ANALYSIS AND DESIGN OF ACCOUNTING INFORMATION SYSTEM FOR SMALL MEDIUM ENTERPRISE CASE STUDY FROM INDONESIA

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Abstract

This paper deals with the implementation of accounting information system in a Small Medium Enterprises (SME) herb medicine manufacture from Indonesia. The manufacture is facing problems in system process costing, lack of supervision on inventory of raw material and finished goods. For the analysis and design of accounting information system is done with Object-Oriented Analysis and Design (OOAD) drawn using Unified Modeling Language (UML) notation and for the cost calculation using weighted average method. Implementation accounting information system can help the company to do every activity of daily process costing and assist management in decision making.

Keyword: *Accounting Information System, Object-Oriented Analysis And Design, Unified Modeling Language*

1. INTRODUCTION

Technology helps companies manage activities to all divisions from finance, marketing, to production. Every company must have a process that is important to the implementation of activity associated with internal business processes. As an example of a process that has the most important role in manufacturing is the production process. PT Sinar Effendi Murni produced herb medicines. It uses a process costing system in production of herb medicines. The manufacture is facing problems in system process costing, lack of supervision on inventory of raw material and finished goods. Objective that wished to be achieved in this research are to design cost system and integrate the information system production inter-department to assist companies in preparing cost of production report.

Most of SME in Indonesia have the same common problem in system information, mainly because the price of the system is very expensive. Usually SME use the traditional system for saving. Pursuant that, we conduct research about design accounting information system which is not expensive and friendly in application. Our title of research is Analysis and Design of Accounting Information System For Small Medium Enterprises Case Study from Indonesia. For the next future research, the writers would redesign the system information in SME to be a system integrated with the supplier.

The research method is a qualitative. Writers gathered data based on interviews, survey, and literature study. Analysis and design method is using OOAD (object-oriented analysis and design) which consists of collection of general guidelines that are used to perform analysis and design. The method for calculating the cost of the production process (process costing) using the calculation of weighted average cost By using accounting information systems, all the needs of each department will be integrated. This system will also assist in remainder inventory minimum, data information and preparing cost of production report.

This research shall be consist of five sections, section 1 is the opening, section 2 brief description on the related literature study, section 3 contains the coverage data and research methodology, sections 4 states the result and discussion. Final section portrays several conclusions.

2. LITERATURE STUDY

Process costing is used in situation where homogeneous products or services are produced in continuous basis. Cost flow through the manufacturing accounts in basically the same way in a process costing system as in a job-order

costing system. However, costs are accumulated by department rather than by job in process costing.

In process costing, the equivalent units of production must be determined for each cost category in each department. Under the weighted-average method, the equivalent units of production equals the number of units transferred out to the next department or to finished goods plus the equivalent units in ending work in process inventory. The equivalent units in ending inventory equals the product of the number of partially completed units in ending work in process inventory and their percentage of completion with respect to the specific cost category.

Using the weighted-average method, the cost per equivalent unit for a specific cost category is calculated by adding the cost of beginning work in process inventory and the cost added during the period and the dividing the result by the equivalent units of production. The cost per equivalent unit is then used to value the ending work in process inventory and the units transferred out to the next department or to finished goods.

Object-oriented analysis and design (OOAD) is a software engineering approach that models a system as a group of interacting objects. Each object represents some entity of interest in the system being modeled, and is characterized by its class, its state (data elements), and its behavior. Various models can be created to show the static structure, dynamic behavior, and run-time deployment of these collaborating objects. There are a number of different notations for representing these models, such as the Unified Modeling Language (UML). The Unified Modeling Language includes a set of graphic notation techniques to create visual models of object-oriented software-intensive systems.

3. DATA AND RESEARCH METHODOLOGY

The research method used is a qualitative. Analysis and design method use OOAD which consists of collection of general guidelines that are used to perform analysis and design. Object oriented analysis and design reflects the four main perspectives on a system and its context, the problem-domain analysis, application-domain analysis, architectural design, and component design.[1]

[1] Mathiassen, et., al (2000, p12)

Method of calculating the cost of the production process (process costing) using the calculation of weighted average cost (weighted average method) which basically combining the cost calculation method of the weighted average cost of beginning inventory with current period costs, to calculate the cost per unit.

4. RESULTS & DISCUSSION

In this chapter, we will explain some of the analytical methods that are used to obtain the expected results. We will also provide an analysis of current running system on the company, making the proposed system in calculating the cost of production and design of the system.

4.1. Current Running System

System that runs on the company can be seen at pictures in rich picture below.
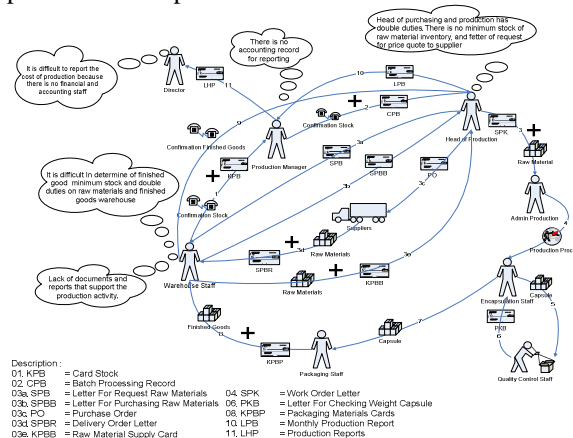
Picture 1 - Rich Picture Of PT. Sinar Effendi Murni's Current Running System

After conducting surveys, interviews and evaluation of the company's current production processes, procedures and organizational structure, we conclude that there are some problems identified in the current system. The problems that are found, are as follow:

1. There are some cases where the same person is doing two or more different jobs, such as the head of the purchasing and production department; the warehouse serves as the warehouse of finished goods and raw materials, and the director calculate the production cost and selling expense.

2. Inventory weakness control of raw materials and finished goods of the company; pursuant that the company is having difficulty in determining the minimum inventory of raw materials and

finished goods. The inventory of finished goods and raw material in the warehouse over capacity.

3. Formal document is unavailable.
4. The number on every document unavailable.
5. The process of recording raw materials and calculation of production costs are still using regular books entry and have not used database system.

4.2. Prepare Cost Report

The method in cost calculation is weighted average. In process manufacturing receive partially completed goods from prior departments. The common practice is to treat transferred of goods as a separate materials category when calculating equivalent units. In dealing with transferred of goods, two important points must be reviewed, *first* the cost of this material is the cost of the goods transferred out as computed in the prior department. Second, the units started in the subsequent department correspondent to the units transferred out from the prior department. For more details see the picture below.
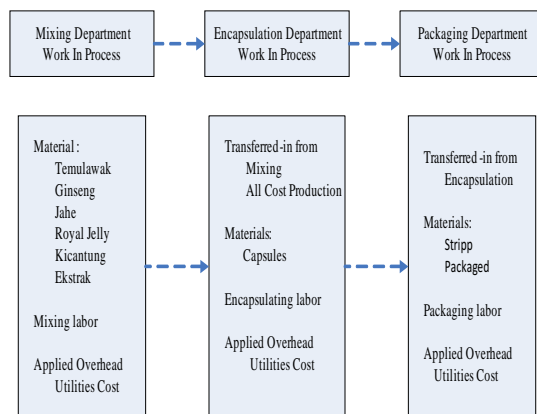
Picture 2 - Flow Of Production Cost PT. Sinar Effendi Murni With The Calculation Of Process Cost Method

In the picture above explains that the production process of herb medicine aladina wich start from the mixing department to the packing department. In the mixing department, there will be the mixing process of raw materials, labor and overhead which is considered as expenses. The calculation of weighted average cost treats the initial cost of inventories and output equivalent with what is followed, as the time period running. This calculation is done by adding the initial production cost of goods in the process of production costs that arise during the period. Total expenses are treated as the sum of production costs for the period.

During the month, the three departments recorded the following costs:

Table 1 - August 2011 Cost
Pt. Sinar Effendi Murni

|	Mixing Department	Encapsulation Department	Packaging Department	Total Cost
Raw Material	Rp. 209.664.000	Rp. 120.960.000	Rp. 17.228.000	Rp. 347.852.000
Labor	Rp. 30.900.575	Rp. 43.949.000	Rp. 52.540.000	Rp. 127.389.575
Overhead	Rp. 300.000	Rp. 350.000	Rp. 422.500	Rp. 1.072.500
	Rp. 240.864.575	Rp. 165.259.000	Rp. 70.190.500	Rp. 476.314.075

Table 2 – Total Unit Production All Department On August 2011
Pt. Sinar Effendi Murni

	Mixing Department	Encapsulation Department	Packaging Department
Unit in Process 01 August 2011	90.000	80.000	75.000
Unit done and finished	1.922.000	1.934.000	1.941.000
Unit in Process 31 August 2011	85.500	78.000	73.000
Total Production (Packaged)	2.097.500	2.092.000	2.089.000

4.2.1. Mixing Department

Production:	
Unit in process, 1Aug 2011	**90,000**
Unit complete and transferred out	**2,012,000**
Unit in process, 31Aug2011	
60% complete	**85,500**
Cost:	
Work in process, `1Aug2011	**Rp.240,864,575**
Cost added during July	**271,586,359**

Picture 3

Total Manufacturing Cost
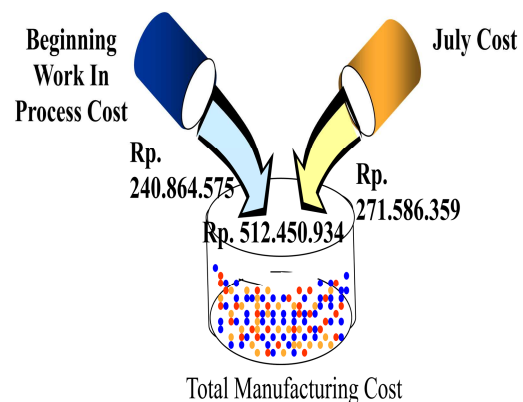
Picture 4

Cost Assignment:

Cost/Unit = Rp. 512.450.934 ÷ 2.063.300 = Rp. 248,36

Transferred Out (Rp. 248,36 x 2.012.000)

= Rp. 499.709.823,2

Ending Work In Process

(Rp. 248,36 x 51.300)   Rp. 12.741.110,3

Total Cost Assigned   Rp. 512.450.934

Picture 5

By using data from the mixing department, in the picture 3-5 illustrated allocate production costs to units transferred out and the units in the ending of the Work in Process (Unit in Process). Cost of beginning unit in process combined with the costs added to production during August. For details of the calculation can be seen in the table below.

Calculation of Weighted Average Cost of Mixing Department August 2011

Table 3 - Step 1 Mixing Departments - Physical Flow Schedule

	Packaged	Packaged
Units to account for:		
Units in beginning work in process		90.000
Units started during the period		2.007.500
Total units to account for		**2.097.500**
Units accounted for:		
Unit completed and transferred out:		
Started and completed	1.922.000	
From beginning work in process	90.000	2.012.000
Units in ending work in process (60% complete)		85.500
Total units accounted for		**2.097.500**

Output For Augustus

Total Physical Units BWIP 2.097.500   Becomes 2.063.300 Equivalent Units

90.000

+

Units Started and Completed   1.922.000

+

Ending Work In Process, 60% Complete   51.300

2.063.300

Table 4 - Step 2 Mixing Departments - Calculation Of Equivalent Units

	Packaged
Units completed	2.012.000
Add: Units in ending work in process x Fraction complete (85.500*60%)	51.300
Equivalent units of output	**2.063.300**

Table 5 - Step 3 Mixing Departments - Computation Of Unit Cost

	Rp
July cost	271.586.359
August cost	240.864.575
Total Manufacturing Cost	**512.450.934**
Cost per equivalent unit =	**248,36**

Table 6 - Step 4 Mixing Departments - Valuation Of Inventories

	Rp
Cost of goods transferred to the Encapsulation Department	499.709.823,2
Ending inventory:	12.741.110,3

Table 7 - Step 5 Mixing Departments - Cost Reconciliation

	Rp
Goods transferred out	499.709.823,2
Goods in ending work in process	12.741.110,3
Total costs accounted for	**512.450.934**
Goods in beginning work in process	271.586.359
Units started during the period	240.864.575
Total costs accounted for	**512.450.93**

4.2.2. Encapsulation Department Calculation Cost

Production:
Unit in process, 1 August 2011
          80.000
Units completed and transferred out
          2.014.000
Unit in process, 31 August 2011, 80%[2] complete
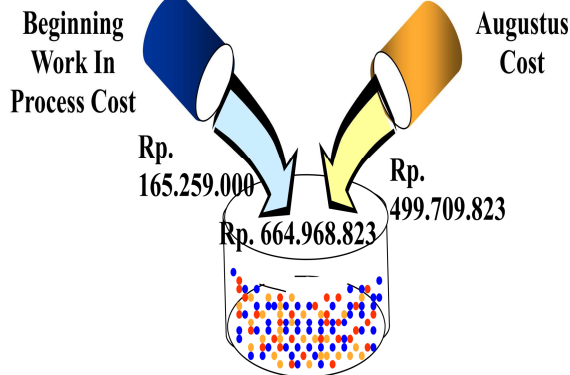   78.000

          Cost:

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[2] 80% conversion cost

Work in process, 1 August 2011

       Rp.   165.259.000

          Cost added in August

          Rp.   499.709.823

Beginning Work In Process Cost

Augustus Cost

Rp. 165.259.000

Rp. 499.709.823

Rp. 664.968.823

Total Manufacturing Cost

Cost Assignment:

   Cost/Unit = Rp. 664.968.823 ÷ 2.076.400 = Rp. 320,25

   Transferred Out (Rp. 320,25 x 2.014.000)

                 = Rp. 644.985.171,41

   Ending Work In Process

   (Rp. 320,25 x 62.400)   Rp. 19.983.651,79

   Total Cost Assigned   Rp. 664.968.823

By using data from the encapsulation department, in the picture 6-8 illustrated the allocate production costs to units transferred out and the units in the ending of the Work in Process (Unit in Process). Cost of beginning unit in process combined with the costs added to production during August. For details of the calculation can be seen in the table below.

Output For Augustus

Total Physical Units BWIP 2.092.000   Becomes 2.076.400 Equivalent Units

80.000

+

Units Started and Completed

1.934.000

+

Ending Work In Process, 80% Complete

62.400

2.076.400

Calculation of Weighted Average Cost of Encapsulation Department August 2011

Table 8 - Step 1 Encapsulation Departments - Physical Flow Schedule

	Packaged	Packaged
Units to account for:		
Units in beginning work in process		80.000
Units from Mixing Department		2.012.000
Total units to account for		**2.092.000**
Units accounted for:		
Unit completed and transferred out:		
Started and completed	1.934.000	
From beginning work in process	80.000	2.014.000
Units in ending work in process		
(80% complete)		78.000
Total units accounted for		**2.092.000**

Table 9 - Step 2 Encapsulation Departments - Calculation of Equivalent Units

	Packaged
Units completed	2.014.000
Add: Units in ending work in process x Fraction complete (78.000*80%)	62.400
Equivalent units of output	**2.076.400**

Table 10 - Step 3 Encapsulation Departments - Computation of Unit Cost

	Rp
August cost	165.259.000
Cost from Mixing Department	499.709.823
Total Manufacturing Cost	**664.968.823**
Cost per equivalent unit =	**320,25**

Table 11 - Step 4 Encapsulation Departments - Valuation of Inventories

	Rp
Cost of goods transferred to the Encapsulation Department	644.985.171,41
Ending inventory:	19.983.651,79

Table 12 - Step 5 Encapsulation Departments - Cost Reconciliation

	Rp
Goods transferred out	644.985.171,41
Goods in ending work in process	19.983.651,79
Total costs accounted for	**664.968.823**
Goods in beginning work in process	165.259.000
Units started during the period	499.709.823
Total costs accounted for	**664.968.823**

4.2.3. Packaging Department Calculation Cost

Production:
Unit in process, 1 August 2011
    75.000
Units completed and transferred out
    2.016.000
Unit in process, 31 August 2011, 100% [3] complete
    73.000
Cost :
Work in process, 1 August 2011
    Rp.   70.190.500
Cost added in August
    Rp.   644.985.171

By using data from the packaging department, in the picture 9-11 illustrated allocate production costs to units transferred out and the units in the ending of the Work in Process (Unit in Process). Cost of beginning unit in process combined with the costs added to production during August. For details of the calculation can be seen in the table below.

Cost Assignment:

Cost/Unit = Rp. 715.175.671 ÷ 2.089.000 = Rp. 342,35

Transferred Out (Rp. 342,35 x 2.016.000)

        = Rp. 690.183.893,52

Ending Work In Process

(Rp. 342,35 x 73.000)   Rp. 24.991.777,89

Total Cost Assigned   Rp. 715.175.671

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[3] 100% conversion cost

Calculation of Weighted Average Cost of Packaging Department August 2011

Table 13 - Step 1 Packaging Departments - Physical Flow Schedule

	Packaged	Packaged
Units to account for:		
Units in beginning work in process		75.000
Unit from Encapsulation Department		2.014.000
Total units to account for		**2.089.000**
Units accounted for:		
Unit completed and transferred out: Started and completed	1.941.000	
From beginning work in process	75.000	2.016.000
Units in ending work in process (100% complete)		73.000
Total units accounted for		**2.089.000**

Table 14 - Step 2 Packaging Departments - Calculations of Equivalent Units

	Packaged
Units completed	2.016.000
Add: Units in ending work in process x Fraction complete (80.000*100%)	73.000
Equivalent units of output	**2.089.000**

Table 15 - Step 3 Packaging Departments - Computation of Unit Cost

	Rp
August cost	70.190.500
Cost from Encapsulation Department	644.985.171
Total Manufacturing Cost	715.175.671
Cost per equivalent unit =	**342,35**

Table 16 - Step 4 Packaging Departments - Valuations of Inventories
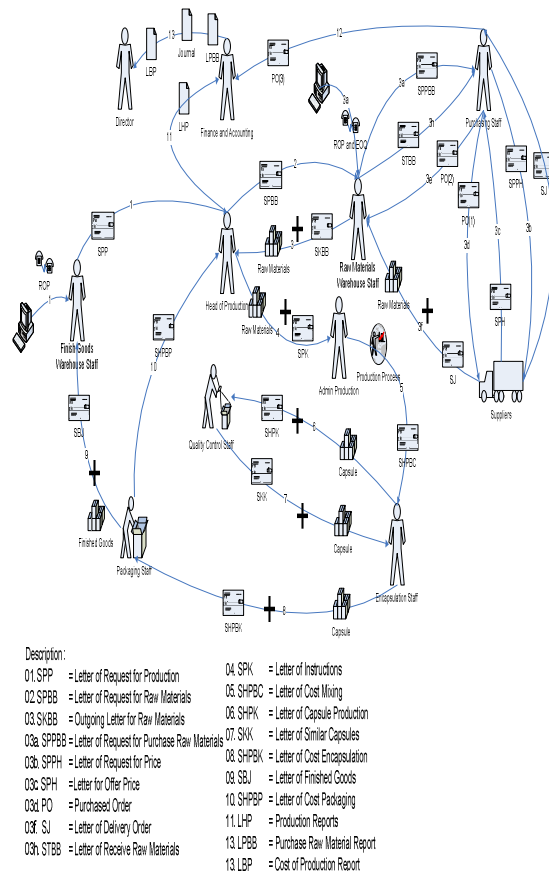
	Rp
Cost of goods transferred to the finish good	690.183.893,52
Ending inventory	24.991.777,89

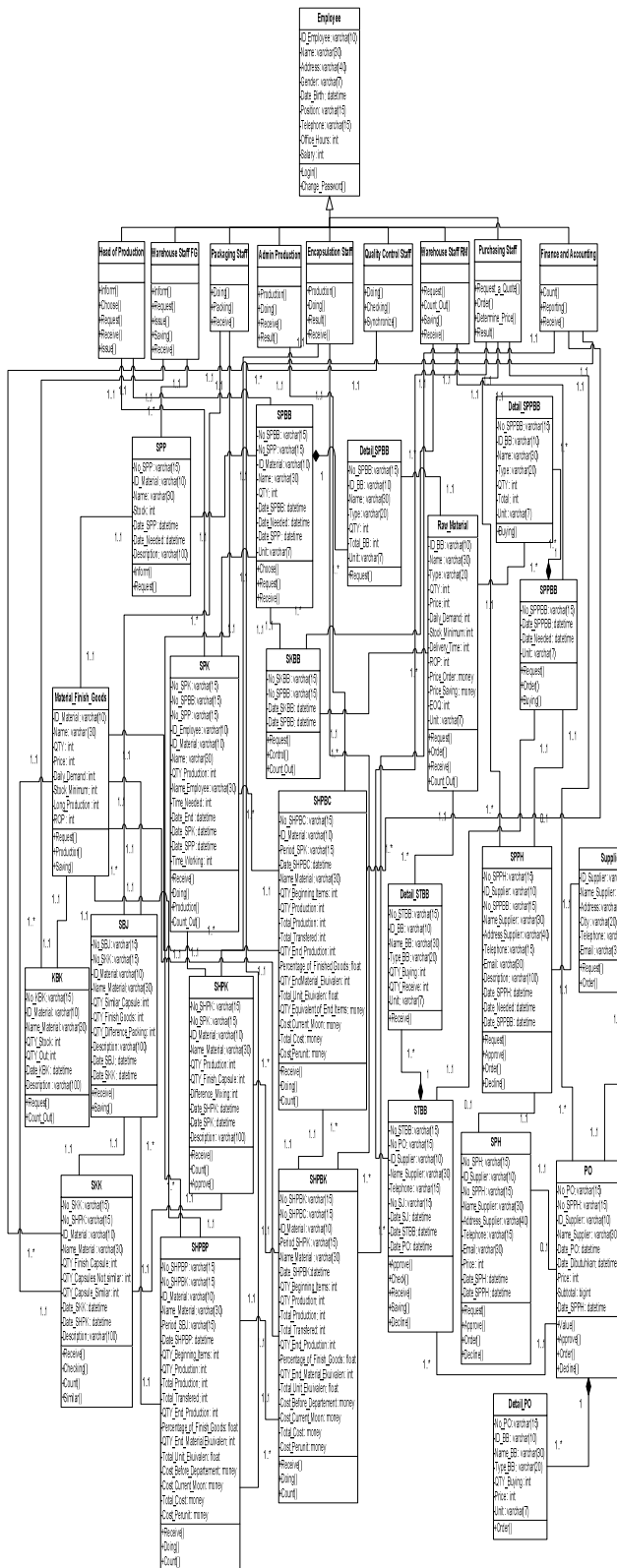*Table 17 - Step 5 Packaging Departments - Cost Reconciliation*

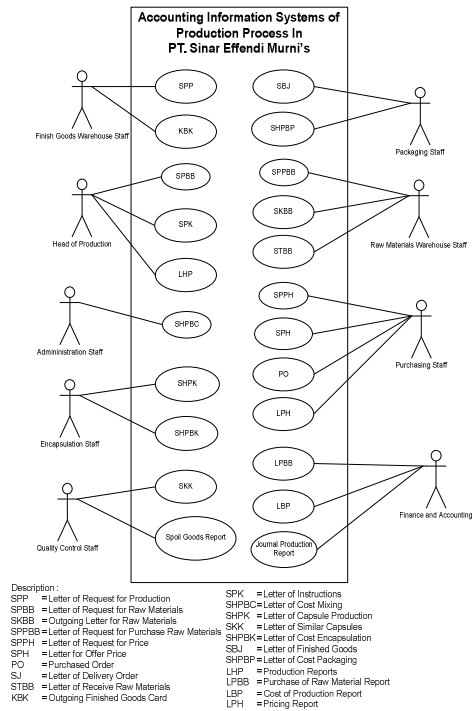|	Rp
Goods transferred out	690.183.893,52
Goods in ending work in process	24.991.777,89
Total costs accounted for	**715.175.671**
Goods in beginning work in process	70.190.500
Units started during the period	644.985.171
Total costs accounted for	**715.175.671**

4.3. Proposed Analysis and Design System

Considering the problems that occur in the current system so it can be identified the need for information to solve problems that occur on the current system and by proposing a draft of the proposed system. The designs of the proposed system are as follows.


Description:
01.SPP = Letter of Request for Production
02.SPBB = Letter of Request for Raw Materials
03.SKBB = Outgoing Letter for Raw Materials
03a.SPPBB = Letter of Request for Purchase Raw Materials
03b.SPPH = Letter of Request for Price
03c.SPH = Letter for Offer Price
03d.PO = Purchased Order
03f.SJ = Letter of Delivery Order
03h.STBB = Letter of Receive Raw Materials

04.SPK = Letter of Instructions
05.SHPBC = Letter of Cost Mixing
06.SHPK = Letter of Capsule Production
07.SKK = Letter of Similar Capsules
08.SHPBK = Letter of Cost Encapsulation
09.SBJ = Letter of Finished Goods
10.SHPBP = Letter of Cost Packaging
11.LHP = Production Reports
13.LPBB = Purchase Raw Material Report
13.LBP = Cost of Production Report

Picture 12 – Proposed Rich Picture of PT. Sinar Effendi Murni

Picture 13 – Class Diagram

Picture 14 – Use case Diagram
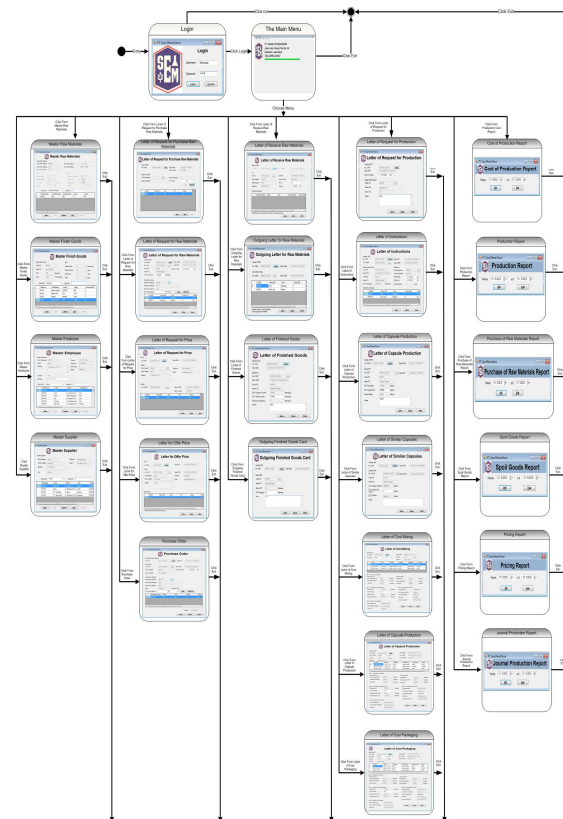
Picture 15 – Navigation Diagram

5. CONCLUSION AND SUGGESTIONS

As any other SMEs, the company's main problem is the limited capital and fund available to adopt any kind of system and or method. Therefore, the company keeps using the traditional method rather than any 'modern or suggested' system. Based on our research, the company have certain problems to be solved, they are: system process costing, lack of supervision on inventory of raw material and finished goods. Pursuant that, we suggest the company to invest on the system that may resolve the problems, and therefore, more efficient for the company and to gain more profit. This system will also provide the company with advantages, such as: (i) Prepare cost of production report for each department, (ii) assist the company in overseeing the company's minimum stock of raw materials and goods in the warehouse by providing the reminder stock minimum and could assist in the presentation of data and recording processes, such as the stock of goods records, raw material stock records, purchase of raw materials records and the making of manufacturing reports, (iii) the system shall be designed using the database as data storage, and make restrictions on access among employees by using a password for each user associated with the system, so that data confidentiality can be maintained, (iv) the sustem would help the management reaching the successful management in maintenance efficiency, accuracy in cost, inventory, and confidentially data.

REFERENCES

[1] Hendarti, Henny. (2008). *Analysis and Design of Information System Production In PD. Sumber Mulya. Journal of Computerized Accounting*, Vol. 1 (No. 1), pp. 1-10.

[2] Bennett, Simon. McRobb, Steve. Farmer, Ray. *Object Oriented Systems Analysis and Design Using Unified Modelling Language*. 3rd edition. McGraw Hill, Berkshire, 2006, pp. 270.

[3] Carter, William K, & Milton F. Usry. *Cost Accounting*. 13th edition, Book 1. Translated By Krista S.E., AK. Jakarta : Salemba Empat, 2006, Chapter 6 and Chapter 9.

[4] Garrison, RH. & Norren ,E.W.. *Management Accounting,* 11th edition, Book 1. Translated By Nuri Hinduan. Jakarta : Salemba Empat, 2006, Chapter 4.

[5] Gelinas, U. J. Jr., Dull, R. B. (2008). *Accounting Information System*. 8th edition. Thomson Learning, Canada.

[6] Hall, James A. (2011). *Introduction To Accounting Information Systems.* 7th edition. South Western Cengage Learning, USA.

[7] Hansen & Mowen. *Management Accounting*. 7th edition, Book 1 Translated By Dewi Fitriasari, MSI. dan Deny Arnos Kwary, M. HUM. Jakarta : Salemba Empat, 2006, Chapter 4 and Chapter 6.

[8] Hansen & Mowen. *Management Accounting*. 8th edition, Book 1 Translated By Deny Arnos Kwary. Jakarta : Salemba Empat, 2009, Chapter 6.

[9] Jones, Frederick L dan Rama, Dasaratha V.. *Accounting Information Systems*. 1st edition, Translated By M. Slamet Wibowo. Jakarta : Salemba Empat, 2008, pp. 7-9.

[10] Mathiassen, Lars., et. al.. *Object Oriented Analysis & Design*. 1st edition. Marko Publishing ApS, Aslborg, Denmark, 2000, pp. 12-15.

[11] O'Brien, James A. *Introduction Information Systems: Business and Managerial Perspectives*. 12th edition, Translated By Dewi Fitriasari and Deny Arnos Kwary. Jakarta : Salemba Empat, 2006, pp. 29.

[12] Render, Barry and Jay Heizer. *Principles of Operations Management*. 1st edition. Jakarta : Salemba Empat, 2001, pp. 322-324.

[13] Romney, Marshall P. Paul John Steinbart. (2006). *Accounting Information Systems*. 8th edition. Prentice Hall, USA.

[14] Whitten, J.L., Bentley, L.D., Dittman, K.C. (2001). *Systems Analysis and Design Methods,* 5th edition. McGraw-Hill, New York.