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Design and Implementation of Inventory Management System in the Analytical Development Laboratory

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ABSTRACT

The importance of information technology in a company to support the running of business processes in the company effectively. With the existence of information technology, incoming and outgoing goods can be recorded properly so as to minimize the occurrence of stock outs of goods that are not regulated. Until now, the inventory system in companies, especially in the Analytical Development Laboratory, still uses a manual process, namely using a logbook, starting from usage, purchasing requests and stock-taking processes, which are still done manually. Data collection was carried out by means of observation, interviews, and field studies. The waterfall method used by the author in this study uses the working principles of this method, namely from needs analysis, design, implementation, verification, and maintenance. The existence of this latest system will further accelerate the processing of raw material information and reduce stock outs at the Analytical Development Laboratory. This system is made using Microsoft Access applications from design to database

Key Words: Inventory, Waterfall. Microsoft access.

1. INTRODUCTION

Raw materials used in the Analytical Development Laboratory often have stock outs. This is caused by the discrepancy between the actual stock data and the data in *the* database. This is due to the lack of stock control and a poor recording system in terms of arrival, use and stock taking. The system that has been implemented so far is still conventional, the entire process of recording requests, usage, listing raw material availability data is still centralized using only a *logbook* and the entire process is handled by the raw materials team.

The existing inventory system causes problems, namely the unfulfilled needs of raw materials for analysis. This causes delays in the existing analysis process so that the analysis *time schedule* becomes backwards and the research and production processes are not timely, the consequences will be detrimental to the company.

The following is a review of the suitability of analysis in the laboratory for a period of 5 times a year from February 2021 to October 2021.

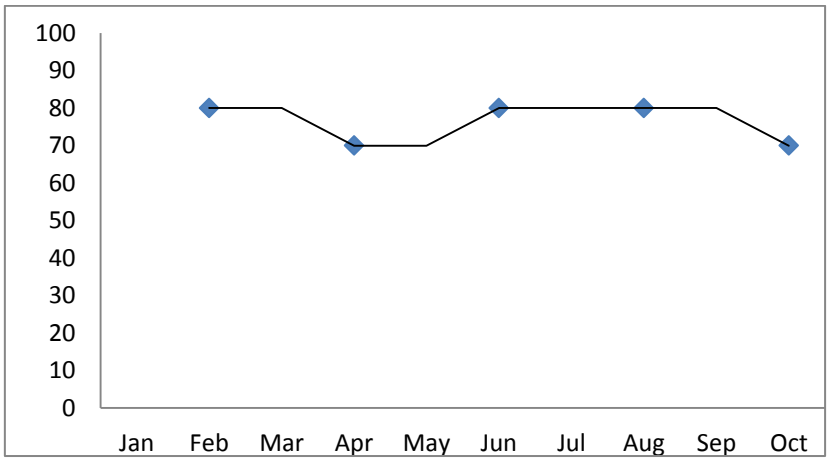

Figure 1. Data Conformity

(Source: Processed Secondary Data, 202 1)

Based on Figure 1, the suitability of the analysis in the analytical development laboratory is still below the company standard, which is 100%, which means that the analysis is not running at the right time due to the non-fulfillment of raw material requirements for several analytical processes.

Factor contributing to the raw materials difference supplies caused by factors namely 3: material, human and methode [1]. The stock planning comparison system with forecasting time series single Exponential smoothing (SES), EOQ, and ROP methods compared to the DDMRP method were obtained that the DDMRP method Produce a better stock of inventory value [2]. The term system comes from the Greek, namely systema which means unity. Viewed from the point of view of the meaning of the system means a group of objects that work together to produce a unit, methods, procedures, techniques that are combined and arranged in such a way as to become a unit that functions to achieve a goal. The system is defined as follows: "the system is a network of procedures that are interconnected, gathered and together to carry out an activity or to complete a specific goal or purpose". Information is one of the main types of resources available to managers. Information can be managed like anything else, and attention to this topic stems from two influences. First, business has become increasingly complex, and second, computers have attained ever-increasing capabilities. An information system is an organized collection of people, hardware, software, data resources in a communications network that collects, transforms and disseminates information [3].

The Waterfall method developed by BW Boehm is a sequential design process and is used traditionally for software development. This model shows progress flowing continuously down like a waterfall through all the phases like conception, initiation, analysis, design, construction, testing, production/implementation and maintenance. The concept of this model comes from the construction and manufacturing industry. This model represents a highly structured physical environment and allows for improvement [4]. In its development the waterfall method has five stages as follows [5]. Waterfall modeling shows the process from start to finish in the development of information systems, namely Requirements Analysis, Design, Implementation, Verification and Maintenance.

Based on the existing background and the problems experienced in the field, the author will analyze the existing problems using the Waterfall method. The researcher purpose to designing improvements to the raw material inventory system in the analytical development laboratory using the Waterfall method and assessing the results of system improvements that have been carried out using the Waterfall method

2. RESEARCH METHODS

The type of research taken is referring to quantitative research. Quantitative research is a research approach that represents the notion of positivism, in the quantitative tradition the instruments used are predetermined and well-organized so that they do not provide many opportunities for flexibility, imaginative input and reflection. The instrument commonly used is a questionnaire (questionnaire). To create high validity, carefulness is also needed in the process of determining the sample, collecting data and determining the analytical tools.

Data is all information that is used and processed for a research activity so that it can be used as a basis for decision making . The type of data used in this study are:

2.1 Primary data

Primary data is data or information obtained through written questions using questionnaires or verbally using the interview method. There are several categories of primary data, namely case studies, surveys and experimental research. Primary data in the study were obtained from observations or direct interviews with the supervisory team for comparison standards , analysts, and supervisors working in the *analytical development laboratory.*

- Existing *inventory system* flow standard reference in the *analytical development* laboratory
- Comparative standard arrival data for January, April, July and October 2020 .
- Comparative standard usage data for January, April, July and October 2020 .
- Checking data for the actual stock of comparison standards for January, April, July and October 2020

2.2 Secondary Data

Secondary data uses material that is not from the source first as a means to obtain data or information to answer the problem under study. This data is also known as literature study and is usually used by researchers who adhere to a qualitative science approach. In this research, the data obtained from the company is the general description of the company, raw material ordering data, and raw material requirement data

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2.3 Data Processing and Analysis Methods

2.3.1 Needs Analysis

User requirements proposed in system development system inventory in the form of a raw material data form that contains a master list form (all data related to materials that have arrived), raw material data forms that are still actually available in the Laboratory .

2.3.2 Design

This stage is the overall system design stage. system design is carried out to follow up on the previous stage and as programming reference. This phase contains Document Flowchart designs, Data Flow Diagrams, input designs and output, database design, data dictionary design, and coding. Thing This is done to create an overview of the system design starting from the page start (home), login, up to the report page.

2.3.3 Implementation

The programming that has been designed is implemented in this study using the *visual basic programming language* to adapt to the running system according to the system that has been implemented in the Analytical Development Laboratory.

2.3.4 Verification

At this testing stage is done to minimize errors (errors) and ensure that the resulting output is as desired. This test is carried out to determine whether the inventory system in the laboratory has been running according to plan, starting from the initial stages on the Home menu to the output report on the total stock of raw materials in the Laboratory.

2.3.5Maintenance

The application of the system must receive support so that the proposed system can run optimally. Maintenance is carried out to keep the system running optimally. Errors in the system or system incompatibility in the future can be corrected by repeating the stages of the system life cycle. This maintenance is carried out every 3 months to see if the system is experiencing problems in the field.

3. RESULTS AND DISCUSSION

The application testing method is carried out using the software testing method in terms of functional specifications without testing the design and program code to find out whether the functions, input and output of the software comply with the required specifications. Testing the system uses the Black Box method, the goal is to find out the weaknesses of the system so that the resulting data matches the data entered after the data is executed and avoids deficiencies and errors in the application before being used by the user

3.1 Inventory System Implementation

The following is the result of the implementation of the database design and interface design so that the application can run as desired.

Figure 2 Login Display

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The login section can be accessed by users and admins. Both have different access rights conditions. The user section is only allowed to access the usage data section. Meanwhile, the admin section can access all the tools on the main page which can be seen as follows.

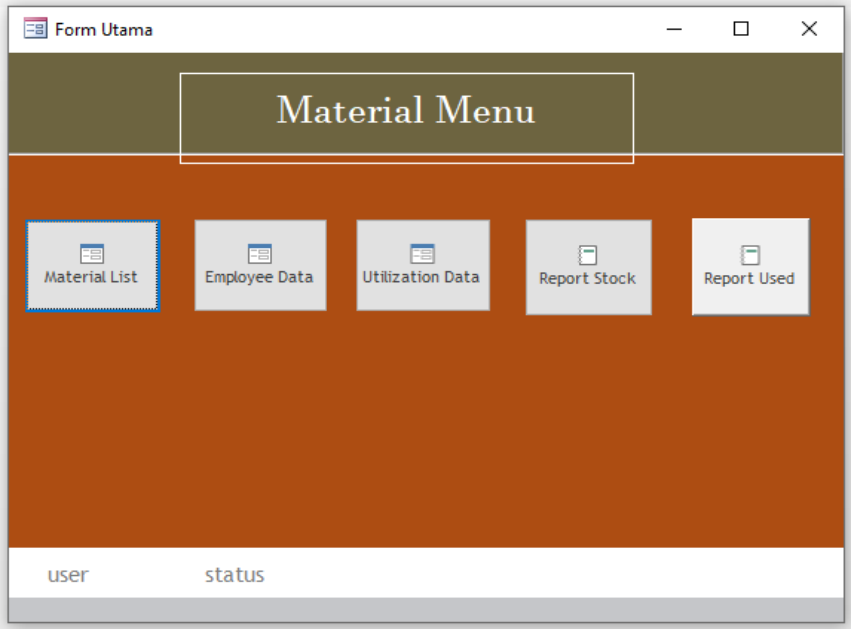

Figure 3 Main Display

The tools section on the main page can bring up pages that can be filled in by users and admins according to their respective access rights. The following are the parts of the form that can be used in the raw material inventory system.

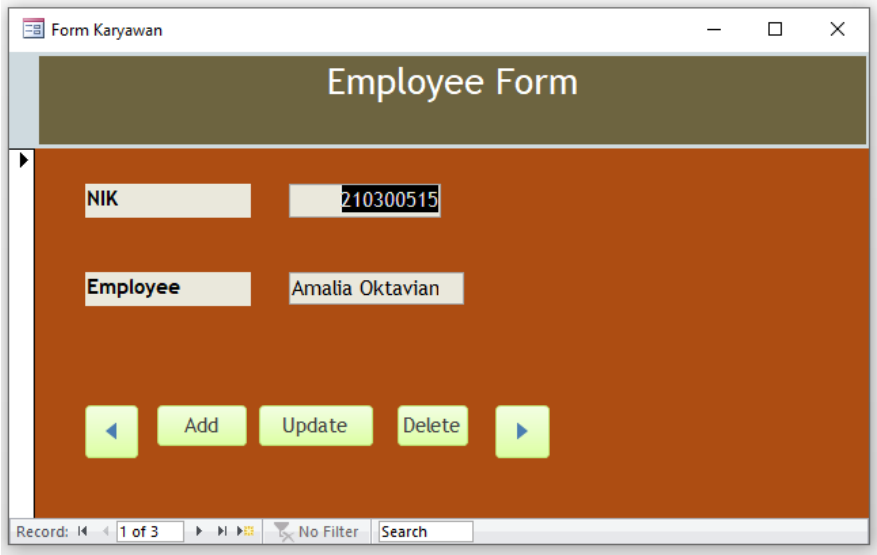

Figure 4 Display of Employee Form

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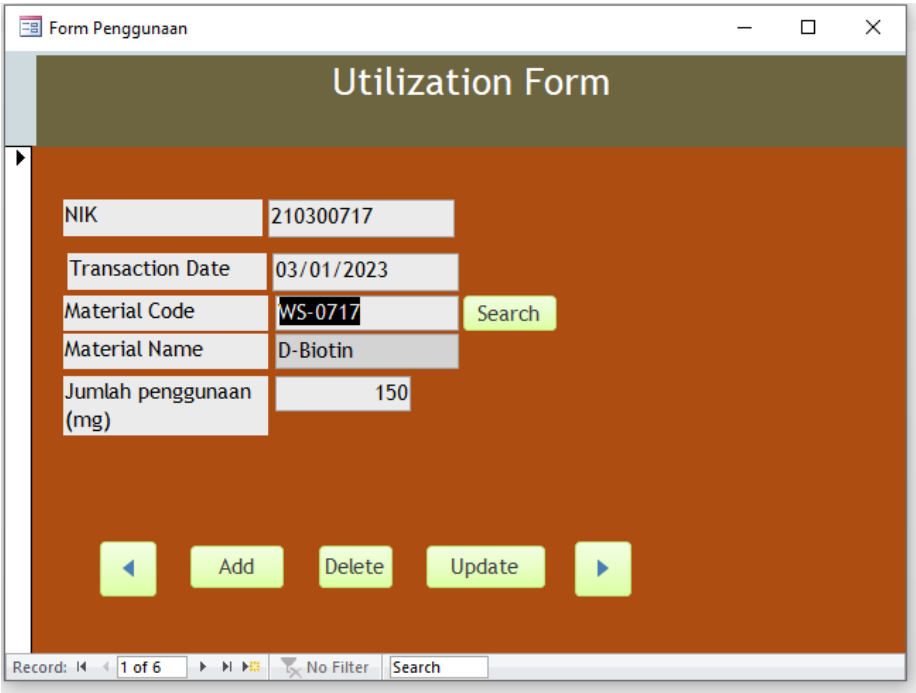


Figure 5 Display of the Usage Form

3.2 Inventory System Verification

This verification is used to see whether the application can run as desired or not. Verification results are described in the form of reports or data on usage reports and stock data. The report generated is in the form of a usage report, namely a report on the material used by displaying the transaction date, item code, item name and amount of use. As for the stock report, you can view actual stock data by displaying the item code, item name, number of items and total stock available. The following is the result of making a report which can be seen in Figure 6 and Figure 7

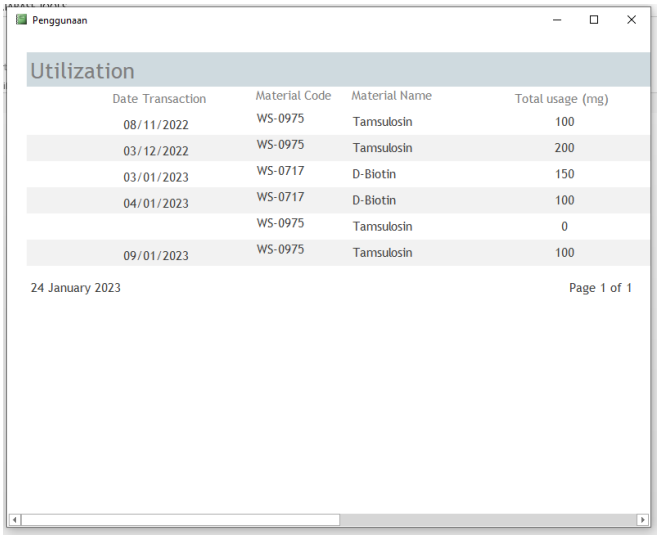
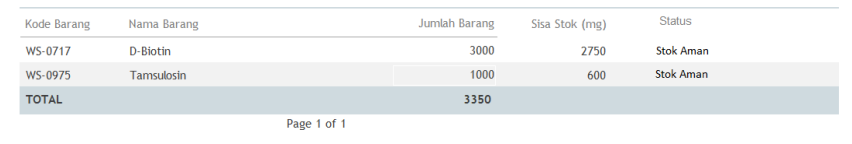


Figure 6 Display of Usage Report



Kode Barang	Nama Barang	Jumlah Barang	Sisa Stok (mg)	Status
WS-0717	D-Biotin	3000	2750	Stok Aman
WS-0975	Tamsulosin	1000	600	Stok Aman
TOTAL		3350		

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Figure 7 Stock Report Display

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Based on the research that has been carried out, all systems, from the database to the interface design with testing on the system using the Black Box method, have been declared valid and ready to be used by users for the stock taking process.

4. CONCLUSION

Based on the results of research on the design of a raw material inventory system in the Analytical Development Laboratory, the following conclusions are drawn. With this inventory application, parties. Companies can control stock transaction actual data usage. With this inventory application, all transactions are recorded in system so that it makes it easier for companies to make reports goods in and out. The system can be developed so that criticism and input are needed for convenience in using the system. Re-socialization is needed to users and admins who use this system so that the system can be used optimally. Keep maintaining the confidentiality of system access rights by not giving passwords to anyone to avoid abuse.

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