The Designing of Warehouse Management Information System

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Abstract. Warehouse Management Information System or WMIS primarily aims to control the movement and storage of materials in the warehouse and process related transactions, including sending, receiving, storing, and taking. This research has the objective to analyze the running system and design a warehouse management information system in Zaeni Conviction. The development methodology used is Rapid Application Development with an object-oriented approach. While the tools used in design are UML (Unified Modeling Language). Problems in the Zaeni Convection are; there is no automatic calculation of raw materials, the process is not yet maximized to regulate the entry and exit of goods, there are no reports on inventory and expenditure of goods, and there is no computerized data storage. In designing a warehouse management information system, there are four actors involved namely Owner, Warehouse Section, Production Manager and Supplier. There are four function that are described, including: Ordering of Raw Materials, Purchase Orders, Production, and Management of Finished Goods.

Based on this research, it can be concluded that the results of the warehouse management information system design can be a solution for the process of managing goods at Zaeni Convexion

1. Introduction
A warehouse management Information system or WMIS primarily aims to control the movement and storage of materials within a warehouse and process the associated transactions, including shipping, receiving, put-away and picking [1]. A warehouse management Information system (WMIS) is a database driven computer application, to improve the efficiency of the warehouse by directing cutaways and to maintain accurate inventory by recording warehouse transactions [2].

A research with the title Application of Information Systems in Warehouse Management by Yaoqin Zhu explains WMIS systems can generally be divided into four modules: storage subsystems, inventory management systems, database subsystems, and the data management systems. By using WMS, the company can control the entry and exit of goods and can provide reports quickly and accurately. From this research, explained that the entire subsystem is the main thing that must be implemented into the WMS [3].

Zaeni Convection is one of the businesses engaged in industrial garments and suppliers of convection products domiciled in Bandung. In managing its business processes, Zaeni Convection still uses a manual system, which used several conventional processes such as; purchase of raw materials that are only reasoned in accordance with orders from consumers, so things like this often occur mismatch between the raw materials needed with the results at the time of production. Then at the time of production, the process of recording the production process, which includes the use of raw materials and the results of finished materials, is still not there is a special recording. Therefore, there are often errors in the calculation of raw materials when production is done. Another problem is when the process of reporting the distribution of goods produced. At this time, when the goods have been produced, the Warehouse Section is immediately handed over to consumers using a shipping service, and then recorded in the ledger as a reminder of the record. However, the warehouse is often difficult in making reports that must be submitted to the owner, because many data must be recapitulated in the general ledger. The
development methodology used is Rapid Application Development with an object-oriented approach. While the tools used in design are UML (Unified Modeling Language). Based on the above problems, we need a solution that can support the warehouse management system at Zaeni Convection. In carrying out its business activities, Zaeni Convection requires a system that is supported by information technology to overcome the problems that occur and help the production process from purchasing raw materials, production to finished goods.

2. Method

In this research conducted the development of software. Therefore, it needs the approach and development system. The approach method used in this research is object-oriented method. The development system method used in this research is RAD (Rapid Application Development). The following will be explained in Figure 1

![RAD Design Workshop](image)

**Figure 1.** The Architecture of RAD[4]

RAD is an object-oriented approach to system development, which includes a development method and software. RAD aims to shorten the time that is usually required in the life cycle of developing a traditional system between the design and application of an information system. In the end, RAD is equally trying to meet rapidly changing business conditions [4]. Three phases in RAD involving the analyzer and the user in the assessment, design and implementation stages. The three phases are requirements planning, RAD design workshop, and implementation [5].

3. Results and Discussion

3.1. Evaluation of the Running System

The evaluation of the current system is an explanation of how the system is running at Zaeni Convection and then the system design is carried out. After that, the author as an evaluation of the company carries out the design. From the research that the author has done, there are a series of problems found in the existing information systems at Zaeni Convection. Table 1 explains about the evaluation of the current system:
Table 1. Evaluation of Current System

| Problem                                                                 | Solution                                                                                           |
|------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------|
| 1 There is no automatic calculation of raw materials that must be used when there are a number of incoming orders from consumers. | Creating a warehouse management system in which there is an automatic calculation that can recommend the type and amount of raw materials that must be purchased. |
| 2 The process is not yet maximized to regulate the entry and exit of goods in Zaeni Convection. | Creating a warehouse management system where the parts involved can carry out the process of purchasing, production, and distribution in a computerized manner. |
| 3 There are no reports on inventory and expenditure of goods, especially in the Warehouse Section. | Provides reports that are built in the warehouse management information system in the form of inventory and the amount that is automatically available in the Warehouse section. |
| 4 There is no computerized data storage, so it is very difficult in carrying out the process of managing data in and out. | Creating a Warehouse Management Information System with a centralized database so that it can simplify data management. |

3.2. System Design

The design used in this research uses the concept of Object Oriented Analysis and Design (OOAD) and the tools used in the design are Unified Modeling Language. Unified Modeling Language (UML) is a "language" that has become an industry standard for visualizing, designing, and documenting software systems [6]. In the discussion of this design system, the diagrams used in the design are Use case Diagrams and Interface Design.

3.2.1. Use case Diagram

Use case Diagram describes the system functionality that should be done as desired by external actors. Actors that interact with the system can be either users or other systems [7].

In designing a warehouse management information system, there are four actors involved namely Owner, Warehouse Section, Production Manager, and Supplier. Then for the use case, there are four main cases that are described including Ordering of Raw Materials, Purchase Orders, Production, and Management of Finished Goods. The following explanation will be illustrated in Figure 2.
In Figure 2, it can be seen that the main actor in the warehouse management information system process is the Owner, Warehouse Section, and Production Manager. In the case of Ordering Goods conducted by customers, the owner can directly calculate the amount of raw materials needed using the application, which will then be used as purchase data for purchase orders to suppliers. Then at the time of production, Production Manager can manage production data and use of raw materials automatically in the application. After the production is complete, the system will record how many finished goods will be distributed to consumers, so that the Warehouse Section does not need to record again because it has been automatically carried out by the application.

3.2.2. Interface Design.
For the interface design, what will be described is the menu structure and application design. The results of this design can be used as a reference in building desktop-based applications, where the programming language used is the Java programming language. The menu structure will be illustrated in Figures 3 and 4. While for the application, the design will be illustrated in the Figures 5, 6, 7, and 8.

![Figure 3. Menu Structure for Owner](image-url)
Figure 4. Menu Structure for Warehouse Section

Figure 5. Design of Input Data for Ordering Goods

Figure 6. Design of Input Data For Purchase Order
4. Conclusion
Based on this research, it can be concluded that the results of the warehouse management information system design can be a solution for the process of managing goods at Zaeni Convection. There are four main cases illustrated in the usecase diagram, namely Ordering Goods, Purchase Orders, Production, and Management of Finished Goods. The results of this design can be used as a reference in building desktop-based applications, where the programming language used is the Java programming language. This design has also described the business processes carried out by the company Zaeni Convection, especially for the Owner, Warehouse Section, and Production Manager.

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