INFORMASTION SYSTEM WITH THE APPROACH SUPPLY CHAIN MANAGEMENT AT PT. MOBAR SARANA ENERGI

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ABSTRACT

PT. Mobar Sarana Energi is a company that provides products and services for testing, machine maker or special-purpose machine and also industrial process control. The problems that occur in the company is determining the estimated cost and raw materials that need to be purchased to meet the requirement for the production process because the type product of demand from the custmer isn't stable, so the procurement process can not be properly estimated. It causing the determination of raw materials can be over than the needs and also causing cost losses for PT. Mobar Sarana Energi. In addition, the shipment of products to customer is also delayed from delivery schedule of products. It caused by the procurement of raw materials and production processes that isn't run correctly so it will affect to customer trust to PT. Mobar Sarana Energi. Based on the problems that occur in PT. Mobar Sarana Energi, the company need an information system with supply chain management approach. The purpose of this system is to help engineering dept. head in determining the estimated cost and raw materials that need to be purchased and also determining the delivery schedule of the product. The supply chain strategy that used is the pull supply chain, because it is based on the suitability of the supply chain that occurs in the company was using make-to-order strategy. This supply chain system is built from upstream to downstream. Based on the test results, it can be concluded that this system has helped engineering dept. head to determining cost estimates and raw materials that need to be purchased to meet the requirement in the production process.

Keywords : supply chain management, pull supply chain, make-to-order

1. INTRODUCTIOIN

PT. Mobar Sarana Energi is a company engaged in manufacturing. PT. Mobar Sarana Energi has produced many kinds of products, especially in the production of machines or special purpose machines. PT. Mobar Sarana Energi has supply chain activities from upstream to downstream, upstream activities at PT. Mobar Sarana Energi is to procure raw materials, acceptance of raw materials and processing of raw materials into a product. All activities are conducted after PT. Mobar Sarana Energi get a tender from companies - companies that require the services of PT. Mobar Energy Facility. While downstream activities in PT. Mobar Sarana Energi is a tender process with customer and process of distribution of finished product to customer. In accordance with supply chain activities can be seen that the strategy used by PT. Mobar Sarana Energi is a make-to-order strategy that is the process of purchasing raw materials to suppliers and the production process is done after PT. Mobar Sarana Energi receives a tender.

Based on interview with Mr. Nurseptian Pramono as engineering dept. head, he stated that the process of procurement of raw materials contained in PT. Mobar Energy Sarana based on two things, that is by looking from the design of the product and by looking from the stock of raw materials left over from the previous product. Demand for product types from erratic customers means that the process of raw material procurement is sometimes not correctly estimated, plus the unloading of remaining raw material stocks that could complicate engineering dept. head in determining the raw material to be purchased and the estimated cost. The list of raw materials to be purchased and predetermined cost estimates is then provided to the purchasing supervisor who will subsequently place the ordering of raw materials to the supplier. If there are errors in determining raw material procurement and cost estimates may result in shortage of raw materials affecting the production process or excess

raw materials that cause the accumulation of waste raw materials, as well as losses for PT. Mobar Energy Facility in terms of cost. Based on the recap of the purchase data, the incompatibility of raw material purchase occurred on the recap of raw material product purchases with code 153.153.16 causing cost loss for PT. Mobar Sarana Energi for Rp.9.320.740 (can be seen in appendix E), one of which is the excess purchase item Zelio 24 VDC with type SR2B121BD which should buy 1 pcs but make a purchase with 3 pcs that will cause the accumulation of raw materials also loss in terms of costs for PT. Mobar Sarana Energi.

Based on interview with Mr. Sanat Ariyakumara as project dept. head, he stated that the production stage starts from the production planning process or the design making by engineering dept and project dept. Next is the process of purchasing raw materials made by purchasing dept. Then made the determination of the production process, there are two types of production process is the production conducted in the workshop PT. Mobar Energy Facility and production process conducted outside workshop of PT. Mobar Energy Facility. The production process itself is done by the production dept. The production process is done when the raw materials needed for production process are available. The last stage is the testing process performed by engineering dept. After all the production process is done next is the process of sending the finished product to the customer. The process of product delivery in PT. Mobar Energy Sarana sometimes experience a decline in delivery schedule of products caused by the procurement process of raw materials or production processes that run poorly. The process of procurement of raw materials can experience delays caused by several factors such as suppliers who can not meet the demand for raw materials so that the production process can not be done. Based on the recap of product delivery data, there are 4 regressions of product delivery schedules that occurred in 2016 which has an average of 35 days of inactivity, one of which is the delivery of products with code 165.165.16 (can be seen in appendix F) that is the delivery of product 165.165.16 which should be sent no later than on October 2, 2016 there is a decline in delivery time to date 21 October 2016 so as to affect the level of customer confidence to PT. Mobar Sarana Energi.

Based on the problems that have been presented, PT. Mobar Sarana Energi currently requires a means to manage its supply chain information. Therefore, supply chain management becomes an option to handle the problems contained in PT. Mobar Sarana Energi because supply chain management serves to integrate business processes from supplier to end user. Therefore it is necessary to build Information Systems With Approach Supply Chain Management at PT. Mobar Sarana Energi.

Based on the problems contained in PT. Mobar Sarana Energi, got the intention of writing this final task is to build an Information System With Approach Supply Chain Management at PT. Mobar Sarana Energi.

While the goal to be achieved from this research are:

a. Assist engineering dept. head in determining raw material raw materials to be purchased and cost estimates to minimize the occurrence of deficiencies or excess raw materials and losses in the case of costs for PT. Mobar Sarana Energi.
b. Assist project dept. head in determining the delivery schedule of the finished product to the customer in order to avoid delay.

2. RESEARCH CONTENTS

2.1 Theoritical Basis

Theoretical basis aims to provide a study of theories related to Information Systems Supply Chain Management Approach at PT. Mobar Sarana Energi.

2.1.1 System

The system is a network of interconnected procedures, gathered together to conduct an activity or to accomplish a particular goal.

System is a collection of elements - elements that interact to achieve a certain goal. [1]

Based on the above definition the researcher concludes that the system is a network of procedures or elements - elements that interact and mutually related together to perform an activity that has a goal to achieve or complete a certain goal.

2.1.2 Information

Information is data that is processed into a form that is more useful and more meaningful for its users.

The source of information is data. Data is a plural form of a single form of data - item. Data can also be defined as a fact that describes an event - event. Events are something that happens at a certain moment. [1]

2.1.3 Definition of Information System

An information system is a system within an organization that determines the daily transaction processing needs, supports operations, is managerial and strategic activities of an organization and provides certain outside parties with the necessary reports. [1]

2.1.4 Information System Components

The information system consists of several components called block terminology, including

input block, block model, block of output, technology block, control block (controls block).

The following is an explanation of the components contained in the information system:

1. Input Block

The input represents data that goes into the information system. Input here can be methods - methods can also be basic documents.

2. Block Model

This block consists of a combination of procedures, logic and mathematical models that will mamnipulasi input data and data stored in the database in a way that is certain to produce the desired output.

3. Block of Output

Output block is a product of information system in the form of quality information and documentation useful for system users.

4. Technology Block

The technology block is ¬tool-box in an information system. Technology functions as an input receiver, runs models, stores and accesses data, generates and sends outputs and assists control of the system as a whole.

5. Database Block

Block database is a collection of data that are interconnected with each other. It is stored inside the hardware and requires software to manipulate it. The data needs to be stored in the database for the purpose of providing more information. Data in the database needs to be organized in order to produce quality information. The database is accessed or manipulated using a software package called DBMS (Database Management System).

6. Control Block

The control block is a designed and implemented block to ensure that things that can damage the system such as natural disasters, temperature, fire, water, dust, fraud, failures, errors, inefficiencies, sabotage etc. prevented or if already happened can be directly addressed. [1]

2.1.5 Supply Chain Management (SCM)

Supply chain is the process that drives information and raw materials to the manufacturing process and service of the company. These processes include the logistics processes that move the product physically and the warehouse and storage processes that position the product so that it can be delivered to customers quickly. The supply chain in this context refers to the provision of products and services to factories and warehouses in the form of initial inputs as well as the supply of products and services to customers in the form of final output. [2]

Supply chain management is an integrative method or approach for managing an integrated flow of products, information, and money involving stakeholders from upstream to downstream consisting of suppliers, factories, distribution networks and logistics services. [3]

Supply chain management is the integrase of raw material and service procurement activities, conversion into intermediate and final products, and delivery to customers. [4]

In a supply chain usually there are 3 kinds of flow that must be managed, 3 kinds of flow that must be managed are as follows:

1. The flow of goods flowing from upstream to downstream.
2. The flow of money and the like that flows from downstream to upstream.
3. The flow of information that can occur from upstream to downstream or vice versa.

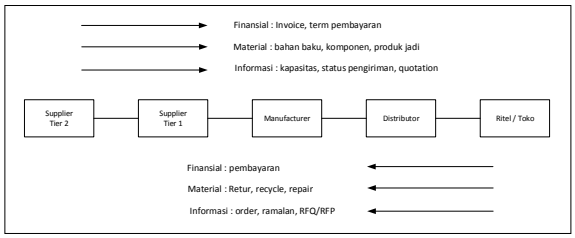


Figure 1. Supply Chain Flow

2.1.6 Procurement

Procurement of goods is an important activity in maintaining the viability of the company, especially in the manufacturing industry.

Procurement is the acquisition of goods or services. It is advantageous that the goods or services are right and that they are purchased at the best cost to meet buyers' needs in terms of quality and quantity, time and location. [5]

Procurement or procurement is an activity to obtain goods or services in a transparent, effective and efficient in accordance with the needs and desires of its users. [6]

Procurement is divided into 2 parts, namely procurement is simple and procurement more complex. Simple procurement is nothing but repetitive purchases or requests, whereas procurement is more complex that can include long-term supplier searches or fundamentally fixed commitments with an organization.

2.1.7 Calculation of Raw Materials Requirement Planning

Calculation of raw material demand planning is done to determine the amount of raw materials that must be met to perform the production process. Planning needs of raw materials obtained by multiplication between the material needs with the number of products to be produced. The formula calculation of raw material demand planning can be seen in equation 1.

Plan for raw materials = Company's production plan x raw material requirements (1)

2.1.8 Monitoring

Supervision is to determine what has been done, that is, to evaluate work performance and, if necessary, to apply corrective actions so that the results of work in accordance with the established plan. [7]

Supervision is control performed by conducting inspection, ability assessment, improving and perfecting, both management and operational area. [8]

Based on the above two definitions can be concluded that the monitoring is the process of examination, assessment of ability to perform performance evaluation and apply corrective actions to improve also improve the results of work so that in accordance with the plans that have been set both in the field of management and operational fields.

2.1.9 Production Management

Important production scheduling is applied in a company to achieve a balanced system, resulting in low production costs, resource efficiency, and minimum production time. The pattern of production system flow is divided into two, namely flow shop and job shop. The problem with flow shop flow is that there are a number of jobs and a number of machines with each job that determines the order in which they are done with the same product trajectory. Production scheduling flow shop helps to minimize makespan. [9]

For calculation of production schedule in PT. Mobar Sarana Energi itself uses equation 2.

$T_{production} = T_{po} + duration\ of\ raw\ material\ ordering$ (2)

Information :

$T_{production}$ = *Date of production*

T_{po} = *Date PO*

2.1.10 Shipping Schedule Calculation

Calculation of delivery schedule is done to determine delivery schedule of product to customer. The formula calculation of product delivery schedule in PT. Moba Sarana Energi can be seen in equation 3.

$T_{completion} = T_{po} + (long\ ordered\ raw\ materials + long\ production)$ (3)

Information :

$T_{completion}$ = *Date completed production*

T_{po} = *Date PO*

2.2 Problem Analysis

Problem analysis of the system that is running in PT. Mobar Energy Facility at present is:

1. Engineering dept. head difficulties in determining the raw materials to be purchased and the cost estimates that make the raw material procurement process and the estimated cost is sometimes not properly estimated resulting in excess raw materials that cause the accumulation of waste raw materials and losses for PT. Mobar Sarana Energi in terms of cost.
2. Project dept. head difficulties in determining the delivery schedule because if there is a process of procurement of raw materials or production processes that are not going well will cause the decline of delivery schedule of products to customers that can affect the level of customer confidence to the PT. Mobar Sarana Energi.

2.3 Supply Chain Management Analysis

PT. Mobar Sarana Energi uses the make-to-order method, which is the production process and the process of purchasing raw materials will be done after PT. Mobar Sarana Energi won the tender from the customer. In the series of work PT. Mobar Sarana Energi has two running streams namely the flow of goods and the flow of information. With the flow of information in the series of work then the company can monitor all activities that run.

2.3.1 Model Supply Chain Management (SCM) at PT. Mobar Sarana Energi

Here is a supply chain management model contained in PT. Mobar Energy Facility which can be seen in Figure 2

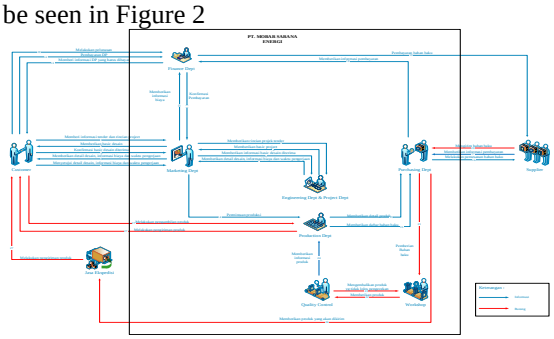


Figure 2. Model *Supply Chain Management* at PT. Mobar Sarana Energi

2.3.2 Supply Chain Management Analysis at PT. Mobar Sarana Energi

Supply chain analysis conducted to describe the process of supply chain management which will be built at PT. Mobar Sarana Energi based on supply chain model in Figure 2 The supply chain analysis at PT. Mobar Energy Facility can be seen in Figure 3.

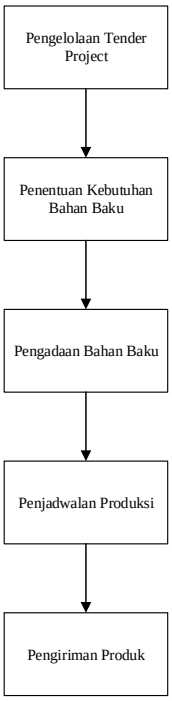


Figure 3. *Supply Chain Management* at PT. Mobar Sarana Energi

1. Tender Project Management

PT. Mobar Sarana Energi has two types of tender projects, namely project tender with project status and tender project with prospect status. Tender project with the status of project is a tender project that has been won by PT. Mobar Sarana Energi and agreed with the customer, while the tender project with the prospect status is a tender project that has not been agreed by PT. Mobar Sarana Energi with the customer and still have the possibility of failing to become PT project. Mobar Sarana Energi.

2. Determination of Raw Materials Needs

The determination of raw material needs is done to determine the needs of raw materials that must be fulfilled for the production process. The plan for raw material needs is known by multiplication of raw material needs with the number of products to be produced. The standard requirement plan always matches the raw material needs for the production process. Calculation of raw material needs in PT. Mobar Sarana Energi has the provision must always be in accordance with the needs in the production process, so that PT. Mobar Sarana Energi can minimize the occurrence of waste of cost. PT. Mobar Sarana Energi prioritizes the accuracy in the production process because considering the raw materials needed do not have a backup. However, in practice there are some products that are defective in production due to ignorance during the production process such as a wrong cutting or at the time of product assembly. Therefore, in order to avoid damage or defect the production performance of employees in the production process should really work well to produce products from raw materials that have been provided.

3. Procurement of Raw Materials

After the need of raw materials is known, then the next process is the process of procurement of raw materials. Purchasing dept to order raw material to supplier based on plan of requirement of raw material that have been made. The process of ordering raw materials at PT. Mobar Sarana Energi is done by contacting the supplier via email or telephone or by coming directly to the supplier. PT. Mobar Sarana Energidetermines the supplier to be selected for raw material procurement where supplier selection is viewed based on the cheapest raw material price from each supplier.

4. Production Monitoring

Production scheduling is carried out in the production process as production targets to be completed at the time of tender project work, so that the product can be produced on time in accordance with the tender that has been used. A tender will enter the production schedule when it has paid down payment (dp) and the need for raw materials needed for the production process is available. Calculation of production schedule is done by using equation.

$T_{production} = T_{po} + duration\ of\ raw\ material\ ordering$ (2)

Information :

$T_{production}$ = *Date of production*

T_{po} = *Date PO*

In the system to be built will also be added production status to provide information for the production rate can be known. The production status consists of "Unprocessed" for products not yet produced, "Production Process" for products that are still in production, and "Completed" for finished products. In addition the time of completion of the production process can also be known. Calculation of production time is done by looking at the difficulty level of production and by looking at the ability of the company in completing the production work. Computation time of finished production is done by using equation.

$T_{completion} = T_{po} + (long\ ordered\ raw\ materials + long\ production)$ (3)

Information :

$T_{completion}$ = *Date completed production*

T_{po} = *Date PO*

5. Shipping Products

Product delivery is a process of delivering the product to the customer after the finished product is produced. The coverage contained in product shipments is shipping scheduling, determining shipping type and monitoring delivery status. Delivery status consists of "Not yet Delivery" for unposted products, "Delivery Process" for products that are still in the shipping process, and "Received" for products already received by the customer.

Shipping scheduling activities can be determined by looking at the finished product, then the company determines the type of shipment that will be made to deliver the product to the customer.

Delivery of products in PT. Mobar Sarana Energi consists of 4 types of shipment, ie shipping by company vehicle if the product to be shipped is small and the delivery destination is still within Bandung, using truck rental if large product, using expedition service if delivery destination is outside Bandung , and the last is delivery of products done by the customer.

2.4 Database Analysis

Database analysis on information systems with supply chain management approach in PT. Mobar Sarana Energi to be built using Entity Relationship Diagram (ERD). The following is the Entity Relationship Diagram (ERD) illustrated in Figure 4

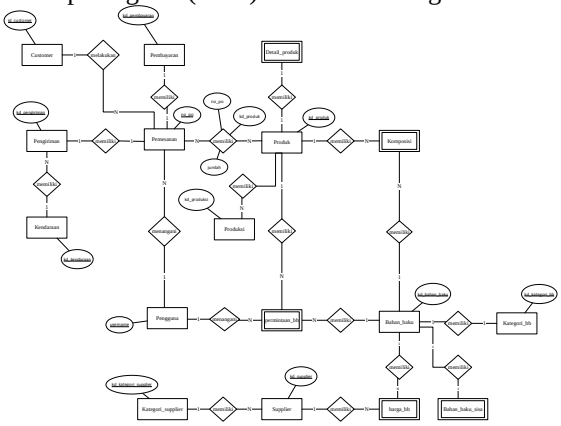
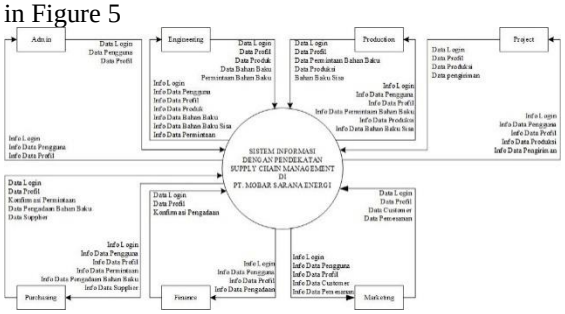


Figure 4. Entity Relationship Diagram of Information Systems With Approach Supply Chain Management at PT. Mobar Sarana Energi

2.5 Context Diagram

Context diagram explains how data is used and transformed to process in the form of data flow into and out of information systems with supply chain management approach in PT. Mobar Sarana Energi globally. Context diagram on the system can be seen in Figure 5



Gambar 5. Contect Diagram of Information Systems With Approach Supply Chain Management at PT. Mobar Sarana Energi

2.6 Data Flow Diagram (DFD)

Data flow diagram (DFD) describes the flow of data and describes the processes that occur in the system until the process is more detailed.

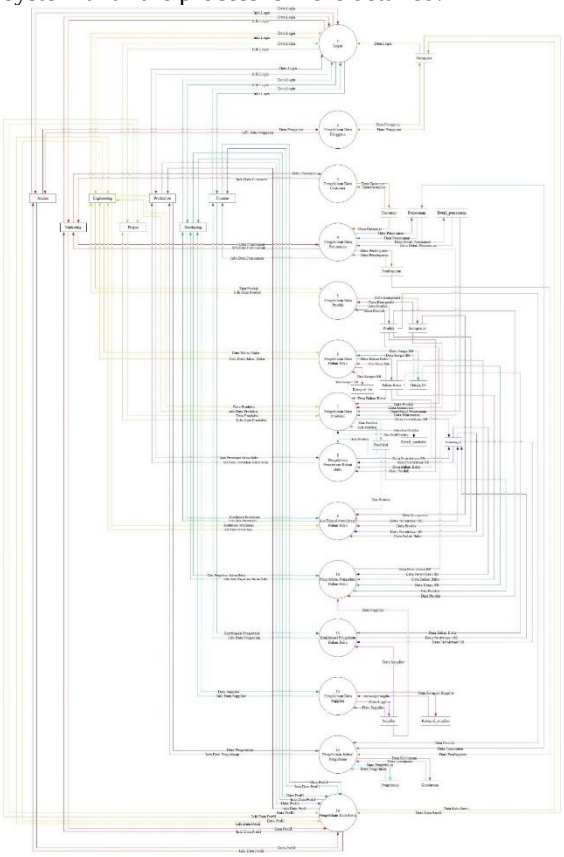


Figure 6. DFD Level 1 of Information Systems With Approach Supply Chain Management at PT. Mobar Sarana Energi

2.7 Tables Relation

Table relation describes the relationship between data. The process of relation between attributes is a combination of attributes that have the same primary key, so that the attributes are related into one entity connected by the key field. Table relation can be seen in Figure 7.

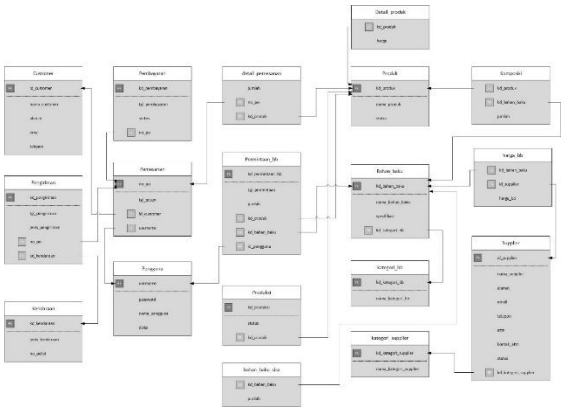


Figure 7. Tables Relation of Information Systems With Approach Supply Chain Management at PT. Mobar Sarana Energi

2.8 Interface Design

Interface design is made to describe the appearance of the program that will be used by the user to interact with the system to be built. The design is made based on the interface of both input and output that will be generated when the system is implemented. The following is an example of designing a login interface that can be seen in Figure 8.

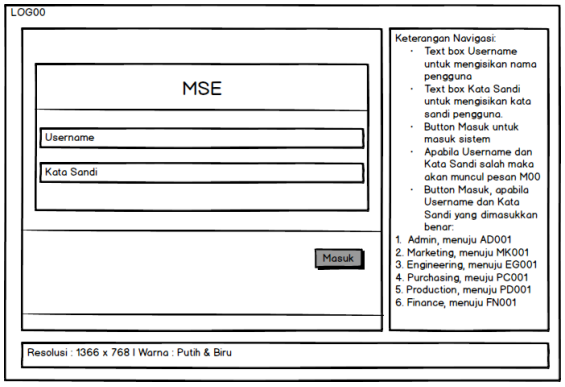


Figure 8. Interface Design Login

2.9 Semantic Network Design

Semantic network design is a concept of the relationship of interface design that shows where each interface is connected. The following is an example of semantic network of engineering users in information systems with supply chain management approach in PT. Mobar Sarana Energi can be seen in Figure 9

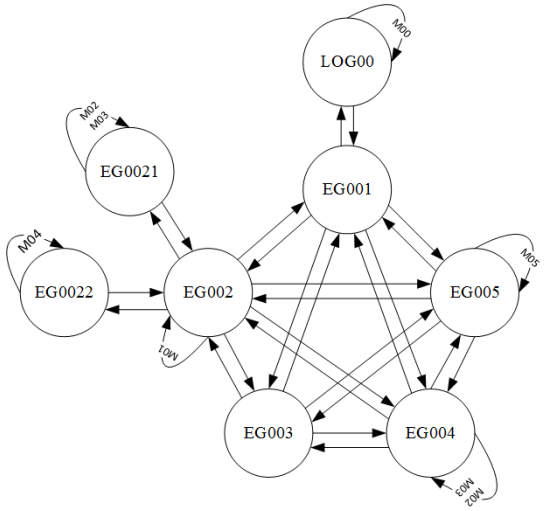


Figure 9. Semantic Network Design Engineering

2.10 System Testing

System testing is a process that aims to find errors or faults in the supply chain system being tested. Testing the system intended to determine the performance of the supply chain system that has been made in accordance with the design objectives.

1. Black Box Testing

Black box testing focused on testing the functional requirements of information systems.

Testing is done by testing each process for possible errors that occur.

Based on the test results with the sample test cases that have been done to give the conclusion that almost on the right. The filtering of process errors in the form of directives appearing still has errors that may occur. However, functionally sisatem can provide output as expected.

2. Beta Testing

Beta testing is a direct test conducted in the environment where the study. Users make an assessment of the system using the method of interviewing the system that has been built. From the results of interviews that have been done then it can be concluded whether the system built has been as expected or not.

Interviews are conducted to users of system users consisting of admin, engineering, purchasing, production, project, marketing, and finance.

Based on the results of interviews obtained the results that almost every user who uses this supply chain information system feel helpful, but there are still some funsional that has not run in accordance with its function so it must still be repaired. For Language, how to use, and appearance, the user can quite accept and feel easy to use.

3. CLOSING

This section describes the conclusions obtained after the analysis, design, and implementation of the design of the built software and suggestions that will provide important records and possible improvements that need to be made for software development.

3.1 Conclution

Based on the results obtained in the writing of this thesis, it can be concluded as follows:

1. This supply chain system can facilitate engineering dept. head in determining the raw materials to be purchased also determine the estimated cost that can minimize the occurrence of deficiencies and excess raw materials and losses in the case of costs for PT. Mobar Sarana Energi.
2. Supply chain system that is built has not been able to realize the process of product delivery scheduling to the customer so can not help the project dept. head in determining the delivery schedule of products to the customer.

3.2 Suggestion

Saran untuk pengembangan sistem rantai pasok ini ada beberapa saran yang dapat dilakukan, antara lain:

1. This supply chain management information system can be embedded by adding some features to make it better like adding a report printing feature

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