

MATERIAL INVENTORY INFORMATION SYSTEM AT UD. ALAMRAYA WEB-BASED USING THE WATERFALL METHOD

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ABSTRACT

UD. Alam Raya is a trading business engaged in the sale of building materials. UD. Alam Raya provides various building materials, such as wood, nails, cement, iron, electrical tools, pipes, glue, and others. In processing inventory and finance, it is still not computerized. Recording sales transactions and goods purchases is still manually done on sheets of note paper and large sheets of paper grouped by transaction date. Recording on paper media is less effective because when the paper is exposed to water, the writing on it also fades. Therefore, it hampers the process of making financial reports. Based on these problems, a computerized building material inventory information system is needed to facilitate the processing sales and purchase data and financial reports at UD. Alam Raya. This research uses qualitative research methods, waterfall software development methods, and the PHP (*Hypertext Preprocessor*) programming language using the *CodeIgniter framework*. This study successfully designed and created a building material inventory information system at UD. Alam Raya. The benefit of this system is that it can facilitate the preparation of purchase reports, sales reports, and financial reports at UD. Alam Raya.

Keywords: *Material inventory information system, web-based, codeigniter, waterfall.*

1. INTRODUCTION

Processing and managing data and information supported by technology is not new to the business world. In general, many advanced commercial companies pay attention to information systems that support their business growth. Considering the information technology needs of the business world, a business company will be able to know more quickly and accurately the developing situation to convey accurate, efficient, and practical information. [1].

Usaha Dagang (UD) Alam Raya is a trading company that sells building materials. UD Alam Raya uses a cash sales system. Besides, this trading company has not maximally used information technology to support every activity. The highest sales intensity of building materials occurs after harvest, from June to January. The intensity of sales transactions from June to January increased by 25% compared to other months. The obstacles experienced at UD. Alam Raya is a poor data processing system. Besides, finding data or reports takes a long time. This is because data on goods and sales are stored as transaction notes. From the transaction notes, the data is written back on sheets of paper which are stapled using a paper clip to back up the data. Then the paper is arranged according to the date of entry and date of exit of the goods. The paper-based recording is not permanent and can cause records and data to be scattered, lost, and even damaged, thus disrupting inventory reporting.

Therefore, the researcher concluded to build a Building Material Inventory information system at UD. Alam Raya Web Based Using

the *Waterfall Method*. The features developed in this information system refer to the Statement of Financial Accounting Standards (PSAK) 14 concerning inventory. The system to be built is a web-based material inventory information system that uses the *Hypertext Preprocessor* (PHP) programming language with the *CodeIgniter framework*.

2. LITERATURE REVIEW

2.1. Information system

According to Jeperson Hutahaeen, in his book explaining the concept of information systems, explaining that information systems are systems in an organization that summarise the needs of day-to-day transaction management, support operations, and cover organisational management and strategic activities as well as providing special external functionality to parties who have needs related to reports. [2].

The definition of a system according to Tata Sutabri in the book *Information Systems Analysis*, explains that basically a system is a group of components that are closely related to one another, which function together to achieve certain goals. [3].

2.2. Statement of Financial Accounting Standards No.14 (PSAK No.14) about Inventory

This system refers to Statement of Financial Accounting Standards No.14 (PSAK No.14). According to the Indonesian Institute of Accountants in a book entitled *financial accounting standards second print*, the Statement of Financial

Accounting Standards or PSAK is a standard or rules that must be followed in accounting reporting in Indonesia. PSAK 14 includes the following matters [4]

2.3. Supplies

In PSAK No.14, the Indonesian Accounting Association provides a statement on inventory. PSAK No. 14 consists of 4 parts, namely introduction, explanation and disclosure regarding merchandise inventory.

a. Introduction

The introduction of PSAK No.14 covers the purpose of the statement, the scope and definition of inventory. This introduction consists of paragraphs 1 to 4.

b. Purpose and scope

The objective of this statement is to formulate inventory accounting based on the historical cost principle. The key issue in inventory accounting is the amount of acquisition cost that should be recognised as an asset and the subsequent conversion until the related revenue is recognised. Paragraph 1 of PSAK No.14 says that: This statement should be applied when preparing financial statements that relate to the historical cost system for accounting for inventories other than:

1. Work in progress under construction contract.
2. Financial instruments;
3. Inventories held by producers of livestock, agriculture and forestry, and mining products. However, such inventories are valued at net realisable value in accordance with certain industry practices.

2.4. Financial statement concept

The following is the concept of financial statements in this study:

a. General journal

General journal according to Soemarso S.R in his book entitled Accounting an Introduction explains that "A general journal is a two-column journal. General journals are sometimes called memorial books or standard journals" [5]. While the General Journal according to Rudianto in his book entitled Cooperative Accounting says that: "General journal is the activity of summarising and recording cooperative transactions based on basic documents chronologically along with the necessary explanations in a daily book." [6].

b. Ledger

According to Mulyadi in his book entitled Accounting Systems, states that: The ledger is a collection of accounts used to sort and summarise the information recorded in the journal. [7].

c. Income statement

According to Warsono, the income statement is a financial report that describes the performance achieved over a certain period of time. Net profit or loss is the difference between total revenue and total costs or total expenses. Revenue measures the inflow of net assets (net of debt) from the sale of goods or services. [8].

d. Balance Sheet

According to Soemarso S.R in his book entitled Accounting an Introduction, explains that: A balance sheet is a statement of a company's assets, liabilities, and capital at a specific point in time. This list also shows the source of the company's assets and expenses. The balance sheet shows the company's financial position at a certain point in time [5].

2.5. Framework

According to Wardana, S.Hut, M.Si in his book entitled Menjadi Master PHP dengan Framework Codeigniter explains that *Framework* is a collection of basic commands or functions that form certain rules and interact with each other so that in making web applications, we must follow the rules of the *framework*. [9].

2.6. Codeigniter

In his book entitled Creating PHP Websites with CodeIgniter, Jubilee Enterprise reveals that CodeIgniter is a PHP framework that can be used to simplify scripts and optimise PHP functions. [10].

Another opinion was expressed by Supono and Vidiandry Putratama that CodeIgniter is an open source application in the form of a framework with the MVC (Model, View, Controller) model for building dynamic websites using PHP. CodeIgniter makes it easy for developers or web developers to create web applications quickly and easily compared to creating from scratch. [11].

2.7. Waterfall model

According to Pressman, the *Waterfall* model is a classic systematic and sequential model of building software. The name of this model is actually the "Linear Sequential Model". This model is often referred to as the "*classic life cycle*" or waterfall model. [12]. Here are the phases in the *Waterfall* Model [12]:



Figure 1. Waterfall model

2.8. Black box testing

According to Rosa and Salahuddin in his book entitled Structured and Object-Oriented Software Engineering explained, *Black box testing* is testing

software against functional specifications without testing the design or program code. [13].

2.9. Website

According to Dewa Made Widia and Salnan Ratih Asriningtias in the book *How to Quickly and Practically Build Dynamic Web with PHP and MySQL*, Website is a collection of documents in the form of web pages containing text in *Hyper Text Markup Language* (HTML) format. The website is stored on a *hosting server* that can be accessed using a browser with an internet network via an Internet address in the form of a *Uniform Resource Locator* (URL). [14].

The next opinion explained by Andrea Adelheid in his book entitled *How to Quickly Create Any Kind of Website* explains that a website is a collection of web pages summarised in a domain or sub domain whose place is in the *world wide* on the internet. [15].

2.10. MySQL

According to Miftakhul Huda in his book entitled *creating database applications* explains that, MySQL is a SQL database management system software or known as DBMS (*database management system*), this *database* is *multithreaded, multi-user*. [16].

In the book *MySQL Database Server Study Guide*, wahana computer explains that MySQL *database server* is an RDBMS (*Relational Database Management system*) that can handle large volumes of data. Even so, it does not demand large *resources*. MySQL is the most popular *database* among other *databases*. MySQL is a *database* programme that can send and receive data very quickly and is multi-user. MySQL has two licences, *free software* and *shareware*. [17].

2.11. Javascript

According to Andi Sunyoto in his book entitled "Ajax Building the Web with Asynchronous Javascript and XML Technology" says that JavaScript is a popular scripting language on the internet and can work in most popular browsers such as Internet Explorer (IE), Mozilla Firefox, Netscape and Opera. JavaScript code can be inserted in web pages using the SCRIPT tag. [18].

The second opinion was put forward by Andre Pratama, according to Andre Pratama, JavaScript is a web programming language that is *Client Side Programming Language* and was developed by Brendan Eich from Netscape. JavaScript is a *Client Side Programming Language*, which is a type of programming language whose processing is done by the *client*. The *client* application in question refers to web browsers such as Google Chrome and Mozilla Firefox. [19].

As for the purpose of using JavaScript

according to Lukmanul Hakim, the author of the book entitled "Dahsyat Tricks Mastering Ajax with JQuery" who has implemented data exchange with JSON and Javascript in his book, said that the website becomes more interactive and does not need to take a lot of time to load excess pages because JavaScript lightens the load that occurs on the website so that the website can be interactive in every action that is being carried out. [20].

2.12. Cascading Style Sheet (CSS)

According to Sulistyawan Rubianto Rahmad in his book entitled *Multiply Blog Modification with CSS* explains that CSS is a stand-alone document and can be included in HTML code or just be a reference by HTML in defining styles. CSS uses codes that are arranged to set styles on HTML elements or can also be used to create new styles commonly called classes. CSS can change the size of text, change the background colour on a page, or can also change the border colour on a table, and there are many more things that CSS can do. In short, CSS is used to organise the layout of HTML pages. [21].

According to Yusi Ardi Binarso Dkk CSS (Cascading Style Sheet) is a stylesheet language used to describe the presentation of documents made in the *mark up* language. CSS is a document that is useful for making arrangements on web page components, the essence of this document is to format standard web pages into web forms that have a more beautiful and attractive quality. [22].

2.13. Hyper Text Markup Language (HTML)

In the book *Web Programming with PHP and MySQL*, Achmad Solichin states that HTML stands for *Hypertext Markup Language*. HTML was first developed by Tim Berners-Lee along with the HTTP (*Hypertext Transfer Protocol*) protocol in 1989. The main purpose of developing HTML is to connect one web page with another web page. HTML is a basic web language that serves to display various web components. Meanwhile, to beautify the appearance of the web, CSS or *Cascading Style Sheet* was developed. [23].

Another opinion expressed by Roberto Kaban & David JM Sembiring in his book entitled *HTML (HyperText Markup Language) Introduction to Web-Based Programming*, HTML (*HyperText Markup Language*) is a markup language used by web browsers to interpret and write text, images and other content into web pages visually and audibly. HTML is not a programming language. In HTML we will not find variables, data types, conditioning or looping like programming languages in general. HTML is a format (markup) used to create documents and applications that run on websites. Although it is not a programming language, without the markup of HTML, we will not be able to access content or information from the website. [24].

2.14. Flowchart

According to Wibawanto *Flowchart* is a diagram with certain symbols that detail the sequence of processes and relationships between processes (instructions) and other processes in the programme. *Flowchart* can show the control flow of an algorithm, that is, how a set of activities is carried out in a logical and systematic way [25].

3. RESEARCH METHODS

All stages carried out in this research can be described in the flowchart as follows:

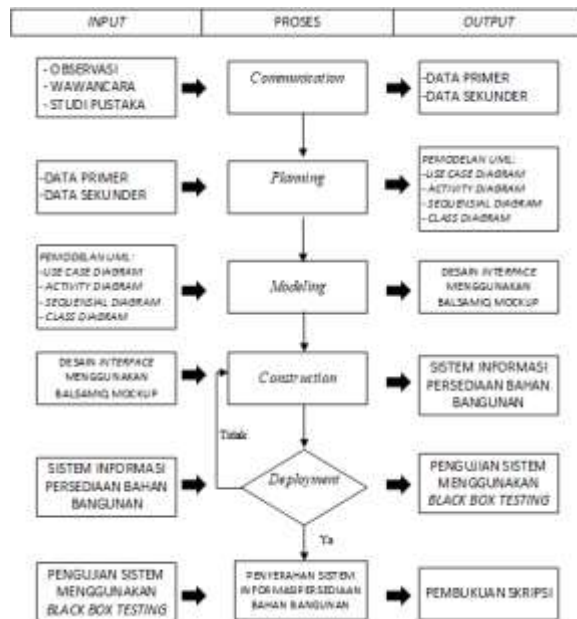


Figure 2. Flow of research method

3.1. Data collection method

The data collection methods used are interviews, observation.

3.2. Development method

The stages that are passed in the *waterfall* method include:

a. Communication

The first stage that researchers do is communicate with the leadership and employees of UD. Alam Raya about the research to be carried out. The results of this communication obtained the problems faced, primary data and secondary data, and defined *software* features.

b. Planning

The second stage in making this information system is planning which includes analysing device needs, analysing system needs, analysing data needs, and *timeline* for system work.

c. Modelling

The next stage is system design and modelling, at this stage researcher focus on creating program algorithms, designing software

architecture, data structures, interfaces.

d. Construction

In the fourth stage, researchers will start creating information systems by translating the design that has been made (coding). After coding, testing will be carried out on the system that has been made to find out errors that may occur and then fix them.

e. Deployment

This stage is the implementation stage, where system evaluation, system improvement, system maintenance and system development will be carried out in accordance with the agreement between the researcher and the research subject.

4. RESULTS AND DISCUSSION

4.1. Running system

The following is the *flowchart of the current system*:

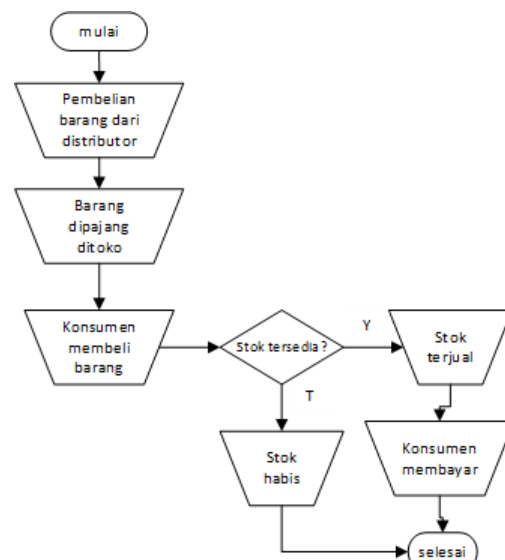


Figure 3. Flowchart of the running system

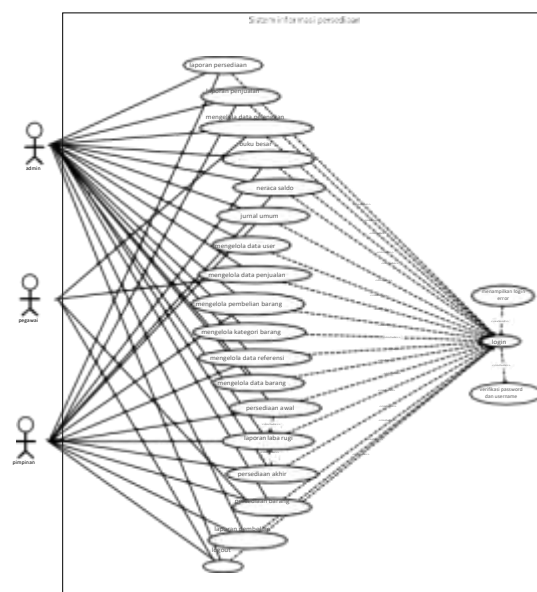


Figure 4. Use case diagram

4.2. Proposed system

a. Use case diagram

Use case diagram of building material inventory information system at UD. Alam Raya is as follows:

b. Login activity diagram

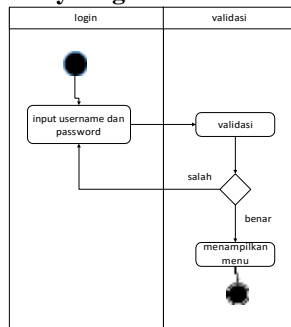


Figure 5. Login activity diagram

The picture above describes the activities of system users who will *log in*. First the *user logs in* by entering the system, then the *user is* asked to enter a *username and password*. If the *username and password are* wrong, an error message will appear and will return to the *login form* again. If the *username and password are* correct, the system will select the general journal menu. When you want to add data, the system will display a general journal data add form, after which the *user* fills in the data according to the provisions. Then the data is saved by the system and the system displays the general journal data. If you want to delete general journal data, the admin or leader chooses delete and the system will delete the data automatically.

c. Income statement activity diagram

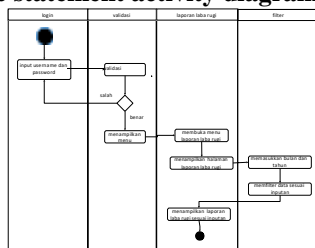


Figure 6. Activity diagram of income

Diagram of income statement display the page according to the *user's* access rights and the user can access the system according to his access rights.

d. Activity diagram of inventory

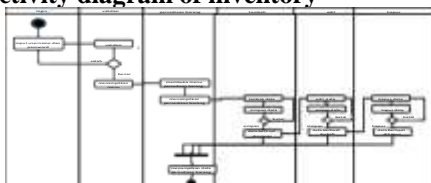


Figure 7. Item inventory activity diagram

The picture above explains the activity when the admin or leader chooses the inventory data menu. First the *user* logs in then, the system displays the inventory data. If the *user* wants to add or edit data, the system will display the inventory data form, after which the *user* fills in or changes the data according to the provisions. Then the data is saved or updated by the system and the system displays the updated inventory data. If you want to delete data, the admin, employees and leaders choose delete, then the system will delete the data automatically.

e. Activity diagram of general journal

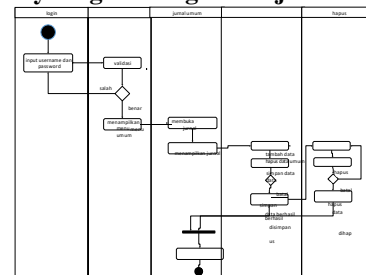


Figure 8. Activity diagram of general journal

The picture above explains the activity when the admin or leader chooses the general journal menu. First, the admin or leader logs in and then

Figure 8 explains the activity when the admin or leader chooses the income statement menu. First the admin or leader logs into the system, then selects the income statement menu, the system will display the income statement page. Admin or leader chooses the month and year of the income statement to be displayed. The system displays the income statement according to the month and year *input*. Admin or leader can view the income statement.

f. Balance sheet activity diagram

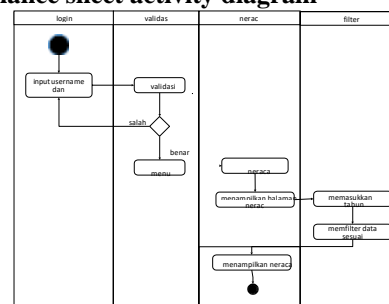


Figure 9. Activity diagram of balance sheet

The picture above explains the activity when the admin or leader chooses the balance sheet menu. First the admin or leader logs into the system, then selects the balance sheet menu, the system will display the balance sheet page. Admin or leader chooses the month and year of the balance sheet to be displayed. The system displays the

balance sheet according to the month and year *input*, Admin or leader can see the balance sheet.

g. Class diagram

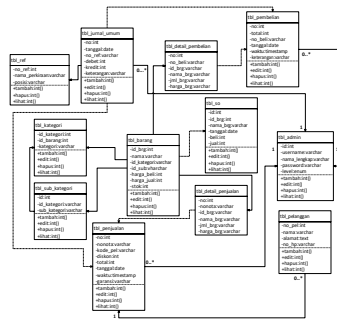


Figure 10. Class diagram

The system has 12 class diagram tables, namely class diagram *tbl_admin*, *tbl_pelanggan*, *tbl_kategori*, *tbl_sub_kategori*, *tbl_barang*, *tbl_ref*, *tbl_penjualan*, *tbl_detail_penjualan*, *tbl_purchase*, *tbl_detail_purchase*, *tbl_so*, and *tbl_jurnal_um*. *Tbl_admin* has *multiplicity* 0.* and 1 with *tbl_sales*, *tbl_purchases*, and

tbl_jurnal_um. *Tbl_detail_purchase* has a dependency with *tbl_purchase*, *tbl_detail_sale* has a dependency with *tbl_sale*, *tbl_so* has a dependency with *table_goods*, *tbl_sale* and *tbl_purchase* have a dependency on *tbl_jurnal_general*. *Tbl_items* has a relationship with *tbl_category* and *tbl_sub_category*. *Tbl_category* has a relationship with *tbl_sub_category*.

4.3. Login view



Figure 11. System login view

On this page the *user* must fill in the *username* and *password* that has been registered so that they can enter the system.

4.4. Item inventory display



Figure 12. Display of inventory

In the inventory view, admins can view item names, categories, types, purchase prices, selling prices, and stock items that have been entered and



Figure 13. Sales page view

In Figure 13 is a goods sales page that functions to fill in goods sales transactions that occur at UD. Alam Raya. After the sales data is filled in, the data will be stored in the *database*. Admins or employees can save data to the *database*, search for goods and add customer data.

4.5. Display of item purchase page



Figure 14. Display of goods purchase page

In Figure 14 is the admin's item purchase page which will add to the stock of goods at UD. Alam Raya. After the data for purchasing goods is filled in, the data will be stored in the *database*.

4.6. General journal page view



Figure 15. General journal page view

The general journal page is a page that displays financial transactions that occur at UD. Alam Raya. Admins and leaders can view transaction data, add transactions, and delete transactions.

4.7. Income statement view

In Figure 16 is an income statement display that displays detailed information about income, expenses, profit and loss at UD. Alam Raya in a certain month and year. Admins or leaders can print and display report data according to the desired month and year.



Figure 16. Income statement display

4.8. Balance sheet view



Figure 17. Balance sheet page display

The balance sheet page displays information that records a list of assets, liabilities, and capital composition displayed based on month and year inputs.

5. CONCLUSIONS AND SUGGESTIONS

Material Inventory Information System for buildings at UD. Alam Raya has been successfully designed and built using the *PHP* programming language and *MySQL* database to facilitate managing inventory, sales, and managing finances at UD. Alam Raya. Suggestions for future development of this system are adding features that are not yet available, such as general journal records, units of goods, and cash flow reports.

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