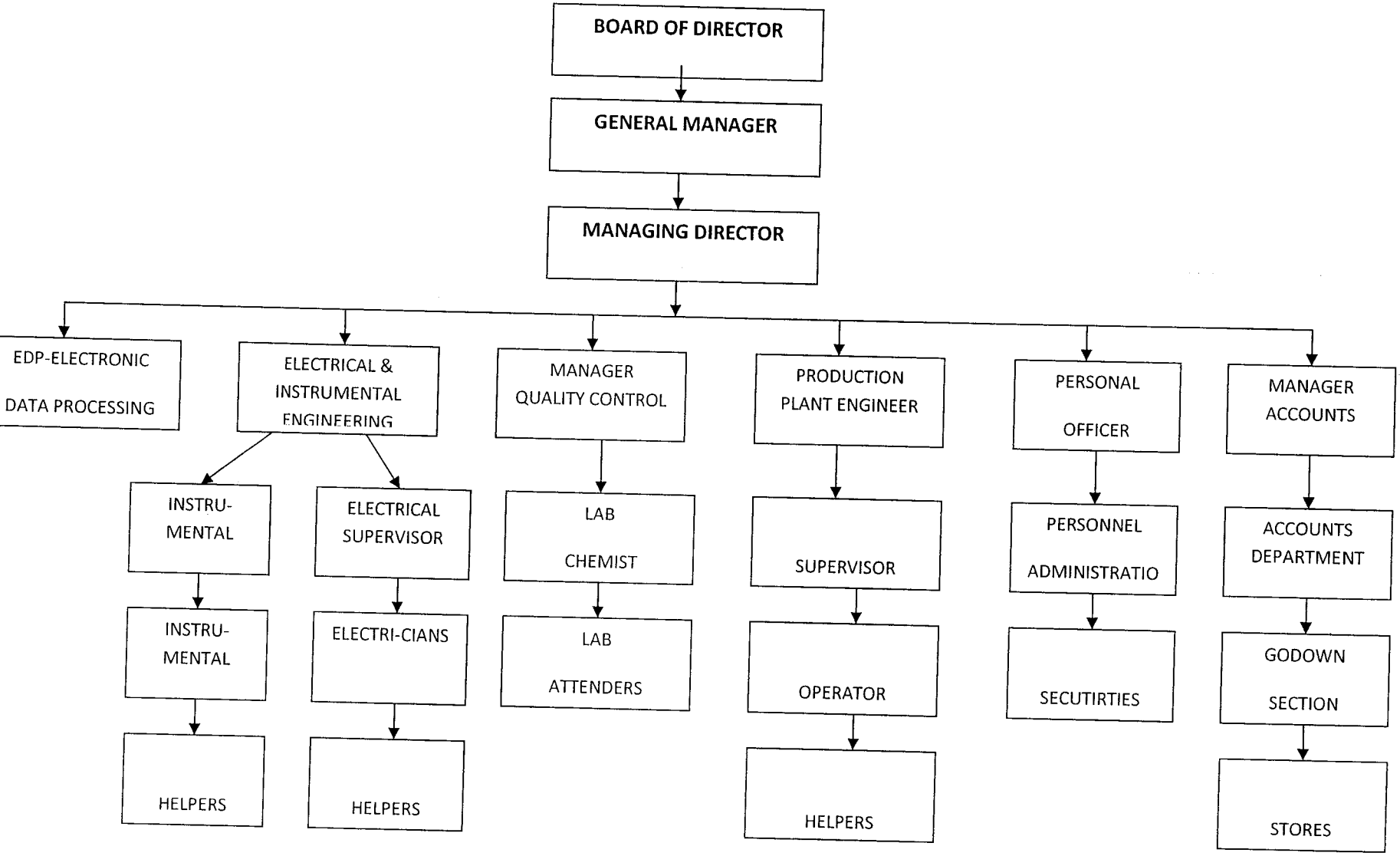
In India Madhya Pradesh, Maharashtra, Rajasthan and Andhra Pradesh are the major producers of soyabeans. Madhya Pradesh tops the list. Nearly 88% of soyabeans is product in this state. During 1997-98 total soya production in the state was 49.19 metric tones which were about 84/2% of the total produce.

Important World Soya Market:

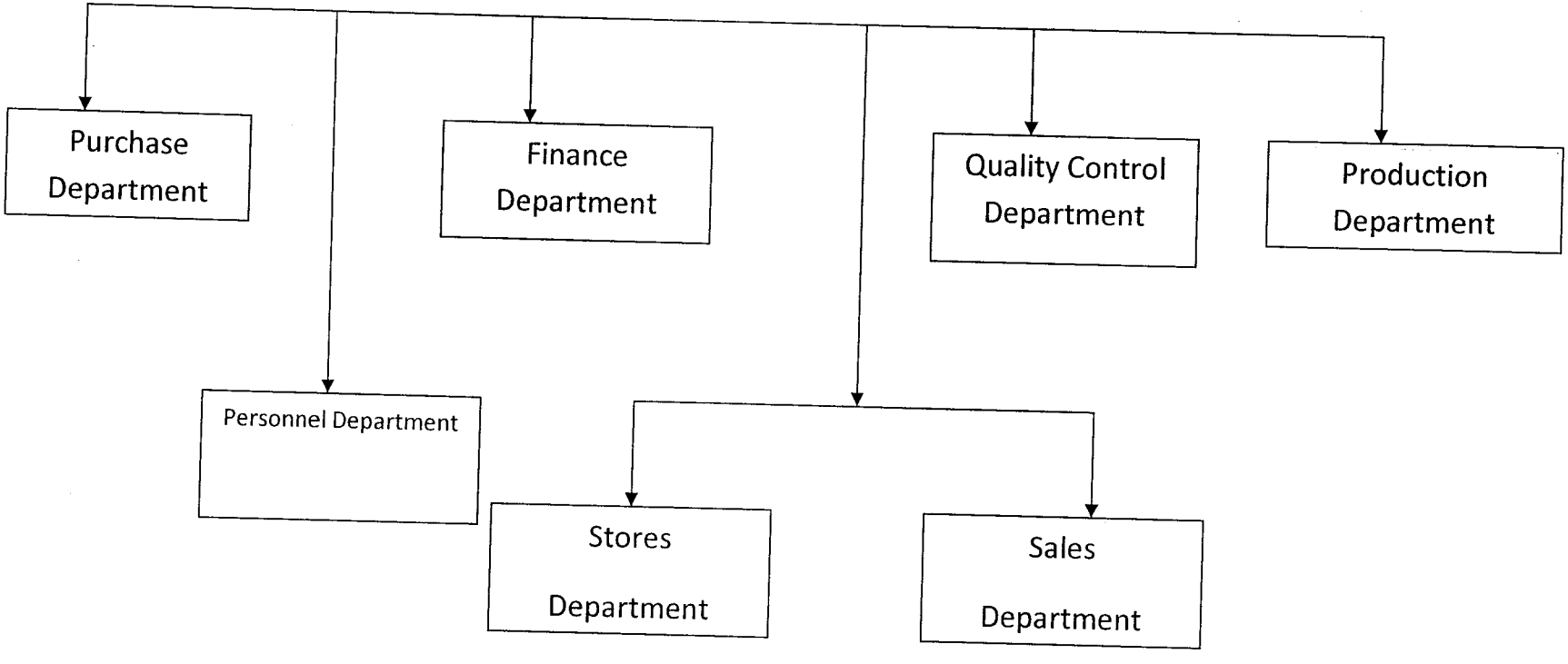
→Chicago (CBOT) largest Soya future market

→China, where beans and meal are traded at Dalian commodity exchange

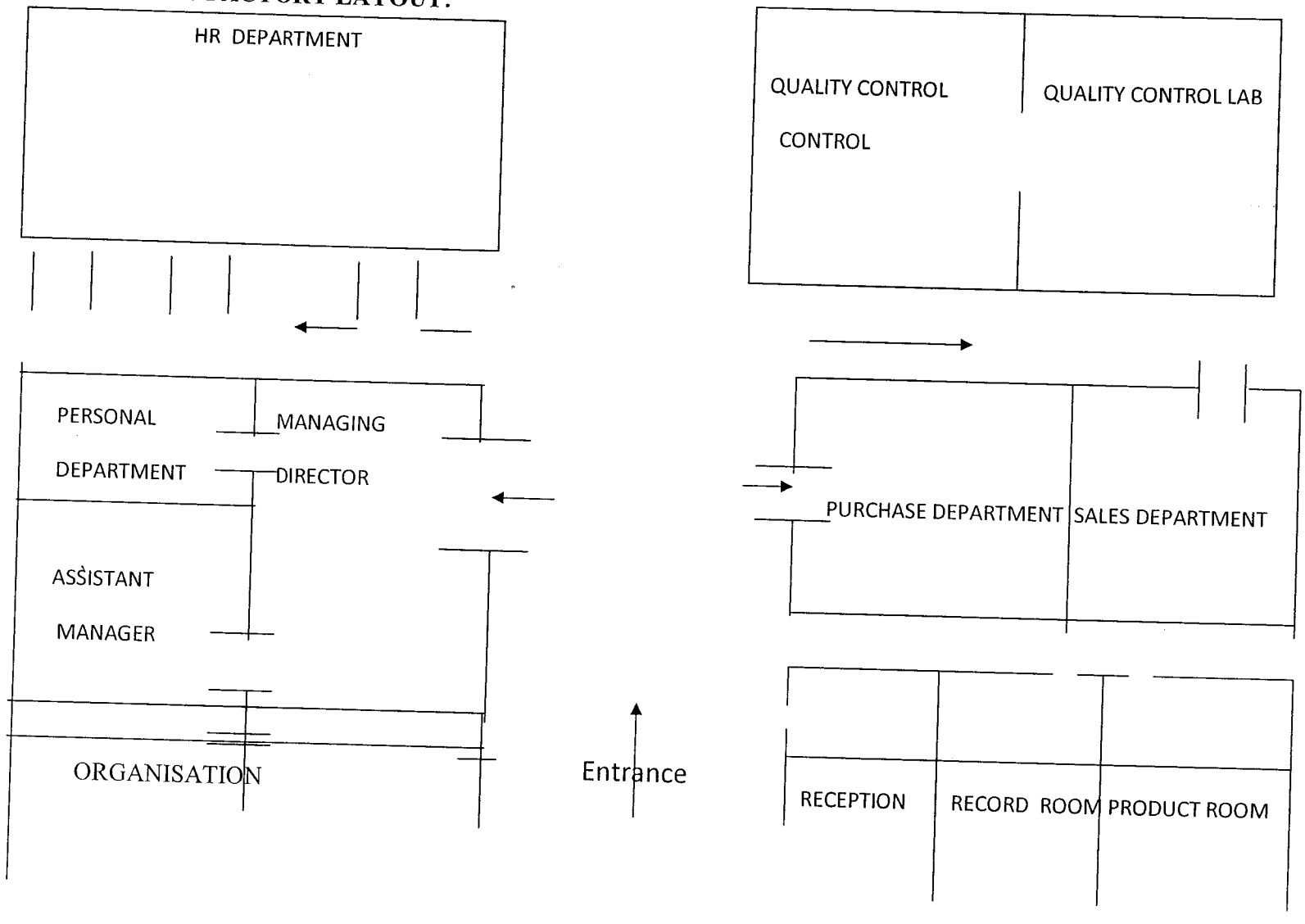
ORGANISATION CHART:



ORGANISATION STRUCTURE:



SAKTHI SOYA'S FACTORY LAYOUT:



PURCHASE DEPARTMENT

The purchase department plays a very important role in a organization because purchasing has its effect on every vital factor concerning the manufacturer, quality, cost, efficiency and promote delivery of goods to customers. Its function is to procure materials, supplies, services, machines and tools at most favorable terms consistent with maintaining the desired standard standard of quality. Purchasing is the most important function of material management.

FUNCTIONS OF PURCHASE DEPARTMENT:

What to purchase?

When to purchase?

Where to purchase?

How much to purchase?

At what price to purchase?

To perform this function effectively the purchasing department follows the following procedure.

→Receiving purchase requisitions
→Exploring the sources of supply
→Preparation and execution of purchase order
→Receiving and inspecting materials
→Checking and passing the bill for payment.

PURCHASE DEPARTMENT IN SAKTHI SOYAS:

Sakthi Soya's factory purchase its raw materials from the Zonal offices apart from that it purchases the materials from the agent or contractor's and from other third parties.

Soyas are the basic raw materials of this factory, yellow soya's and Col Soya's are two varieties in the factory. The variety is mainly cultivated and is available from North India. It is only available for a period of 6 months (i.e) from the month of October to March. The purchase of raw material is based on requisition. The raw material costs benefits to the company based on the purchases.

Purchase Requisition

In this company, whenever production departments need, materials, it is officially brought to the notice of purchasing department through a document known as purchase requisition. The purchase department action to purchase materials on the basis of purchase requisition. Printed form is used for purchase requisition. A purchase requisition contains the following information.

a.Specifications of materials.

b.Quantity and quality of materials.

c.Date by which materials requires

d.Place at which the materials should be delivered

A purchase requisition is prepared is duplicate and is signed by authorized persons only.

Bill of materials

A bill of materials is a list of all standard items required for a job. It is generally prepared by the product planning department and sends to stores. It is advance intimation to the store keeper about the requirement of materials. The storekeeper work out the total material requirement form bill of materials, find out the existing stock and decides the actual materials to be purchased. Then a purchase requisition is prepared and sent to purchase department.

List of suppliers

Raw materials are purchased from farmers and also from Tanjore and North Side.

Purchase Order

After selecting the supplier, a purchase order is sent to him, it is a letter sent to the supplier, asking to supply materials and bill.

Six copies of purchase order are prepared and signed by the purchase officer. Out of these copies one copy each is sent to

→Supplier

→Storekeeper

→Account Section

→Inspection department

→The department placing purchase requisition

→Retained by the purchase department for record.

Follow up of purchase order

In this company merely placing the purchase order will not guarantee the supply. The purchase department shall maintain contact with the supplies. The supplier is retained of delivery period. It must be ensured that materials will be supplied in time. In case, materials are not received in time, corrective actions shall be taken, such as transferring order to other vendors, change of transport etc.

Inspection of materials received

In Sakthi Soyas after the receipt of materials, the same is inspected and compared with the purchase order. The discrepancies found are promptly informed to the supplies. The rejected materials are returned to supplier for replacement.

Verifying Suppliers Bill or Invoice

In Sakthi Soyas the bills are verified for the correctness of the materials received and the prices. It must be ensured that the discount if any has been allowed in the bill. The bill must also be verified for taxes and other terms and condition. After confirming.

Closing the Completed Order

The file copy of purchase order is removed and entries such as "materials received in good condition", "bill passed for payment" etc are made. Then it is stored in the file of closed order.

PRODUCTION DEPARTMENT

Production department takes care of the works regarding production activities starting from the manufacturing of a product, the machineries used, and shifts of workers, production unit and its capacity utilization. It also maintains books regarding production.

Product

Good products are key to market success. The product represents a bundle of expectations of the consumer. The product satisfies the need of society. A successful product ensures its own promotion if satisfies the need of consumer, that is the product is right to the market. A good product should be able to generate extra amount of enthusiasm which is important to market organization. It gives the marketer independent in decision making. For the marketer the meaning of product is determined by the needs and desires of consumers.A product is one which satisfies the needs of customer. According to Philipkotler, "A product is anything

that can be offered to market for attention, acquisition, use or consumption that might satisfy a want or need. It includes physical objects, services, person, places, organization and ideas."

A product is both what a seller has to sell and what a buyer has to buy. Production process should be done after having the detailed analysis of the product. Product analysis should be made with following determination such as

→What is to be produced?
→How much is to be produced?
→What will be the sequence of operation?
→How much time each operation will take?
→How the machine can be best grouped?
→What will be capacity of machines and their production?

PRODUCTION DEPARTMENT IN SAKTHI SOYAS

The company is exploring various up country markets. The company producing the Soya in various forms like Soya means, Soya chunks, Soya flakes, Soya oil, Soya flour, and Soya lectin. The Soya bean industry has introduced a number of technologies that have significant impact starting with farming methods, commodity storage, handling and distribution Infra structure. In processing the beans are first cleaned to remove foreign material. They are dried and cracked in to small pieces and de-hulled. The resulting pieces are heat conditioned and rolled into flakes that are conveyed to toasters and are dried and ground while the crude Soya bean oil is degummed and refined for edible and non-edible uses.

Soya bean meal serves as the basic protein source and mixed with corn for use as animal feed. It is also processed into high value food items such as Soya flour, Soya grita and Soya protein isolates. Soya hills are used in high fibred bread.

Refined Soya oil is used through out the world in such edible product as cooking oil, salad dressings, margarine, Shortenings and mayonnaise. The degumming processes also yield. This is widely used in candy and baking industries.

Soya bean oil is used in Several food industries as fill fad Soya flour for baking. Soya-based beverages, snack foods and a sauce, to fu, miso and tem pen. Led by Soya has been growing by an annual rate of 355 over the past few years and is expected to sub stain a growth of 15-20% for at least the next ten years. Texturised vegetable protein (tvp) in different forms or names or sizes made from defaulted Soya flour. Although biotechnology is a tool increase world food production, there is an urgent need to educate the public. It may take time; Soya food is an excellent one to combat growing hunger and malnutrition due to population growth. More Soya products can be developed to get the acceptance in the global market.

STORAGE AND HANDLING OF RAW MATERIALS

The raw materials, Soya beans are produced from farmers directly and stored for further processing. The beans procured from farmers will not be fit enough for direct inflow in to the processing line as they contain stones, sand, dirt, trash, splits etc. These foreign matter, insert materials and splits are removed prior to taking the material for further processing. The seed moisture has to bring down to 9% to 10% before taken into processing.

SEED PREPARATION FOR EXTRACTION

The seed is passed through cracker mills and are broken into 4 to 6 pieces. The cracked beans are separated from hulls using aspiration. This Soya hulls with about 11% Protein and 35% Crude Fiber, are toasted and ground which can be either sold directly or as a filler ingredient for feed formulations or mixed along with the defatted meal. The cotyledon or meat pieces are cooked and conditioned with steam and then led into the flaker roles, are converted into thin flakes of 0.25mm to 0.3mm thick.

SOLVENT EXTRACTION AND OIL REFINING

The flakes prepared as above are fed into the extractor. The solvent (Food Grade Hexane) is pumped in to the extractor for dissolving the oil from flake. This extractor works under special system of counter-current and cross-flow strengthen with continuous percolation. Thus special system ensures maximum oil recovery with minimum solvent consumption. The oil an dissolvent mixture, called 'MISCELLA' is drained out for distillation. The solvent is fully recovered and re-circulated into the hexane tank for reuse. Crude Soya bean oil is sent for refining. Soya bean oil has free fatty acid, Phosphatides, anti-nutritional factor, adour and flavour etc., which make the crude soya bean oil unfit for direct consumption. Crude oil is subjected to processing stages like Degumming, Neutralization, Bleaching and Filtration, Deodorisation, etc., During refining, the crude Soya bean oil is treated with hot water to separate crude gums and degummed crude oil is treated with phosphoric acid and caustic dye to produce natural oil and soap. After further purification and addition of anti oxidants we get fully refined and stable oil for ready use as cooking oil. The soap stock and gum stock are treated with dilute sulfuric acid to produce acid oil. The spent – flakes are desolventised using DTDC (Desolventisor, Toaster, Drier and Cooler) to recover the solvent that is detained in flakes. The flakes are then toasted, dried and cooled carefully to destroy the tripsin inhibitors.

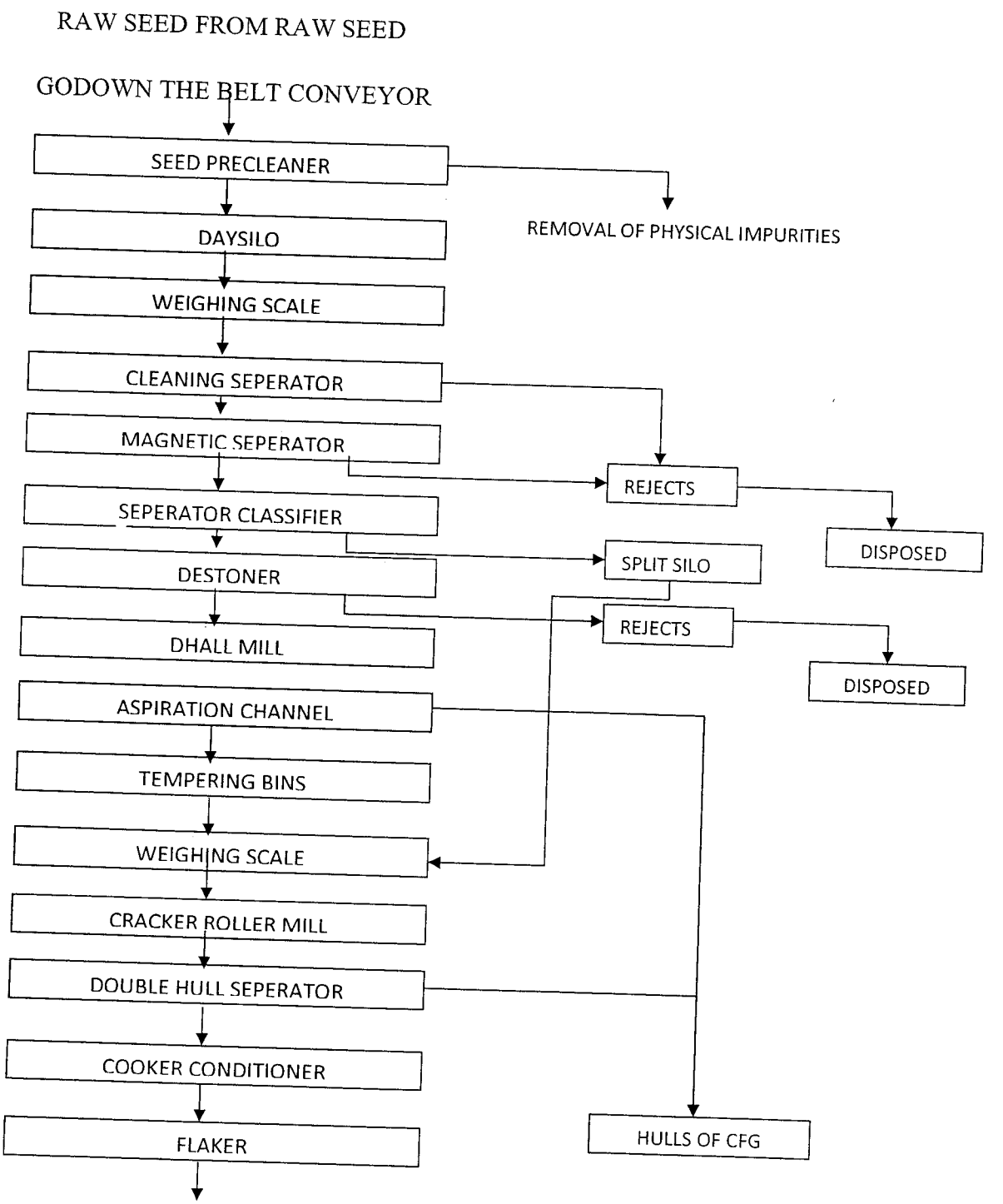
EDIBLE FLOUR PROCESSING TVP

They have provisions to convert a part of the 'mare' (150 tonnes per day) into quality edible flour for human consumption. For this purpose and innovative technology called FDS 'Flash Desolventising System' is provided. Super-heated hexane vapour is used to de-solventise the defatted meat at optimum temperature. We get while flakes which are ground in two stages to the mesh size of 100-200, packed and are stored for sale. As this stream of operation is intended for direct human consumption, all operations are done untouched by hand under the most hygienic conditions. The high PDI quality Soya flour thus produced, is extruded in an cooking process at 150C along with specified quantity of water to produce Texturised Soya Protein (TVP).

PROCESS FLOW CHART

Process Flow for Cleaning and Preparation of seed:

(Process Code-PC 03).



QUALITY CONTROL DEPARTMENT IN SAKTHI SOYAS

- Control over raw material through setting up of specifications.
- Continuous improvement of product quality.
- Continuous improvement of processing methods resulting savings in cost of production and greater profits.
- Standardisatoin of finished product to given specification
- Increases awareness for better housekeeping of plant
- Earn continuous consumer confidence in maintaining high quality of the product.

STORE DEPARTMENT

Stores Department is responsible for storing the goods purchased by the purchase department. Store department stores all finished goods produced by production department. This department has to give the details about the stock whenever the management asks, they also maintain the record (ie.) how many goods are sent, how many goods are there in the store etc., stores department even store the new materials supplied by the parties.

FUNCTIONS OF THE STORE DEPARTMENT

1.Managing the stores of semi-manufacture and raw materials.
2.Storing the production department's products (bulk products and desk ventilators) on the basis of supplying agreements with consumers.
3.Placing manufacturing orders with the production department (the bulk products department and the smaller scale systems department).

ESSENTIALS OF GOOD STORAGE

→The storage must aim at reducing spoilage, damage, breakage etc.

→Storage must facilitate to know the volume and conditions of products, without much labour.

→There must be material handling equipments.

→It must be located in a suitable plavour as near to the factory and market as possible to avoid transportation cost.

→Goods must be so stored as to be picked up easily and quickly.

IMPORTANCE OF STORAGE

1.Stabilisation of pricing.

2.Price reduction by eliminating waste.

3.Easy availability of goods.

4.Bulk buying and selling is possible

5.Reduction of risk by storing goods.

STORE DEPARTMENT IN SAKTHI SOYAS

Stores Department is a place where the Soya beans procured from the farmers and from others are stored, which are to be used for the production process, are properly stored and preserved. The concern will place a person who is fully capable in maintaining the materials that are stored in the department. He must take care of soya beans correctly in orders to avoid any defects in it.

Thus the stores department will be of grader importance in a company for the perfect supply of soya for the production process as well as for the supply of finished goods. In the modern world storage of goods has its own significance. A part form raw seeds, the following are the products, which are stored in the godowns.

- Low protein disposable Index toasted flakes.
- White flake
- Crude oil
- Refined Oil
- High Protein Disposable Index Flour
- Low Protein Disposable Index Flour
- Cattle feeds and

- Texturised vegetable proteins (TVP) chunk.

This unit has well-equipped and comfortable godowns for storing the different type of products the godown has all facilities and its roof is made of concrete. Because of its well-equipped nature it withstands for all seasonal changes.

Approximately the sizes of godowns are 60 feet in breadth; 120 feet in length and 40 feet in height.

SALES DEPARTMENT

1.The customer of Soyas products may be a whole seller / retailer must first approach the head office.

2.In the head office the customer must state about the product he wants to purchase and quantity he needs.

3.On knowing the requirements of the customer the head office will study the current market situation and pass an order for sale of the product to the Soya division.

4.The order contain Name and Address of the customer quantity required price per tone.

5.Based on this order only the customer can purchase the needed goods from this division.

6.After his / her arrival he should approach the weigh bridge operator to weigh container. Here the weight bridge operator prepares a document named dispatch weighment ticket.

7.The customer should take it to the office and handover to marketing incharge to prepare a delivery challen-cum invoice / cash bill.

8.It contain the amount to be paid by him to this division. The customer may make the payment by cash payment or by demand draft or by cheque.

9.Another document called 'Loading Advice Memo' (The goods required by the customer to be dispatched from the godowns.

10. Based on the loading advice memo. The godown in charge loads the needed products of the customer. Finally, the driver of the vehicle / customer should sign the memo on departure.

ACCOUNTS DEPARTMENT

This department provides the information about the business in a general way. It tells about the profit & loss and financial position of business to owners and other outside parties. It provides information to the management for proper planning, operation, control and decision making. The accounts are kept in such a way to meet the requirements of companies act and income tax act.

This department classifies, records and analyze the transaction in subjective and also in objective manner. This department plan, control the expenses on the basis of nature of the expenditure. It gives data to the management for effective decision making. It complies all the department monetary transaction in an effective manner. It maintains records for all the transaction met in these different departments.

This department assists the management with the help of accounting methods and techniques which assist the management in the task of maximizing profit or minimizing losses. It compiles the work of cost and management accounting. This information is collectively responsible for any firms to make appropriate decisions.

FUNCTIONS OF ACCOUNT DEPARTMENT

There are three basic functions of Accounts Department viz. Accounting, Finance and Payment.

Accounting:

- Keeping the books of accounts in accordance with the rules.
- Internal check of transactions affecting the receipts and expenditure.
- Prompt settlement of proper claims against the railway.

Finance

Tendering advice to the administration in all matters, involving railway finance, Compilation and control of budget (including exchequer) in consultation with the other departments Ensuring no financial irregularity in the transaction

Receipt and Disbursement

- Making payment to the bonafide payees
- Preparing payment schedule and arranging payment to the labour accordingly.
- Collection and deposit of cash received on account of tariff and others.

FUNCTIONS OF MANAGEMENT ACCOUNTANT

1.Providing financial data for management reporting

2.Assisting inventory management participation in purchase/contracting decisions.

3.Conducting surveys for major schemes,

4.Interpret financial statements

5.Compile cost data and prepare cost reports

DUTIES OF ACCOUNT OFFICER

1.Administration

2.Booking and Compilation

3.Budget

4.Cash and Pay

5.Compensation Claims

6.Establishment Accounts

7.Finance and Planning

8.Fuel Accounts

9.Inspection\

10.Other expenditure accounts including departmental catering accounts.

11.PF and pension

12.Stores accounts and inventory control

13.Workshop Accounts

ACCOUNTS DEPARTMENT IN SAKTHI SOYAS

The accounting procedure adopted in the company are as below

a.Preparation of basic record/voucher

b.Maintenance of subsidiary / journal books

c.Preparation of trail balance/ profit or loss account and balance sheet.

d.Preparation of basic records / vouchers and maintenance of subsidiary / journal books.

Every transaction of the company is being recorded. In evidence of each transaction a serially numbered voucher is prepared.

Ex. Cash voucher,Bank voucher

Copy of invoices raised on Sundry debtors, bills received from Sundry Creditors and Journal vouchers. Product sold, taxes collected there of etc. Original of the invoice is sent to the buyer, copy is kept with the company.

SALES JOURNAL

Invoices are serially numbered and recorded in the sales journal. Sales journal book shows invoice number, date, name of buyer, name of goods, quantity and value of the product sold, taxes, if any collected.

GENERAL JOURNAL VOUCHERS

There are some transactions which do not fall under any of the above category like salary/ wages payable, provisions for any expenses, rectification entries for any error in the above books etc.

For these transactions a voucher will be generated through computer. These General Journal Vouchers are given separate serial number.

a.General Ledger

b .Parties Ledger

c. Accounts Received Ledger

d. Accounts Payable Ledger

e. Advance for Expenses Ledger

TRAIL BALANCE PROFIT/LOSS ACCOUNT AND BALANCE SHEET

Trail balance in prepared at every month and by taking the balances of every head of accounts appearing in the ledgers. P & L Account and Balance sheet are taken at every quarter-year ending.

COUNTING POLICIES

→All ascertained and expenses are accounted on accrual basis contracts in pollution control division are accounted based on the level of completion.

→Depreciation has been provided on all assets under straight line method at the rate prescribed in schedule XIV of the companies Act 1956.

1. Material consumption is net of MODVAT
2. Valuation of closing stock.
   a. Finished goods are valued at market price.
   b. Process stock is valued at estimate.
   c. Raw materials of Soya unit are valued on FIFO basis and all the other units are average cost.
   d. Bagasse mottasses and Soya by products are valued at market.
   e. New spirit fertilizer and chemical are valued at market.
   f. Materials at contract site of pollution control division are valued at contracted.
   g. Stores and spares are valued at monthly weighted average basis.
   h. Gratuity liability to the employees on acturial basis has been accounted, the company has opted for life insurance corporation of India group gratuity scheme.
3. Fixed assets are valued at MODVAT
4. Investments are accounted at cost.
5. Expenses and income in exchange are accounted for at the rate prevailing on the date of transaction.
6. Contingent liabilities are disclosed by way of note.

PERSONNEL DEPARTMENT:

Personnel Department is the management of human resources in an organization and is concerned with the creation of harmonious working relationships among its participants and bringing about their utmost individual development. Such management is concerned with leadership in both groups and 'individual relationships' and 'labour relations' and 'personnel management', It effectively describes the functions and main objectives.

There are 12 members in managing category, 15 members in supervising, 9 clerical workers and 80 workmen. The workers may be contract based or civil based workers. The workers employed are mostly male and female employees are not being employed because of certain hazards.

The workmen are divided into nearly five grades such as

- Unskilled category
- Semiskilled category
- Skilled A category
- Skilled B category and
- Highly skilled category

The salary to the clerical workers and workmen are based on their settlement variable, Dearness Allowance (DA) IS PAIN IN 1.45 paise per month. 2T is fixed by All India Average Communication. There is an Union called All Indian Trade Union Congress (AITUC) for the employees. There is also a Community Union. The Settlement period for the worker is form April to March. The salary is paid at every seventh day for confirmed employees. The salary for the contract worker is paid weekly.

1.4 STATEMENT OF THE PROBLEM:

Maintenance is a vital requirement for hassle-free production process. Preventive maintenance is the preferable option while Breakdown maintenance will be a mandatory requirement. Hence, a study is undertaken to analyse the Preventive and Breakdown Maintenance performed at Sakthi Soyas Limited.

1.5 OBJECTIVES OF THE STUDY:

Primary objectives:

The primary objective is to analyse the maintenance details in soya processing in sakthi sugars limited (soya division).

Secondary objectives:

1.To study the existing of maintenance management in Sakthi sugars Limited(soya division).

2.To study the proportion of break down maintenance time.

3.To study the ratio between the breakdown time and running time.

1.6 SCOPE OF THE STUDY:

The study is confined with the Production department of Sakthi Soyas Limited. The outcome is confined to the data analysed during the study period.

CHAPTER 2

REVIEW OF LITERATURE

2.REVIEW OF LITERATURE:

Jun Yao ,Dr. Hualiang (Harry) Teng and Dr. Lester Hoel[1] observed that Maintaining Inductive Loop Detection (ILD) systems in good conditions allows the systems to perform the functions they are designed for. The objective of this study is to identify the factors that influence the life times of loop detection systems and evaluate several fundamental maintenance policies. To identify the factors that influence the life time of the ILD, survival theorybased deterioration models were developed using the maintenance data collected in a previous study. Special features of the maintenance data (unidentifiable lifetime, censoring data, and panel data) were taken into account in using the models. It was identified that heavy vehicle traffic volume is the major contributor to the diminishing life times of loops in an ILD. No factors can be identified for piezos that are co-installed usually at the same detection stations with vehicle classification capability.

Olanrewaju Abdul Lateef[2] observed that Investment in building maintenance is huge all over the world. In most countries, it represents almost 50 per cent of the total turnover of the construction industry. The value of buildings depends on the quality of the maintenance invested in them. Maintenance management involves obtaining maximum benefit from the investment made on the maintenance activities. Maintenance in buildings in Malaysia is on the increase regardless of size, type, location, and ownership. The current maintenance management procedures in Malaysia are, however, condition and reactive based. The weaknesses in the current procedures are the primary problems because they do not explicitly link maintenance needs with building performance with respect to the building users. The building users measure the performance of a building with various criteria. The condition of a building is just one of those criteria. This research establishes the need for a building maintenance management system that is based on the concept of value in the effort to lead towards the optimisation of building maintenanceprogrammes. Maintenance management that is value based allows users to be proactively put at the centre of maintenance management during decisionmaking processes and takes into consideration both the objective and subjective requirements of users.

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[1] Final report of ITS Center project: ITS infrastructure maintenance management

[2] Building maintenance management in Malaysia.

Hackman Hon Yin Lee, David Scott[3] observed that the main objective of the paper is to examine strategic and operational factors influencing the management of building maintenance operation processes in sports and leisure facilities. These factors are developed from the identifi cation of four main aspects in building maintenance management: building maintenance policy and strategy, strategic management, facility management and performance management. The management of building maintenance operation processes is the key for providing better built environment to building customers and users. It is particularly important in managing hospitality facilities such as sports and leisure facilities. However, maintenance is not in a high priority list in most of the organisations. This barrier contributes to the gaps between top management at the strategic level and maintenance personnel at the operational level. Building maintenance is changing pace with the development of facility management, which has impacts on the planning to implementation of maintenance operation processes and building performance. The information related to the strategic and operational factors is essential before an in-depth study is undertaken about the improvement of the gaps between top management at the strategic level and maintenance personnel at the operational level for building operation efficiency.

F. Marmier, C. Varnier and N. Zerhouni [4] observed that To remain competitive, companies must decrease their costs as much as possible and optimise their means of production. In order to maintain better availability of equipment, the maintenance service intervenes. It deals with problems before or after breakdowns. This improvement mainly requires better management of the workforce and its skills. It is difficult to determine precisely the required number of human resources in a maintenance service (Mjema 2002). Indeed, the factors which enable capacity adaptation are prone to uncertainties. This is due to several parameters (variations of the intervention requests which are never similar, arrival dates of requests, the contents of the request, required treatment duration and availability of equipment as well as elements related to the real intervention treatments). Thus, the different tasks are well known when they occur. The

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[3] Report on the management of building maintenance operation processes in sports and leisure facilities, Hong Kong

[4] Proactive, dynamic and multi-criteria scheduling of maintenance activities.

reactivity and the organisation of the maintenance service will depend on the importance of the required treatment.

Sanjeev manchanda s. b. singh mayank dave[5] observed that The aim of the present research work is to develop an information system development process and a model for the development of new generation information systems. New age information systems are those information systems that are capable of fulfilling the demand of highly dynamic information requirements derived from the competitive environments of business organizations and support controlling the complexity involved in their maintenance and software configuration management. Present research work analyzes the theoretical, financial, technical and practical problems related to the information system development, maintenance and change management to propose an appropriate system development process and a model for the development as well as maintenance of information systems with maximum software reuse. The proposed system development process and model provide inherent support to the business organizations in having total control over information system development, maintenance and software configuration management.

Olanrewaju Abdul Lateef [6] observed that A building exists to serve the user ' s space requirement. The essence of maintenance is, therefore, to maximize the service life of a building, by delaying deterioration, decay and failure. Building maintenance management is a complex and multi-faceted thought process that involves planning, directing, controlling and organizing resources for the sustenance of the building ' s functional performance. The purpose of this paper is to propose an alternative maintenance
management model for university buildings in Malaysia. A number of studies have investigated the maintenance management of buildings; however, most of the studies have observed maintenance management procedures that were corrective and condition-based. Although this research is specifically proposed for university buildings, however, many public and private

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[5] Change management and software reuse supportive 'genetic information system development and maintenance' model.

[6] Case for alternative approach to building maintenance management of public universities.

sector institutions face similar maintenance management problems. Therefore, this research has broaderapplications. This research emerged from the need for an alternative building maintenance management system that refl ects current thinking on the efficient and effective use of maintenance resources.

Abdul Lateef A. Olanrewaju, Mohd Faris Khamidi, Arazi Idrus [7]observed that Facilities management is taking centre stage in the discourse of academic institutions because of its relevance to facilitating learning, teaching and conducting research. University buildings are an important part of these facilities and considerable resources are committed to their design, construction and maintenance. This article is based on the premise that if there is information on the criteria that infl uence the maintenance of university buildings, the characteristics of defects in university buildings and the criteria within the users ' value system, the maintenance and management of the university buildings will be initiated and implemented more effectively andefficiently compared with how it is currently executed. The main aim of the present research, however, is to determine the kind and nature of defects in university buildings in Malaysia. The article reviews the related literature and presents the outcome of a questionnaire survey.
The questionnaires were administered to 50 university maintenance organisations. With a 66 per cent response rate, the fi ndings suggest that some defects require maintenance more urgently than others. On this basis it is concluded that resources should be directed to the more urgent areas whereas less urgent ones can be included in the next planned maintenance programme. The research found that lift failure, faulty electrical systems and roof damage were defects that respondents considered highly critical and that required urgent maintenance intervention.

[7] Quantitative analysis of defects in Malaysian university buildings: Providers ' perspective.

Vasile DEAC, Gheorghe CÂRSTEA, Constantin BÂGU, Florea PÂRVU[8] observed that Academy of Economic Studies, Bucharest, Romania. The maintenance activity isn't a purpose in itself, it's a necessity of which "the production suffers" and the financial agent "considers too expensive". It often exists a conflict between the production units and the maintenance department, not only for a short term, but, sometimes, for a long term, imposing a rigorous definition of each person's responsibilities. Considering the mutations in the industrial equipments' technical complexity and the accidental failures' catastrophic consequences from the economic and/or social point of view,it should be assigned a new dimension to the maintenance activity. One of the imperativesimposed to this action is represented by modern means of informing through the maintenance's operational computerization.

A Case Study Mahesh Pophaley and R K Vyas[9] observed that The Industrial Age has given way to the Information Age. This transition calls for unmatched kind of organizations filled with innovations, since success in the past does neither assure continued success nor a good reputation or bigger size in future. It is not uncommon for large businesses to have millions of dollars invested in production assets. Today, the management of maintenance function, of these assets, which range from factory machines to huge power generating units are increasingly being viewed as strategic contributors to company's profit and loss. The constant increase in capital needed for this function has recently directed vast interest in two methodologies: Total Productive Maintenance (TPM) and Theory of Constraints (TOC), that are found to be adequate to optimize returns on capital invested.

This paper presents a case study of initiating TPM implementation backed by TOC application in an automobile company. As the case with many continuous improvement projects in maintenance management, TPM program is often launched using Pareto analysis by focusing on the resource with the most unscheduled downtime. The logic behind this approach is that such a resource presents the biggest potential for improvement. While the logic appears obvious the

[8] The Modern Approach to Industrial Maintenance Management.

[9] Optimizing Maintenance Management Efforts by the Application of TOC.

question remains: Is this always true? The specific purpose of this paper is to demonstrate a new and innovative approach for directing maintenance improvement initiative using the theory of constraint principle. Further, this research also shows that both the methodologies are convergent and the ideas and concepts of the two different approaches to improvement can be combined to give the company a unique competitive advantage.

Lenka Branska *University of Pardubice* [10]A trend has been currently growing to integrate business logistics systems in supply chains and to implement new methods (such as Quick Response) for logistics performance increasing. All systems based on synchronization of material flows fail if production facilities in each successive production show a high number of accidents and subsequent repairs after failure. The maintenance in Quick Response systems is extremely important. The maintenance system must be clearly focused on prevention. It can be designed being based on several of modern methods of maintenance, such as TPM and RCM methods, whose principles it uses and appropriately combines. Moreover, in the maintenance management in companies involved in the chain, it seems desirable to cooperate in the maintenance with the customers and suppliers. In this paper is a proposal for modification of maintenance system in an enterprise that is part of a chain operating on the basis of the Quick Response method.

Larry Pearson and Walt Olsen Maintenance Programs Managers.[11] Based upon recent proposals, counties are being asked to demonstrate the effectiveness of their maintenance programs. Use of a Maintenance Management System is a way for counties to document characteristics of their maintenance programs and to communicate maintenance program effectiveness to the public, employees and other agencies. In order to understand how the various

[10] Maintenance management in quick response systems.

[11] Maintenance management project initial survey report.

elements of a formal maintenance management system (MMS) relate to existing procedures now being used in the counties, a survey of maintenance management was conducted.

M. DAHANE, C. CLEMENTZ and N. REZG[12] observed that the paper, we deal with the problem of joint maintenance and production management under a subcontracting constraint. We will study a system with a machine M which undergoes corrective maintenance actions together with preventive maintenance actions,both of which have random durations. A stock S with a capacity h is developed at a rate _¼Umax – d, where Umax¼production rate, d¼constant demand, and Umax4d. In addition, machine M is allocated to carry out subcontracting tasks (ST) at a frequency A1, for an effective duration A2, during which time it cannot be used to fulfil our system's demand d.

We initially study the system analytically when the machine M is forced to carry out a single subcontracting task during each cycle T. We thereafter present a generalization of the subcontracting constraint which entails assigning the machine M to subcontracting several times during each cycle.

[12] Analysis of joint maintenance and production policies under a subcontracting constraint.

CHAPTER 3

RESEARCH METHODOLOGY

3.RESEARCH METHODOLOGY:

3.1 TYPE OF RESEARCH:

Descriptive research

3.2 Data and Sources of data:

Primary Data collected from the company's maintenance records. Idle time and Breakdown time of all the 6 production process departments and the preventive maintenance check list are collected from the company.

3.3 Time Period covered:

Months starting from January 2009 to March 2011.

3.4 Statistical tools used:

Simple percentage analysis.

3.5 Limitations of the study:

- The study does not explore the reasons for machine breakdown.
- The study period covered is only 15 months.

CHAPTER 4

ANALYSIS AND INTERPRETATION

4. ANALYSIS AND INTERPRETATION:

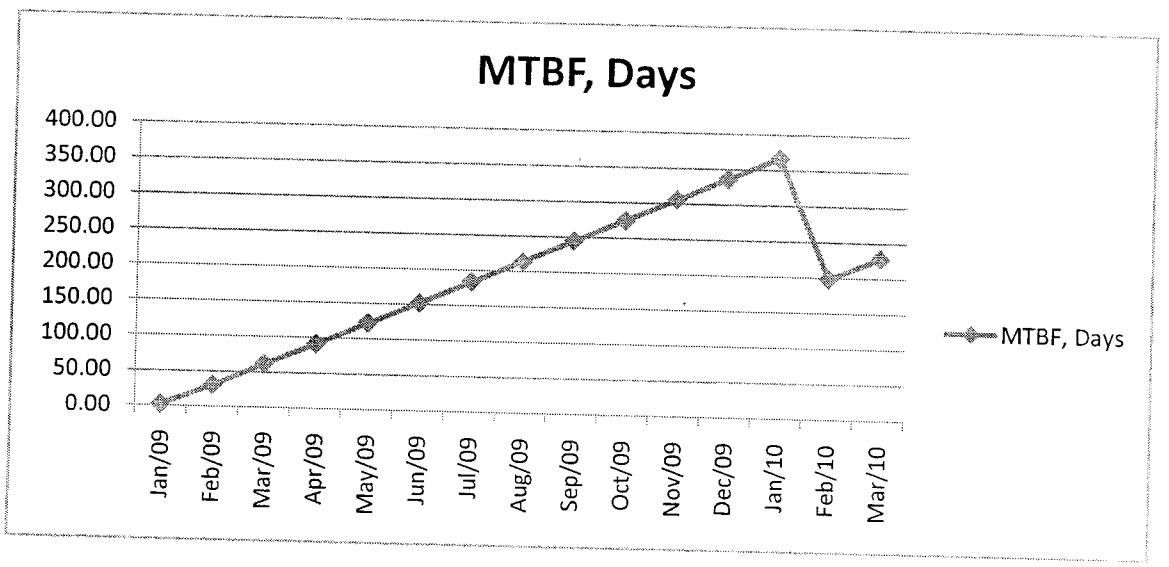
TABLE 4.1 FAILURE DAYS IN THE SOYA OIL REFINERY PROCESS:

MONTHS	JAN-09	FEB-09	MAR-09	APR-09	MAY-09	JUN-09	JUL-09	AUG-09
AVAILABLE HRS.	744	672	744	720	744	720	744	744
RUNNING HRS.	45.5	190	148.67	68.7	68	114	140.55	124
NO. OF BD.	0	0	0	0	0	0	0	0
CALC. BD	0	0	0	0	0	0	0	0
MTBF, HRS.	45.50	717.50	1461.50	2181.50	2925.50	3645.50	4389.50	5133.50
MTBF, DAYS	1.90	29.90	60.90	90.90	121.90	151.90	182.90	213.90

THS	SEP-09	OCT-09	NOV-09	DEC-09	JAN-10	FEB-10	MAR-10
LABLE	720	744	720	744	744	672	744

NNING S.	100	104	152	178.7	132	158.5	73
. OF BD.	0	0	0	0	0	1	0
LC. BD	0	0	0	0	0	4.239747634	0
BF, HRS.	5853.50	6597.50	7317.50	8061.50	8805.50	4738.75	5482.75
BF, YS	243.90	274.90	304.90	335.90	366.90	197.45	228.45

CHART 4.1 FAILURE DAYS IN THE SOYA OIL REFINERY PROCESS



INTERPRETATION:

The breakdown occurred in the oil refinery process during the month of February 2010 and the total hours of breakdown reduced from 8805 hours to 4738hours during the month of January to

ebruary 2010.During the month of march 2010 there is no breakdown and hence the mean time etween failure increased.

nference:

The failure days in Soya Oil refinery process in February 2010 is only 1 with a calculated reakdown time of 4.23 hours. The mean time between failure hours have improved compared to revious months.

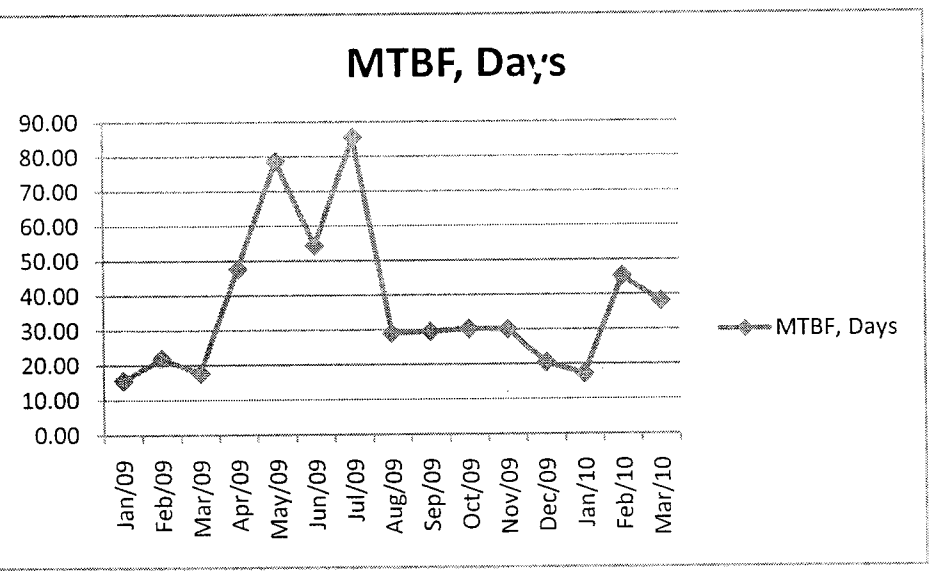
TABLE 4.2 FAILURE DAYS IN SEED EXTRACTION PLANT PROCESS:

MONTHS	JAN-09	FEB-09	MAR-09	APR-09	MAY-09	JUN-09	JUL-09	AUG-09
AVAILABLE HRS.	744	672	744	720	744	720	744	744
RUNNING HRS.	350	264	96	77	134	125	209	202
NO. OF BD.	1	1	2	0	0	1	0	3
CALC. BD	2.13	2.55	15.55	0.00	0.00	5.77	0.00	11.05
MTBF, HRS.	372	522.00	422.00	1142.00	1886.00	1303.00	2047.00	697.75
MTBF, DAYS	15.50	21.75	17.58	47.58	78.58	54.29	85.29	29.07

MONTHS	AUG-09	SEP-09	OCT-09	NOV-09	DEC-09	JAN-10	FEB-10	MAR-10

VAILABLE RS.	744	720	744	720	744	744	672	744
UNNING RS.	202	155	123	154	245	107	139	64
O. OF BD.	3	1	1	1	2	2	0	1
ALC. BD	11.05	4.65	6.07	4.69	6.07	13.97	0.00	11.72
ITBF, HRS.	697.75	708.88	726.44	723.22	489.07	411.02	1083.02	913.51
ITBF, DAYS	29.07	29.54	30.27	30.13	20.38	17.13	45.13	38.06

CHART 4.2 FAILURE DAYS IN SEED EXTRACTION PLANT PROCESS:



INTERPRETATION:

In the month of march there are 2 breakdowns so the meantime between failure days is reduced due to the calculation of breakdown hours. In December 2010 to January 2010 the

breakdown occurred then the calculation hours reduced due to that mean time between failure reduced.

Inference:

The failure days in seed extraction plant process is more during the study period. A maximum of three breakdowns happened in the month of August 2009 with 11 hours of break down. The Mean Time between Failures is comparatively high in this department.

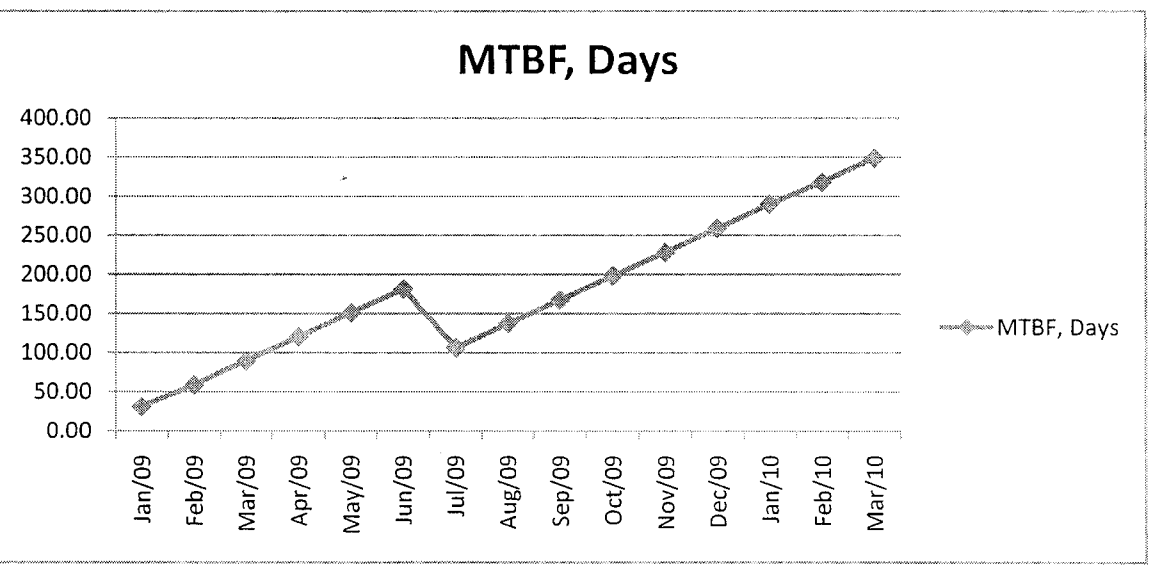
TABLE 4.3 FAILURE DAYS IN EDIBLE FLOUR MANUFACTURING PROCESS:

MONTHS	JAN-09	FEB-09	MAR-09	APR-09	MAY-09	JUN-09	JUL-09	AUG-09
AVAILABLE HRS.	744	672	744	720	744	720	744	744
RUNNING HRS.	502.7	353	332.5	321.4	438	439.45	364.2	412.4
NO. OF BD.	0	0	0	0	0	0	1	0
CALC. BD	0.00	0.00	0.00	0.00	0.00	0.00	2.04	0.00
MTBF, HRS.	744	1416.00	2160.00	2880.00	3624.00	4344.00	2544.00	3288.00
MTBF, DAYS	31.00	59.00	90.00	120.00	151.00	181.00	106.00	137.00

MONTHS	SEP-09	OCT-09	NOV-09	DEC-09	JAN-10	FEB-10	MAR-10
AVAILABLE HRS.	720	744	720	744	744	672	744

UNNING IRS.	346.75	156.0833333	423	485	415.5	316.83	334.25
NO. OF BD.	0	0	0	0	0	0	0
CALC. BD	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MTBF, HRS.	4008.00	4752.00	5472.00	6216.00	6960.00	7632.00	8376.00
MTBF, DAYS	167.00	198.00	228.00	259.00	290.00	318.00	349.00

CHART 4.3 FAILURE DAYS IN EDIBLE FLOUR MANUFACTURING PROCESS:



INTERPRETATION:

The Table showing Edible flour manufacturing process in that there is only one break down hours in July 2009 from January 2009 to March 2010 so there is no impact in mean time between failure days.

INFERENCE:

In edible flour manufacturing process only one breakdown occurred in July 2009 with 2 hours of breakdown. The Mean Time between Failures is comparatively high in this department.

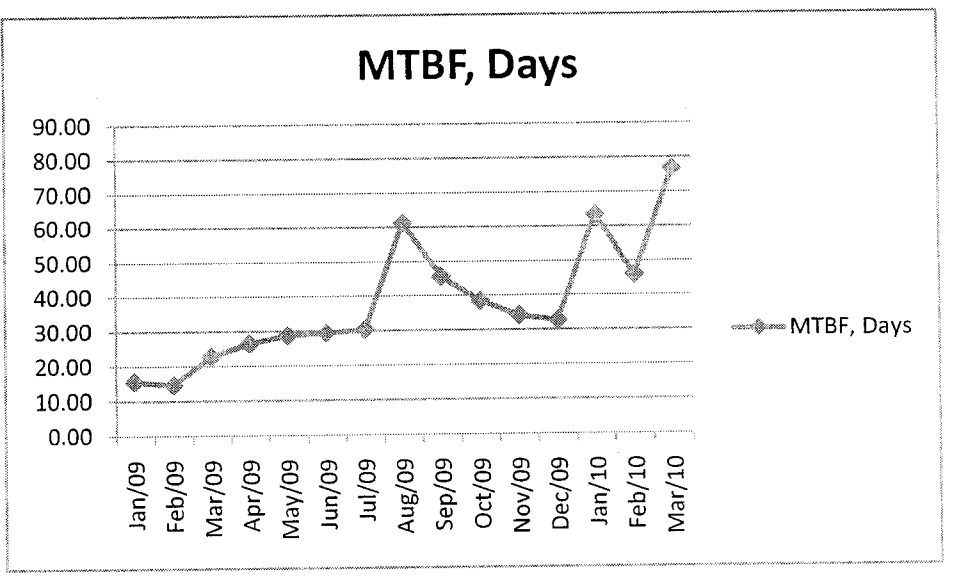
TABLE 4.4 FAILURE DAYS IN TEXTURED VEGETABLE PROTEIN PLANT-1 PROCESS:

MONTHS	JAN-09	FEB-09	M.\R-09	APR-09	MAY09	JUN-09	JUL-09	AUG-09
AVAILABLE HRS.	744	672	744	720	744	720	744	744
RUNNING HRS.	700	626	617	564	551.5	496.5	601	595.5
NO. OF BD.	1	2	1	1	1	1	1	0
CALC. BD	1.06	2.15	1.21	1.28	1.35	1.45	1.24	0.00
MTBF, HRS.	372	348.00	546.00	633.00	688.50	704.25	724.13	1468.13
MTBF, DAYS	15.50	14.50	22.75	26.38	28.69	29.34	30.17	61.17

MONTHS	SEP-09	OCT-09	NOV-09	DEC-09	JAN-10	FEB-10	MAR-10
AVAILABL E HRS.	720	744	720	744	744	672	744
RUNNING HRS.	236.5	287.5	478.95	436	347.25	366.5	308
NO. OF BD.	1	1	1	1	0	1	0
CALC. BD	3.04	2.59	1.50	1.71	0.00	1.83	0.00
MTBF, HRS.	1094.06	919.03	819.52	781.76	1525.76	1098.88	1842.88
MTBF, DAYS	45.59	38.29	34.15	32.57	63.57	45.79	76.79

CHART 4.4 FAILURE DAYS IN TEXTURED VEGETABLE PROTEIN

PLANT-1 PROCESS:



INTERPRETATION:

The Table showing Textured vegetable plant-1 process in that all the months having breakdown hours from January 2009-March 2010 so there is an major impact in mean time between failure days.

INFERENCE:

In Textured vegetable protein plant-1, the breakdown occurred 2 times. So in this month calculation of breakdown hours occurred. The mean time difference between days and hours is reduced than the previous month.

Table 4.5 FAILURE DAYS FOR TEXTURED VEGETABLE PROTEIN

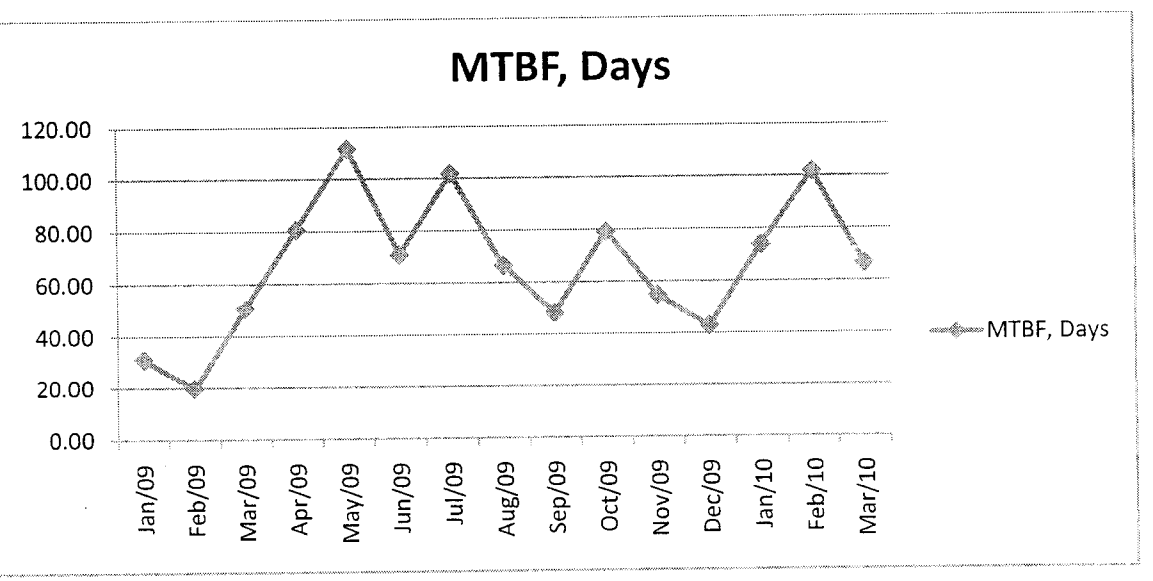
PLANT-2 PROCESS:

MONTHS	JAN-09	FEB-09	MAR-09	APR-09	MAY-09	JUN-09	JUL-09	AUG-09
AVAILABLE HRS.	744	672	744	720	744	720	744	744
RUNNING HRS.	700	636	667.5	508	424.5	380	646	367
NO. OF BD.	0	2	0	0	0	1	0	1
CALC. BD	0.00	2.11	0.00	0.00	0.00	1.89	0.00	2.03
MTBF, HRS.	744	472.00	1216.00	1936.00	2680.00	1700.00	2444.00	1594.00
MTBF, DAYS	31.00	19.67	50.67	80.67	111.67	70.83	101.83	66.42

ONTHS	SEP-09	OCT-09	NOV-09	DEC-09	JAN-10	FEB-10	MAR-10
VAILABLE RS.	720	744	720	744	744	672	744
UNNING RS.	439.25	372	412	547.6	373	298.75	348
O. OF BD.	1	0	1	1	0	0	1
ALC. BD	1.64	0.00	1.75	1.36	0.00	0.00	2.14
ITBF, HRS.	1157.00	1901.00	1310.50	1027.25	1771.25	2443.25	1593.63
ITBF, AYS	48.21	79.21	54.60	42.80	73.80	101.80	66.40

CHART 4.5 FAILURE DAYS IN TEXTURED VEGETABLE PROTEIN

PLANT-2 PROCESS:



INTERPRETATION:

The Breakdown occured in February, June, August, September, November, December, arch. So the calculation for breakdown hours will be occurred and the mean time between lure days and hours is reduced.

ference:

In textured vegetable protein plant-2 process ,2times the breakdown has occurred in brauary 2009 ,due to this calculations of breakdown hours occurred and the meantime between ilure days and hours has reduced in hours.

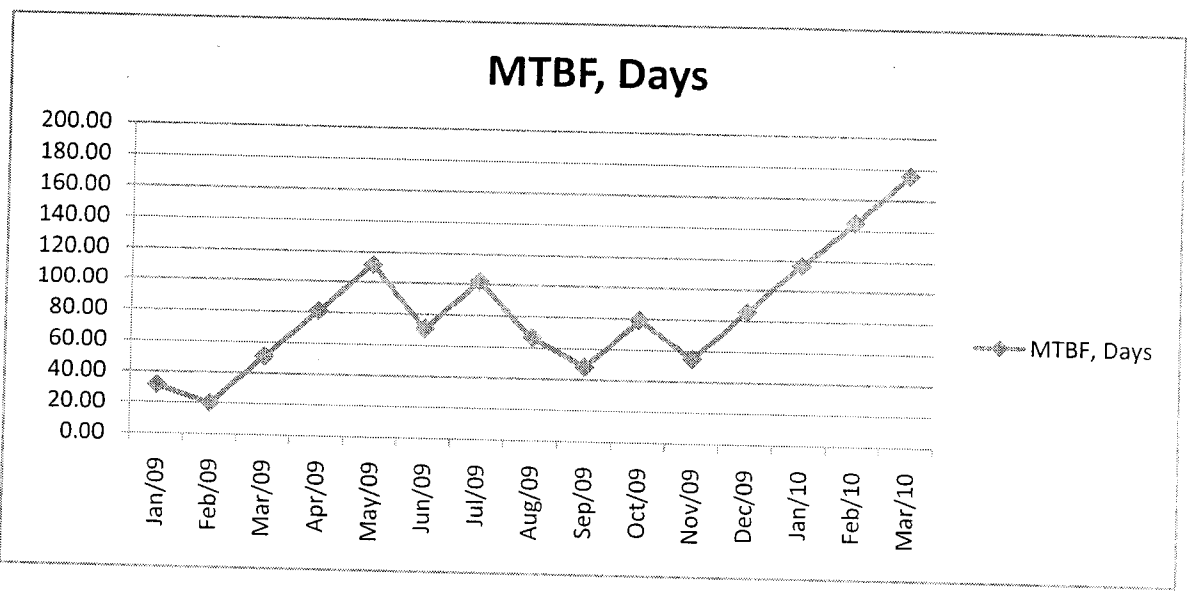
able 4.6 FAILURE DAYS FOR TEXTURED VEGETABLE PROTEIN PLANT-3 ROCESS:

MONTHS	JAN-09	FEB-09	MAR-09	APR-09	MAY-09	JUN-09	JUL-09	AUG-09
AVAILABLE HRS.	744	672	744	720	744	720	744	744
RUNNING HRS.	623	620.5	692.5	674.5	679.5	632	724.5	681.5
NO. OF BD.	0	2	0	0	0	1	0	1
CALC. BD	0.00	2.17	0.00	0.00	0.00	1.14	0.00	1.09
MTBF, HRS.	744	472.00	1216.00	1936.00	2680.00	1700.00	2444.00	1594.00
MTBF, DAYS	31.00	19.67	50.67	80.67	111.67	70.83	101.83	66.42

MONTHS	SEP-09	OCT-09	NOV-09	DEC-09	JAN-10	FEB-10	MAR-10

AVAILABLE HRS.	720	744	720	744	744	672	744
RUNNING HRS.	466.5	334.75	397.25	533.75	465	443.25	193.25
NO. OF BD.	1	0	1	0	0	0	0
CALC. BD	1.54	0.00	1.81	0.00	0.00	0.00	0.00
MTBF, HRS.	1157.00	1901.00	1310.50	2054.50	2798.50	3470.50	4214.50
MTBF, DAYS	48.21	79.21	54.60	85.60	116.60	144.60	175.60

CHARTS 4.6 FAILURE DAYS FOR TEXTURED VEGETABLE PROTEIN PLANT-3 PROCESS:



INTERPRETATION:

In Textured vegetable plant-3 the breakdown occurred in febrauary, June,August,September,November so that calculations for breakdown hours is occurred and the mean time between failure days and hours is reduced than their previous month.

INFERENCE:

In textured vegetable protein plant-3 process,the breakdown occurrences is less in this process only in February 2009 only more breakdown occurred compared to other months so mean time between failure days is reduced than previous month.

Table 4.7 MEAN DIFFERENCE BETWEEN FAILURE:

MTBF in 2010 FEB &MAR MONTH	Feb'10	March'10	Difference
SEP	9.0	11.7	2.7
OR	196.8	227.8	31.0
EFM	26.6	13.5	-13.1
TVP PL-I	24.5	37.5	13.0
TVP PL-II	55.3	34.9	-20.4
TVP Pl-III	95.0	103.1	8.1

INFERENCE:

The overall meantime failure was taken for 2months to measure the difference for each processing machine breakdowns. In this the edible flour and the textured vegetable protein plant1 have negative values. So both having low breakdowns than other processes

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CHART 4.7 MTBF DIFFERENCE BETWEEN 2MONTHS IN EACH PROCESS:

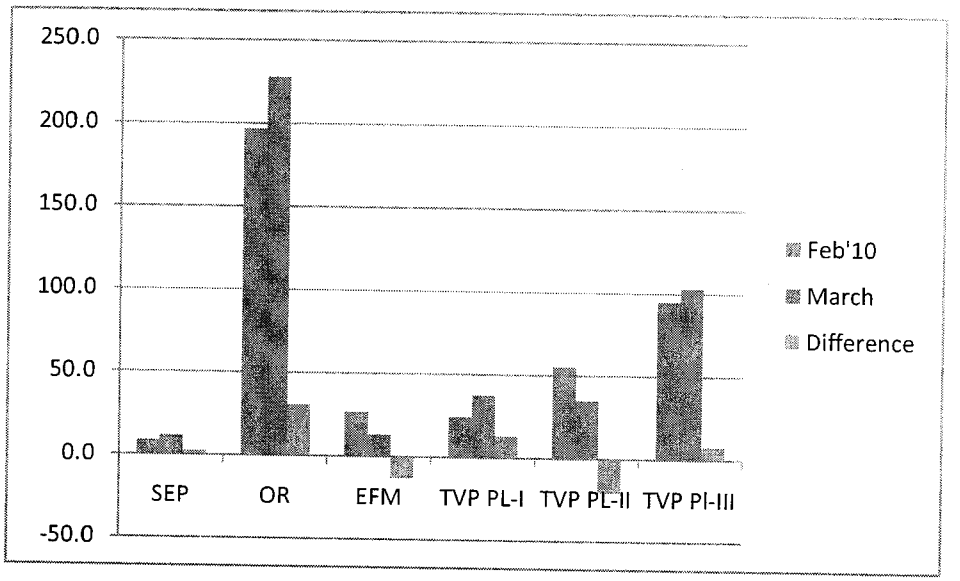
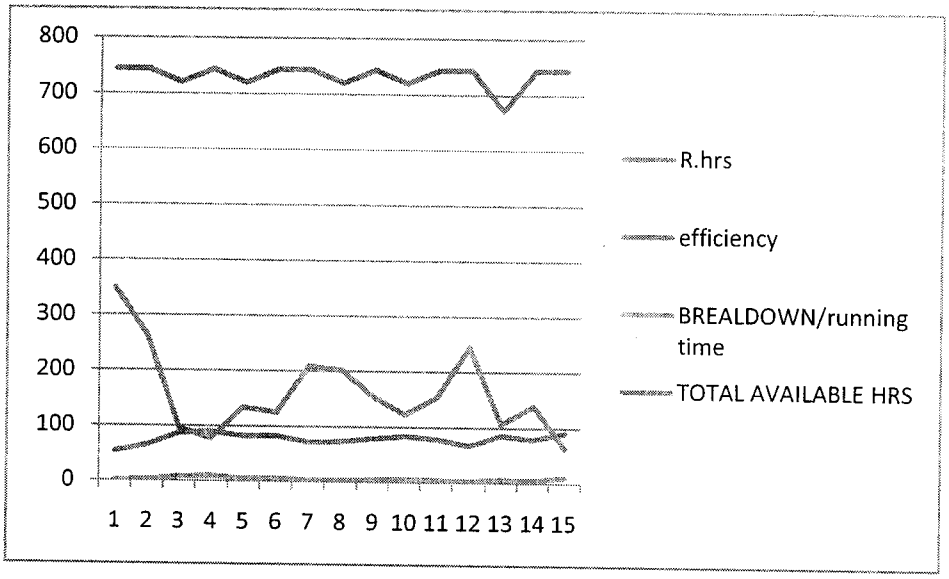


TABLE 4.8 SEED EXTRACTION PLANT:

SEP	JAN-09	FEB-09	MAR-09	APR-09	MAY-09	JUN-09	JUL-09	AUG-09
POWER FAILURE	4.83	0.67	1.75	2.39	0.25	0.20	3.45	3.50
ELETRICAL PROBLEM	0.83	0.50	2.33	1.53	0.00	1.00	1.30	1.15
MECHANICAL	4.83	0.50	1.50	0.00	0.00	1.00	0.00	16.20
STEAM	16.75	0.50	0.00	0.00	0.00	0.00	7.10	0.00
NO PROGRAMME	310.83	474.50	642.75	636.75	582.45	593.00	518.00	416.30
PROCESS CHANGEOVER	0.42	1.25	0.00	1.83	0.30	0.00	1.50	28.45
HOLIDAY	48.00	0.00	0.00	0.00	24.00	0.00	0.00	48.00
OTHERS	7.83	2.50	0.00	0.83	3.30	0.00	4.10	28.45
TOTAL HRS OF NON-OPERATION	394.33	480.42	648.33	643.33	610.30	595.20	535.45	542.05
TOTAL AVAILABLE HRS	744.00	744.00	720.00	744.00	720.00	744.00	744.00	720.00
RUNNING HOURS	349.67	263.58	95.67	76.67	133.70	124.80	208.55	201.95
EFFICIENCY IN %	53.00	64.57	87.14	89.35	82.03	82.67	71.97	72.86
BREAKDOWN/RUNNING TIME (IN NUMBER OF TIMES)	1.13	1.82	6.78	8.39	4.56	4.77	2.57	2.68

SEP	SEP-09	OCT-09	NOV-09	DEC-09	JAN-10	FEB-10	MAR-10
POWER FAILURE	10.25	2.50	2.10	6.10	1.75	4.42	1.00
ELETRICAL PROBLEM	0.03	3.33	5.05	4.25	3.00	0.42	0.00
MECHANICAL	0.25	35.00	0.00	9.08	3.50	0.00	2.75
STEAM	0.00	0.00	0.00	0.00	0.50	0.00	0.00
NO PROGRAMME	530.00	529.50	545.75	474.75	604.00	525.50	674.75
PROCESS CHANGEOVER	0.50	0.50	2.00	2.75	0.00	1.50	0.50
HOLIDAY	24.00	48.00	0.00	0.00	24.00	0.00	0.00
OTHERS	0.00	2.50	11.50	2.00	0.75	1.00	1.50
TOTAL HRS OF NON-OPERATION	565.03	621.33	566.40	498.93	637.50	532.84	680.50
TOTAL AVAILABLE HRS	744.00	720.00	744.00	744.00	672.00	744.00	744.00
RUNNING HOURS	154.97	122.67	153.60	245.07	106.50	139.16	63.50
EFFICIENCY %	78.48	83.51	78.67	67.06	85.69	79.29	91.47
BREAKDOWN/RUNNING TIME(IN NUMBER OF TIMES)	3.65	5.07	3.69	2.04	5.99	3.83	10.72

CHART 4.8 SEED EXTRACTION PLANT



INTERPRETATION:

The efficiency is calculated by the available hours and running hours with in 100% and concluding the efficiency percentage for every month. then the ratio level is calculated by breakdown by running time. the seed preparation plant is calculated by these running hrs,efficiency, breakdown/running time and total available hrs.In total available hrs every 2months there will be increase in working hrs but in 14^{th} month there is continuous decrease because there is other problems like holidays and breakdown machines occur in before year and their recovery time will take more hours.the efficiency occurred after 3^{rd} month is moderate for all months due to their maintenance properly verified for each month. The ratio level for breakdown/running time is same level in their accuracy of running it for all months. Running hours was decreased in fourth month due to the power failures, labour problems and the natural disasters then these are recovered and increased in 12th month then again attains primary stage in 13^{th} and 15^{th} month.

Inference:

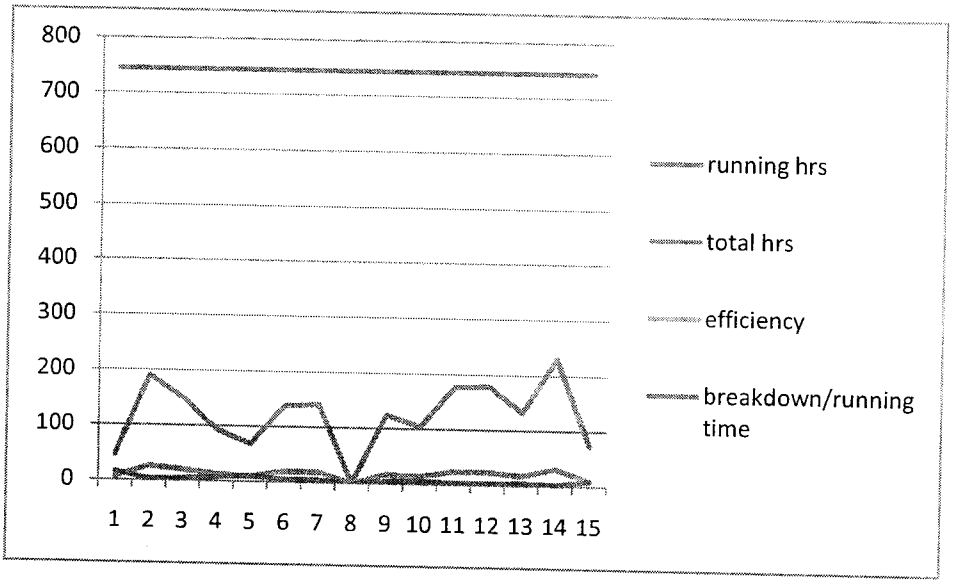
The hours operated is much less than and hours available in the Seed Extraction plant. Where in, the efficiency is reduced in any month indicates chances of more breakdowns in that month.

TABLE 4.9 OIL REFINERY:

OR	JAN-09	FEB-09	MAR-09	APR-09	MAY-09	JUN-09	JUL-09	AUG-09
POWER	0.5	0	0.83	0	1	0	6.45	0
STEAM	0	0	2.5	0	0	0	0	0
NO PROGRAMME	650	554	592	651.3	651	606	597	696
OTHERS	48	0	0	0	24	0	0	48
BREAKDOWN HRS	698.5	554	595.3	651.3	676	606	603.5	744
RUNNING HRS	45.5	190	148.67	92.7	68	138	140.6	0
TOTAL AVAILABLE HRS	744	744	744	744	744	744	744	744
EFFICIENCY %	6.116	25.538	19.983	12.46	9.1398	18.548	18.89	0
BREAKDOWN/RUNNING TIME(IN NUMBER OF TIMES)	15.35	2.9158	4.0044	7.0259	9.9412	4.3913	4.293	0

OR	SEP-09	OCT-09	NOV-09	DEC-09	JAN-10	FEB-10	MAR-10
POWER	0	0	0	8	0	0	0
STEAM	0	0	0	5.3	0	1.5	0
NO PROGRAMME	596	592	568	552	612	504	671
OTHERS	24	48				8	0
BREAKDOWN HRS	620	640	568	565.3	612	513.5	671
RUNNING HRS	124	104	176	178.7	132	230.5	73
TOTAL AVAILABLE HRS	744	744	744	744	744	744	744
EFFICIENCY%	16.66667	13.97849	23.65591	24.01882	17.74194	30.98118	9.811828
BREAKDOWN/RUNNING TIME(IN NUMBER OF TIMES)	4.29349	6.153846	3.227273	3.163402	4.636364	2.227766	9.191781

CHART 4.9 OIL REFINERY:



INTERPRETATION:

In oil refinery the total running hours is same for all 15months and the running hrs is lower than available because the labour available for production is low,then the cleaning separator for this machine will take more time.the efficiency in failure occurrence is moderate for all 15 months,which having lower failure efficiency.the percentage level for failure is calculated by using the breakdown by running time which is for 100%.In this running time is low due the cleaning separator time and the stock for a oil refinery product is lower than the productivity level.

INFERENCE:

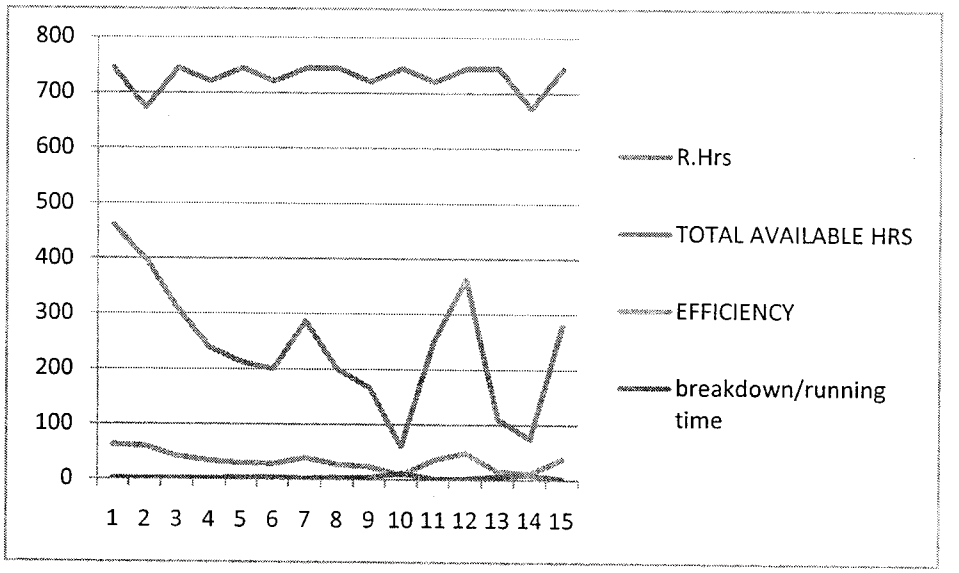
In august there are no running hours and hence 0% in the breakdown efficiency.

TABLE 4.10 EDIBLE FLOUR MANUFACTURING:

EFM	JAN-09	FEB-09	MAR-09	APR-09	MAY-09	JUN-09	JUL-09	AUG-09
POWER FAILURE	42.15	46.25	17.83	20.25	4	0	22.4	32
ELE-PROBLEM	0	0	1.75	0	0	0	0	0
MECH -PROBLEM	0	0	0	1	0	0.3	0	0
WANT OF MAN POWER	27	0	0	10.35	1.45	1	6.25	16
PROCESS CHANGE OVER	0	1.25	0	0	0	0	6	0
HOLIDAY	48	0		0	24	0	0	48
NO PROGRAMME	175	268.25	433.25	469.3	506.3	519	442.3	456.35
OTHERS	34	2.25	0	0	0	0	3	24
TOTAL HRS NO-OPERATION	284	271.75	435	480.65	531.75	520.3	457.6	544.35
RUNNING HOURS	460	400.25	309	239.35	212.25	199.7	286.5	199.65
TOTAL AVAILABLE HRS	744	672	744	720	744	720	744	744
EFFICIENCY%	61.83	59.561	41.532	33.243	28.528	27.736	38.5	26.835
BREAKDOWN/RUNNING TIME(IN NUMBER OF TIMES)	0.617	0.679	1.4078	2.0081	2.5053	2.6054	1.597	2.7265

'M	SEP-09	OCT-09	NOV-09	DEC-09	JAN-10	FEB-10	MAR-10
)WER FAILURE	0	0.5	0	9.75	9.25	0	39.75
E-PROBLEM	0	0	0	1.25	0	0	16
ECH -PROBLEM	0	0	0	0	0	0	0
ANT OF MAN POWER	40	0	0	55.83333	0	0	0
OCESS CHANGE ER	0	0	0	0	0	0	0
LIDAY	24	48	0	0	609.5833	0	0
PROGRAMME	489.3	635.75	469	324	24	597.92	449.15
HERS	0					0	0
TAL HRS NO-ERATION	553.3	683.75	469	381.0833	633.5833	597.92	465.15
NNING HOURS	166.7	60.25	251	362.9167	110.4167	74.08	278.85
TAL AVAILABLE S	720	744	720	744	744	672	744
ICIENCY%	23.15278	8.098118	34.86111	48.77912	14.84095	11.02381	37.47984
EAKDOWN/RUNNING E(IN NUMBER OF ES)	3.319136	11.34855	1.868526	1.050057	5.738113	8.071274	1.668101

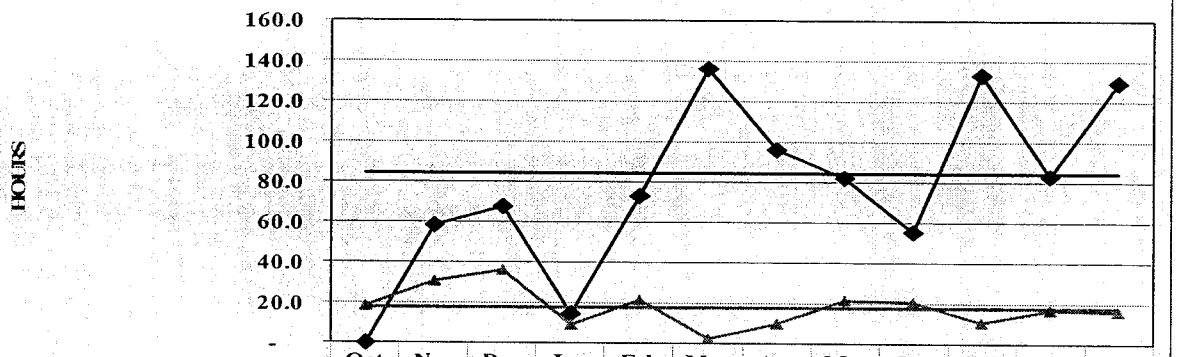
CHART 4.10 EDIBLE FLOUR MANUFACTURING:



INFERENCE:

Edible flour manufacturing is the process of edible flour oils. Total available hours is more for all the months which is equal to their idle hrs 744 hours, only 2nd and 14th month is low because it's a shutdown duration. Running hours is high in first 2months because of their high labours and the maintenance of each parts in that machine. Running hrs is low due to mechanical breakdowns in the productivity. The below graph briefly explains the breakdowns with the comparison of 4years from 2007-2009.

LOSS OF PRODUCTIVE HOURS DUE TO MECHANICAL BREAKDOWNS



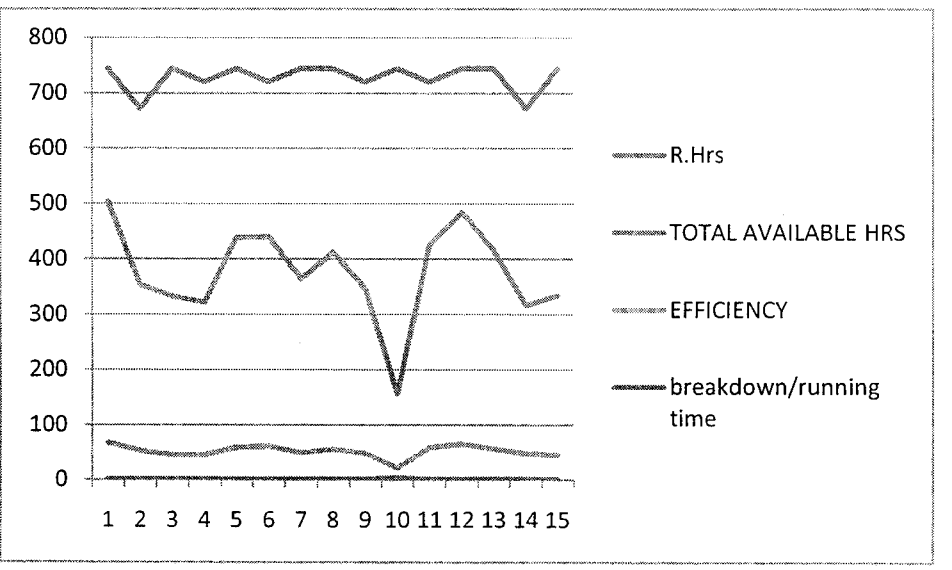
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Mechanical Failure in Yr. 2007-08	-	58.6	67.5	14.3	73.2	136.4	95.9	82.2	55.1	133.0	82.9	129.2
Average in Yr. 2007-08	84.4	84.4	84.4	84.4	84.4	84.4	84.4	84.4	84.4	84.4	84.4	84.4
Mechanical Failure in Yr. 2008-09	18.3	30.6	36.4	9.0	21.2	2.4	9.9	21.3	20.8	11.0	17.0	16.5
Average in Yr. 2008-09	17.9	17.9	17.9	17.9	17.9	17.9	17.9	17.9	17.9	17.9	17.9	17.9

TABLE 4.11 AIR CLASSING MILL-1:

ACM - 1	JAN-09	FEB-09	MAR-09	APR-09	MAY-09	JUN-09	JUL-09	AUG-09
POWER FAILURE	1	0.75	18	41.2	0	3	18.35	34.5
ELE-PROBLEM	0	3	0	0	0	1	0	0
MECH -PROBLEM	0	18.75	0	0	0	9	0	0
WANT OF MAN POWER	0	0	0	0	0	0	0	0
PROCESS CHANGE OVER	0	0	0	0	0	0	0	0
HOLIDAY	48	0		0	24	0		48
NO PROGRAMME	192.3	296.5	393.5	357.4	282	267.55	350.3	225.1
OTHERS	0	0	0	0	0	0	11.15	24
TOTAL HRS NO-OPERATION	241.3	319	411.5	398.6	306	280.55	379.8	331.6
RUNNING HOURS	502.7	353	332.5	321.4	438	439.45	364.2	412.4
TOTAL AVAILABLE HRS	744	672	744	720	744	720	744	744
EFFICIENCY%	67.57	52.53	44.691	44.639	58.871	61.035	48.95	55.43
BREAKDOWN/RUNNING TIME(IN NUMBER OF TIMES)	0.48	0.9037	1.2376	1.2402	0.6986	0.6384	1.043	0.8041

M - 1	SEP-09	OCT-09	NOV-09	DEC-09	JAN-10	FEB-10	MAR-10
VER FAILURE	8	0.5	0	12.75	4.5	0	30.25
-PROBLEM	5.15	0	0	0	0	0	2.5
CH -PROBLEM	0	0	0	0	0	0	0
NT OF MAN POWER	0	0	0	0	0	0	0
CESS CHANGE ER	0	0	0	0	0	0	0
LIDAY	24	48	0	0	300	0	0
PROGRAMME	336.1	539.4167	297	246.25	24	355.17	407.25
ERS	0					0	0
AL HRS NO-RATION	373.25	587.9167	297	259	328.5	355.17	409.75
NING HOURS	346.75	156.0833	423	485	415.5	316.83	334.25
AL AVAILABLE	720	744	720	744	744	672	744
CIENCY%	48.15972	20.97894	58.75	65.18817	55.84677	47.14732	44.92608
AKDOWN/RUNNING E(IN NUMBER OF S)	1.076424	3.766684	0.702128	0.534021	0.790614	1.121011	1.225879

CHART 4.11 AIR CLASSING MILL:



INFERENCE:

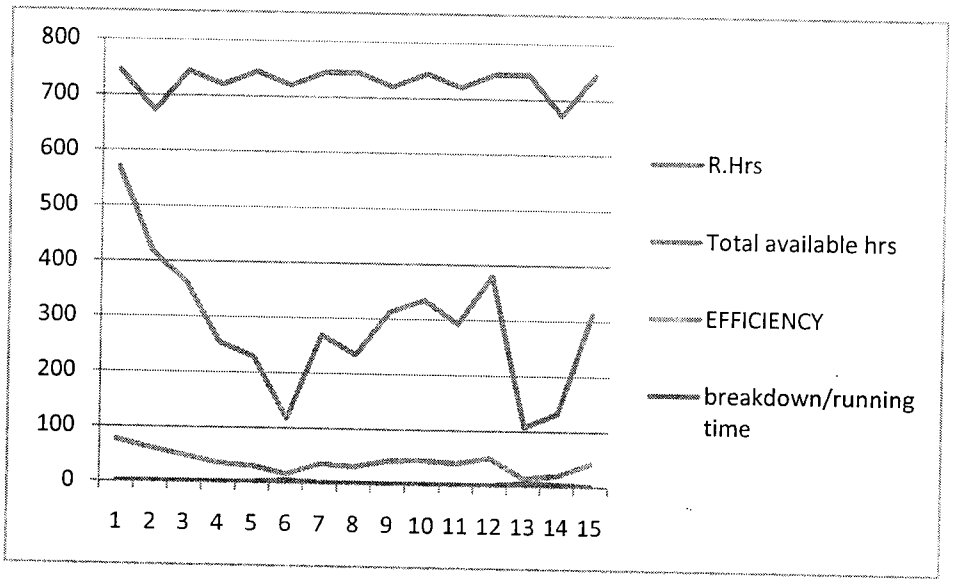
Total available hours is same for all the process which is 744 hours running hours is so low in 10^{th} month due to power failures and power holidays. Then again it was decreased in 14^{th} months due to electrical breakdowns. The efficiency is low in 10^{th} month due to the power failure breakdown.

TABLE 4.12 AIR CLASSING MILL-2

ACM - 2	JAN-09	FEB-09	MAR-09	APR-09	MAY-09	JUN-09	JUL-09	AUG-09
POWER FAILURE	20.15	16.75	15.83	33.35	2	0	22.4	32.3
ELE-PROBLEM	0	4.5	0	1	0	0.45	0	0
MECH -PROBLEM	0	0	0	0	0	0	0	0
WANT OF MAN POWER	17.45	0	0	10.35	1.45	0	3.4	16
PROCESS CHANGE OVER	0	1.25	0	0	0	0	6	0
HOLIDAY	48	0		0	24	0	0	48
NO PROGRAMME	89	232.75	366.33	421.55	488.55	601.9	429.6	389.35
OTHERS	0	0	0	0	0	0	13.3	24
TOTAL HRS NO-OPERATION	174.6	255.25	382.16	466.25	516	602.35	474.7	509.65
RUNNING HOURS	569.4	416.75	361.84	253.75	228	117.65	269.3	234.35
TOTAL AVAILABLE HRS	744	672	744	720	744	720	744	744
EFFICIENCY%	76.53	62.016	48.634	35.243	30.645	16.34	36.2	31.499
BREAKDOWN/RUNNING TIME(IN NUMBER OF TIMES)	0.307	0.6125	1.0562	1.8374	2.2632	5.1198	1.763	2.1747

M - 2	SEP-09	OCT-09	NOV-09	DEC-09	JAN-10	FEB-10	MAR-10
WER FAILURE	11.3	0.5	3.5	9.25	9.25	0	30.15
E-PROBLEM	12	0	0	6.75	0	0	0
CH -PROBLEM	0	0	0	0	0	0	0
NT OF MAN POWER	40	0	0	63.83333	0	0	1
OCESS CHANGE ER	0	0	0	0	0	0	0
LIDAY	24	48	0	0	603.8333	0	0
PROGRAMME	320.15	360	424	284	24	539.5	400.3
HERS	0					0	0
AL HRS NO-RATION	407.45	408.5	427.5	363.8333	637.0833	539.5	431.45
NING HOURS	312.55	335.5	292.5	380.1667	106.9167	132.5	312.55
AL AVAILABLE	720	744	720	744	744	672	744
CIENCY%	43.40972	45.09409	40.625	51.09767	14.37052	19.71726	42.00941
AKDOWN/RUNNING E(IN NUMBER OF ES)	1.303631	1.217586	1.461538	0.957036	5.958691	4.071698	1.380419

CHART 4.12 AIR CLASSING MILL-2



INFERENCE:

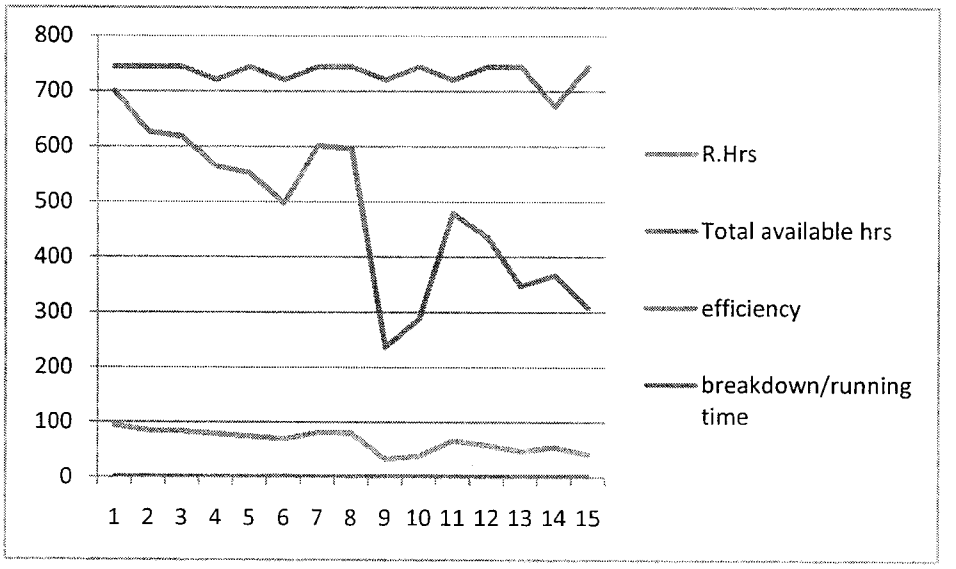
The running hours is decreased from 1st to 6th month because of motor failures. The electronic problem is solved using the development work. The illumination level found to be sufficient. Then in 15th month running hrs is low due to power shutdown breakdowns.

TABLE 4.13 TEXTURED VEGETABLE PROTEIN PLANT-1

TVP PL-1	JAN-09	FEB-09	MAR-09	APR-09	MAY-09	JUN-09	JUL-09	AUG-09
POWER FAILURE	6	12	40	43.25	9.75	46.25	29.5	20.5
MECHANICAL	4.75	15.5	0.75	3.25	1.75	7.75	27.5	1.75
ELECTICAL	5.5	15.25	4.25	0	4.5	0	0	0
STEAM	0	0.5	1.5	0	0	0	0	0
SHUTDOWN	0	0	0	0	0	0	0	0
MANPOWER	0	0	0	24.25	64.5	45.25	11	47.5
MAINTENANCE	2.25	8.25	6.5	2	5	9	0	0
MISCELLANEOUS	3.5	7.5	10.5	5.25	10.75	3.5	3.5	4.5
NO PROGRAMME	22	59	63.5	78	96.25	111.75	71.5	74.25
TOTAL HRS NO-OPERATION	44	118	127	156	192.5	223.5	143	148.5
RUNNING HOURS	700	626	617	564	551.5	496.5	601	595.5
TOTAL AVAILABLE HRS	744	744	744	720	744	720	744	744
EFFICIENCY%	94.09	84.14	82.93	78.333	74.126	68.958	80.78	80.04
BREAKDOWN/RUNNING TIME(IN NUMBER OF TIMES)	0.063	0.1885	0.2058	0.2766	0.349	0.4502	0.238	0.2494

TVP PL-1	SEP-09	OCT-09	NOV-09	DEC-09	JAN-10	FEB-10	MAR-10
POWER FAILURE	12.75	36.25	34.25	32.75	35	34.75	49.25
MECHANICAL	40.75	7	44.3	9.75	0	1.75	0
ELECTICAL	3.5	1	2.25	9.75	1.75	3.5	0
STEAM	0	0	0	0	0	0	0
SHUTDOWN	0	0	0	0	0	0	0
MANPOWER	38.5	12.25	49.25	127.5	0	13	0
MAINTENANCE	0	0.5	2.25	4.5	4.5	2.75	1.25
MISCELLANEOUS	5	5.25	12.75	21.25	8.75	5.25	3
NO PROGRAMME	383	394.25	96	102.5	346.75	244.5	382.5
TOTAL HRS NO-OPERATION	483.5	456.5	241.05	308	396.75	305.5	436
RUNNING HOURS	236.5	287.5	478.95	436	347.25	366.5	308
TOTAL AVAILABLE HRS	720	744	720	744	744	672	744
EFFICIENCY%	32.8472	38.6424	66.5208	58.6021	46.6733	54.5386	41.39785
BREAKDOWN/RUNNING (IN NUMBER OF TIME)	2.044397	1.587826	0.503288	0.706422	1.142549	0.833561	1.415584

CHART 4.13 TEXTURED VEGETABLE PROTEIN PLANT-1



INFERENCE:

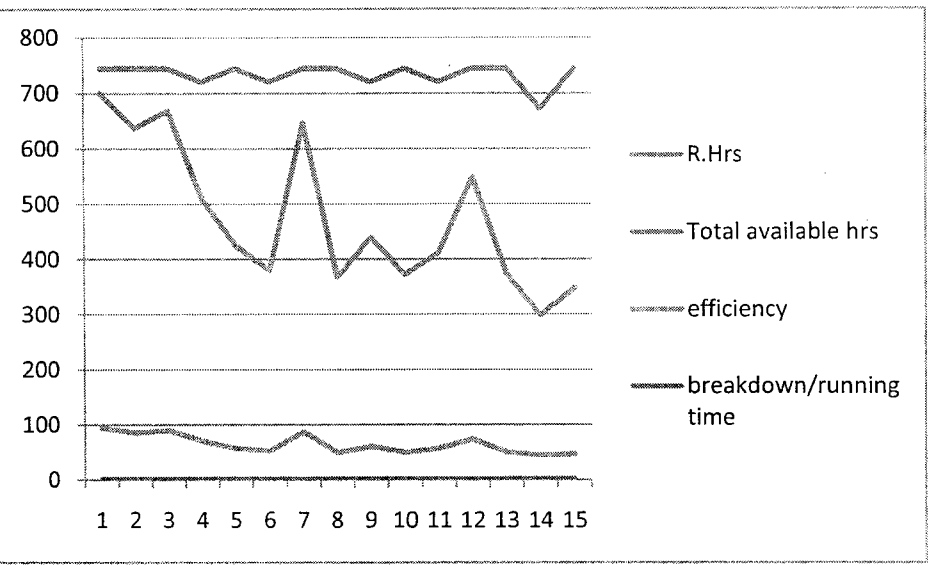
The running hours is decreasing due to mechanical breakdowns continuously the mean difference between failure graph is mentioned below and efficiency also reduced in 9^{th} month due to time taken to solve the breakdowns reliability.

TABLE 4.14 TEXTURED VEGETABLE PROTEIN PLANT-2

PL - 2	JAN-09	FEB-09	MAR-09	APR-09	MAY-09	JUN-09	JUL-09	AUG-09
VER FAILURE	5.25	12.25	20.25	43.25	2.75	39.5	35.25	34.75
CHANICAL	4.75	15.75	2	25.75	62	32.75	5.5	0.5
CTICAL	9	16.75	1.75	0.25	2	0	0	0
AM	0	0.5	0	0	0	0	0	0
TDOWN	0	0	0	0	0	0	0	0
NPOWER	0	0	0	35.25	80.5	93	0	140.25
NTENANCE	2	4	8	1	1	1	0	0
CELLANEOUS	1	4.75	6.25	0.5	11.5	3.75	8.25	13
PROGRAMME	22	54	38.25	106	159.75	170	49	188.5
AL HRS NO-RATION	44	108	76.5	212	319.5	340	98	377
NING HOURS	700	636	667.5	508	424.5	380	646	367
AL AVAILABLE	744	744	744	720	744	720	744	744
CIENCY%	94.09	85.484	89.718	70.556	57.056	52.778	86.83	49.328
AKDOWN/RUNNING E(IN NUMBER OF ES)	0.063	0.1698	0.1146	0.4173	0.7527	0.8947	0.152	1.0272

' PL - 2	SEP-09	OCT-09	NOV-09	DEC-09	JAN-10	FEB-10	MAR-10
VER FAILURE	40.5	52.5	32.75	57.25	37.25	27.5	59.75
CHANICAL	5.5	0.5	9.75	6	0	0	0
CTICAL	8.5	0.5	9.75	3.15	0	2.75	1
AM	1	0	0	0	0	0	0
JTDOWN	0	0	0	0	0	0	0
NPOWER	67	72.5	127.5	29.75	15.5	38	32.5
INTENANCE	0	0	4.5	0	4	0	0
CELLANEOUS	3.75	3.25	21.25	6.25	13.25	4.25	2.5
PROGRAMME	154.5	242.75	102.5	94	301	300.75	300.25
AL HRS NO-RATION	280.75	372	308	196.4	371	373.25	396
NNING HOURS	439.25	372	412	547.6	373	298.75	348
AL AVAILABLE	720	744	720	744	744	672	744
ICIENCY%	61.00694	50	57.22222	73.60215	50.13441	44.45685	46.77419
AKDOWN/RUNNIN TIME(IN NUMBER IMES)	0.639158	1	0.747573	0.358656	0.994638	1.249372	1.137931

CHART 4.14 TEXTURED VEGETABLE PROTEIN PLANT-2



INFERENCE:

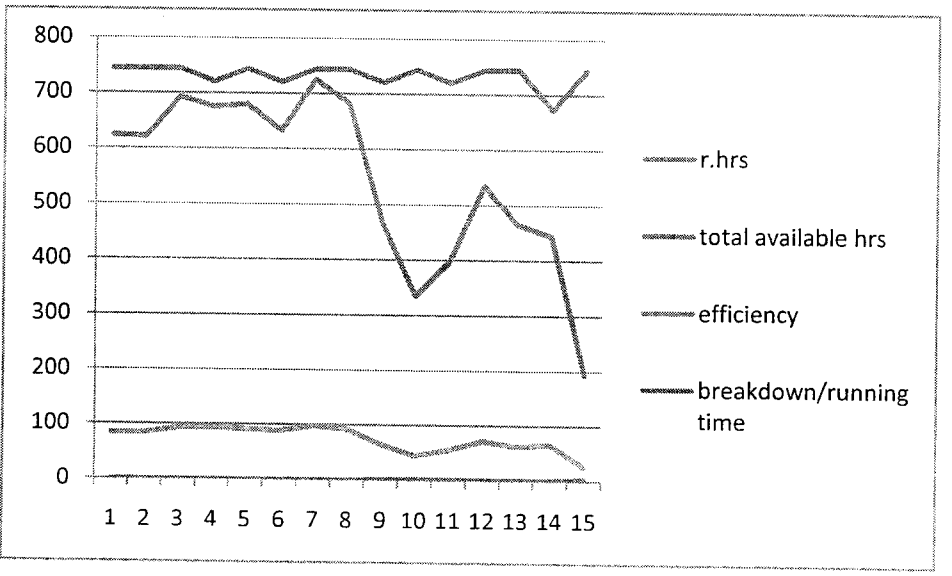
The total available hrs is same in all months with some slight differences in some months. The running hrs is decreasing firstly due to the power failures and labour shortage breakdowns for running the production process.

TABLE 4.15 TEXTURED VEGETABLE PLANT -3:

TVP PL - 3	JAN-09	FEB-09	MAR-09	APR-09	MAY-09	JUN-09	JUL-09	AUG-09
POWER FAILURE	1.75	11.25	3.75	5.25	2	11	0	0
MECHANICAL	3	10.5	0	0	0	9	0	0
ELECTICAL	1	12	7.75	0	5.25	0	0	3.5
STEAM	0	0.5	0	0	0	0	6.5	0
SHUTDOWN	0	0	0	0	0	0	0	0
MANPOWER	33.5	0	0	0	0	12	0	0
MAINTENANCE	4.5	20.75	13	0	9.5	1.25	0	0
MISCELLANEOUS	16.75	6.75	1.25	17.5	15.5	10.75	3.25	27.75
NO PROGRAMME	60.5	61.75	25.75	22.75	32.25	44	9.75	31.25
TOTAL HRS NO-OPERATION	121	123.5	51.5	45.5	64.5	88	19.5	62.5
RUNNING HOURS	623	620.5	692.5	674.5	679.5	632	724.5	681.5
TOTAL AVAILABLE HRS	744	744	744	720	744	720	744	744
EFFICIENCY%	83.74	83.401	93.078	93.681	91.331	87.778	97.38	91.599
BREAKDOWN/RUNNING TIME(IN NUMBER OF TIMES)	0.194	0.199	0.0744	0.0675	0.0949	0.1392	0.027	0.0917

VP PL - 3	SEP-09	OCT-09	NOV-09	DEC-09	JAN-10	FEB-10	MAR-10
OWER FAILURE	13	4	3.5	17.5	17.25	12.5	23.5
ECHANICAL	0	0	0.75	4	1	0	3
LECTICAL	6.5	0	3	2	0	0.25	0
TEAM	0	0	0	0	0	0	0
HUTDOWN	0	0	0	0	0	0	0
ANPOWER	0	11.75	85.75	0	0	0	0
AINTENANCE	19.25	0	2	3.25	0.5	0	0
ISCELLANEOUS	20	14.25	20	43.75	15.5	25.25	5.5
O PROGRAMME	194.75	379.25	207.75	139.75	244.75	190.75	518.75
OTAL HRS NO-ERATION	253.5	409.25	322.75	210.25	279	228.75	550.75
NNING HOURS	466.5	334.75	397.25	533.75	465	443.25	193.25
TAL AVAILABLE S	720	744	720	744	744	672	744
FICIENCY%	64.79167	44.99328	55.17361	71.74059	62.5	65.95982	25.97446
EAKDOWN/RUNNING ME (IN NUMBER OF MES)	0.543408	1.222554	0.812461	0.393911	0.6	0.516074	2.849935

CHART 4.15 TEXTURED VEGETABLE PLANT-3



INFERENCE:

The total available hours is same for all processes then the running time is slight decrease due to motor problems and for increasing due to efficient labour for the process and handle the machine without any breakdowns but some decrease in the running hours due to the shutdown and other failure breakdowns.

CHAPTER 5

5. FINDINGS:

- The failure days in Soya Oil refinery process in February 2010 is only 1 with a calculated breakdown time of 4.23 hours. The mean time between failure hours have improved compared to previous months.

- The failure days in seed extraction plant process is more during the study period. A maximum of three breakdowns happened in the month of August 2009 with 11 hours of break down. The Mean Time between Failures is comparatively high in this department.

- In edible flour manufacturing process only one breakdown occurred in July 2009 with 2 hours of breakdown. The Mean Time between Failures is comparatively high in this department.
- In Textured vegetable protein plant-1, the breakdown occurred 2 times. So in this month calculation of breakdown hours occurred. The mean time difference between days and hours is reduced than the previous month.
- In textured vegetable protein plant-2 process ,2times the breakdown has occurred in febrauary 2009 ,due to this calculations of breakdown hours occurred and the meantime between failure days and hours has reduced in hours.
- In textured vegetable protein plant-3 process,the breakdown occurrences is less in this process only in February 2009 only more breakdown occurred compared to other months so mean time betwThe overall meantime failure was taken for 2months to measure the difference for each processing machine breakdowns. In this the edible flour and the textured vegetable protein plantl have negative values. So both having low breakdowns than other processes in failure days is reduced than previous month.
- The hours operated is much less than and hours available in the Seed Extraction plant. Where in, the efficiency is reduced in any month indicates chances of more breakdowns in that month.
- In august there are no running hours and hence 0% in the breakdown efficiency.
- Edible flour manufacturing is the process of edible flour oils. Total available hrs is more for all the months which is equal to their idle hrs 744 hrs, only 2nd and 14th month is low

because it's a shutdown duration. Running hrs is high in first 2months because of their high labours and the maintenance of each parts in that machine. Running hrs is low due to mechanical breakdowns in the productivity. The below graph briefly explains the breakdowns with the comparison of 4years from 2007-2009.

- Total available hrs is same for all the process which is 744 hrs running hrs is so low in 10^{th} month due to power failures and power holidays. Then again it was decreased in 14^{th} months due to electrical breakdowns. The efficiency is low in 10^{th} month due to the power failure breakdown.
- The running hrs is decreased from 1^{st} to 6^{th} month because of motor failures. The electronic problem is solved using the development work. The illumination level found to be sufficient.then in 15The running hrs is decreasing due to mechanical breakdowns continuously the mean difference between failure graph is mentioned below and efficiency also redused in 9^{th} month due to time taken to solve the breakdowns reliabilityth month running hrs is low due to power shutdown breakdowns.
- The total available hrs is same in all months with some slight differences in some months. The running hrs is decreasing firstly due to the power failures and labour shortage breakdowns for running the production process.
- The total available hrs is same for all processes then the running time is slight decrease due to motor problems and for increasing due to efficient labor for the process and handle the machine without any breakdowns but some decrease in the running hrs due to the shutdown and other failure breakdowns.

- The reporting system has been in successful operation for a year and is well accepted by maintenance personnel. An annual maintenance work plan has been prepared. a concept was developed for all operations and has resulted in saving of better manpower utilization over the specialized gang concept. various management reports are being prepared. the reporting system is working satisfactorily.

6. SUGGESTIONS:

- The breakdown details must be observed and evaluated to find out the mean time between failures for the breakdowns.
- Running hours must be checked to find out the breakdown occurrences in that month then in next month that break down will be reduced.

7. CONCLUSION:

The study is concluded that the maintenance operations performed in Sakthi Sugars Limited (Soya Division) is done in proper way. A few processing units has more than one breakdowns in a month, while the overall breakdown occurrences are low. The ratio between the breakdown time and running time is maintained in a favourable position. The meant time between failures is high which ensures the consistent operations of the Plant & Machinery. The overall maintenance operations of the organization is satisfactory.

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