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Information System for Management of Plastic Recycling as A Raw Material for Manufacturing Plastic Bags at PT. Jujur Barokah Plastik Using The Safety Stock Method

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ABSTRACT

PT Jujur Barokah Plastik is a manufacturing company located in Pecangaan Kulon, Jepara Regency, which converts plastic waste into ready-to-sell plastic bags. They obtain raw materials from two main sources: the Village Waste Bank and individual collectors. The production process involves several stages, including waste collection, cleaning, crushing, mixing, heating, extrusion, molding, and finishing. Their main products are Plastic Boyo and Plastic Sangkuriang, with the main markets in Central Java and West Java. The business flow starts with purchasing raw materials from suppliers, which are then processed in the raw materials warehouse and processed into plastic sheets for bag production. Incoming and outgoing raw material data is summarized by the warehouse admin. However, there are several obstacles faced, such as manual data collection using paper, stocks of raw materials and products that are not recorded efficiently, and lack of data accessibility. Therefore, companies need a web-based solution that is responsive and easy to access from various platforms, such as mobile phones and computers. The desired solution is to develop a website system using PHP and MySQL as a database. As well as implementing the Safety Stock method.

1. INTRODUCTION

1.1 BACKGROUND

Currently, information systems using computer technology act as a tool to facilitate humans in processing data that can accelerate performance in obtaining accurate data and producing more accurate output (information) and can save time, space and costs[1]. Data management will produce valuable information for the benefit of an organization's needs so that data management can be more effective and efficient [2]. PT Jujur Barokah Plastik is a manufacturing company where this company processes plastic waste (raw materials) into plastic bags (finished products) that are ready to be sold to the public. The location of this company is in Pecangaan Kulon, Jepara Regency. Plastic waste or what is called raw materials is obtained from several suppliers, suppliers there are divided into two, namely the Village Waste Bank and individual collectors. The process of making plastic bags themselves from raw materials as above goes through several stages including: collecting similar plastic waste, cleaning waste, crushing it into plastic sand / plastic particles, mixing and heating, the extrusion process, and the printing process then finishing the production results to produce plastic bags with several sizes that are ready to be sold to the public. Currently, products from PT Jujur Barokah Plastik such as: Boyo Plastic, Sangkuriang Plastic, each of these products has its own fans in the market. The distribution range of PT Jujur Barokah Plastik's goods is still within the scope of Central Java and West Java.

The business flow that takes place at PT Jujur Barokah Plastik itself starts from a company manager buying from a supplier to get plastic waste that has been sorted by the supplier, then the plastic waste will enter the raw material warehouse and then be recorded by the raw material warehouse admin. The raw material warehouse admin will prepare the material for the crushing process until the extrusion process and produce sheet materials - sheets that will become plastic bag production materials. While the sheet material will be taken by the warehouse admin as raw material in the plastic bag production process. After production is complete, the warehouse admin will later summarize the report on incoming and outgoing raw materials for production and also record finished goods.

Based on the ongoing business flow at PT Jujur Barokah Plastik, there are several points that are obstacles there, including the data collection of all processes there still uses manual methods or methods, namely using paper and handwriting. This is very worrying because the transaction writing for purchasing goods to suppliers could be lost while in the transaction there is a debt value that must be paid by the company to the supplier. As well as the constraints of production goods stock due to ineffective manual data collection and resulting in a shortage of production materials and a small amount of Reserve inventory so that it can hamper the production process of goods. Data collection of raw materials and also ready-to-production materials is still manual[3]. This is less efficient when the owner or manager asks for the latest stock, they have to look for stock cards for production materials and raw materials (plastic waste). From these obstacles, PT Jujur Barokah

Plastik needs a solution with an online and responsive system data collection so that it can be accessed through several platforms such as cellphones, computers.

PT Jujur Barokah also needs to implement the Safety Stock method so as not to run out of inventory or raw materials when consumer demand is high. The system needed by PT Jujur Barokah Plastik is a website system that can be easily developed and easily accessed through multiplatforms. In the development of this system will use the PHP programming language and also manage the MySql database. And the need for the application of the safety stock method so that there is no stock or raw material outage when demand is high. The hope with this research is to produce a web-based system that can help record keeping in the company to be more effective and efficient.

1.2 FORMULATION OF THE PROBLEM

How to make a waste management information system into a production-ready material by applying the safety stock method to analyze stock requirements so that they are always safe.

1.3 SCOPE OF PROBLEM

In this research, the author limits the problem or scope of the research to the following matters:

a. Website-based system with several actors: manager, admin gudang mentah, dan admin gudang.
b. The system will manage data including: plastic waste categories, waste data, product data, and supplier data.
c. The system will manage information and reports including: transactions for purchasing raw materials (plastic waste), recording the production of waste into production materials, and also recording waste stock and finished product stock.
d. Implementation of the safety stock method to avoid shortages of raw materials in plastic packaging production.
e. The system is developed with PHP programming language and manages the MySql database.

1.4 RESEARCH PURPOSES

The purpose of the research to be conducted is to produce a system that can realize a web-based information system for managing plastic recycling as a raw material for plastic bags, as well as the implementation of safety stock that can help operational managers to analyze the need for raw materials and finished products so that they are always safe and also make it easier for warehouse admins for materials and finished products to update stock in real time.

2. RESEARCH METHODOLOGY

2.1 METHOD OF COLLECTING DATA

Data collection aims to obtain accurate, relevant, valid and reliable data, so the author collects data sources in the following ways:

2.1.1. Primary Data Sources

Primary data is data obtained directly from the research site through observation and recording of the research object. Primary data sources include:

a. Observation

Observation is a data collection technique by directly observing the activities in one of the wholesale admins in the company. Observation is carried out so that the author can know or can directly observe how the activities are in the field.[4]

b. Interview

In the process of information system development and development activities, identifying system needs is an activity of general analysis of the existing situation to be able to find real problems while at the same time connecting them with the causes of existing problems.[6]

Interview technique is one of the most effective ways to obtain data. In the process of implementing a computerized information system, an interview technique with one of the wholesale admins was carried out to handle the existing problems.

2.1.2. Secondary Data Sources

Secondary data sources are data sources obtained indirectly from the research object. These secondary data can be obtained from literature or books. Secondary data sources include:

a. Documentation Study

Documentation studies are collected through literature and documentation from internet media or other information sources.

b. Literature Study

This study was collected through books that are in accordance with the theme of the research problem.

2.2 SYSTEM DEVELOPMENT METHODS

The system development method is a method with an important process for creating a system. In the development that will be applied in this research is the waterfall method. Waterfall provides a sequential software lifecycle approach starting from analysis, design, coding, testing, and support stages. [5]

The stages of system development in the waterfall method include:

a. Software Requirements Analysis

The process of gathering needs is done intensively to specify software needs so that it can be understood what kind of software is needed by the user. Software requirements specifications at this stage need to be documented.

b. Software Design

Software design is a multi-step process that focuses on the design of software program creation including data structures, software architecture, interface representations, and coding procedures. This stage translates software requirements from the requirements analysis stage into design representations so that they can be implemented into programs at a later stage. The software design produced at this stage also needs to be documented.

c. Program Code Creation

The design must be translated into a software program. The result of this stage is a computer program according to the design that has been made in the design stage. In making the program code, the compiler uses PHP and Mysql as its database.

d. Testing

Testing focuses only on the software in terms of logic and functionality, ensuring that all parts have been tested. This is done to minimize errors and ensure that the output produced is as desired.

e. Supporters and Maintainersan

It is possible for a software to change when it has been sent to the user. Changes can occur because of errors that appear and are not detected during testing or the software must adapt to a new environment. The support or maintenance stage can reduce the development process from specification analysis to changes to existing software, but not to new software.

2.3 SYSTEM DESIGN METHODS

In the development of object-oriented programming techniques, a standardization of modeling languages for software development built using object-oriented programming techniques emerged, namely the Unified Modeling Language (UML).[5] UML emerged because of the need for visual modeling to specify, describe, build, and document software systems. UML is a visual language for modeling and communicating about a system using diagrams and supporting texts. [6] The following are the types of Unified Modeling Language (UML) diagrams, including:

a. Use Case Diagram

Use Case Diagram is a modeling for the behavior of the information system to be created. Use case describes an interaction between one or more actors with the information system to be created. There are several actors in the system, namely verification officers, field officers and department heads. Use cases are used to find out what functions are in an information system and who has the right to use these functions.

b. Class Diagram

Class diagrams describe the structure of a system in terms of defining the classes that will be created to build the system. Classes have what are called attributes and methods or operations.

c. Sequence Diagram

Sequence diagrams describe the behavior of objects in a use case by describing the lifetime of the objects and the messages sent and received between objects. They graphically depict how objects interact with each other through messages in a sequence of use cases or operations.

d. Activity Diagram

Activity diagram is a diagram that describes the workflow or work flow or activities or activities of a system or business process or menu in the software. What needs to be noted here is that the activity diagram describes the system's activities, not what the actor does, so the activities that can be done by the system only.

e. Statechart Diagram

Statechart diagram or in Indonesian called machine diagram is used to describe the status change or transmission of a machine or object system. This diagram illustrates the life cycle of an object, various states that can be assumed by the object and the events that cause the object from one place to another.

3. RESULTS AND DISCUSSION

3.1. FOD (Flow Of Document)

Flow-Of-Document (FOD) refers to the flow or process by which documents move through various stages in a system or organization. This concept is important in document management and business processes to ensure that documents are managed efficiently, effectively, and in accordance with existing policies. [7] The FOD formed during the analysis of the ongoing process is as follows as in figure 1.

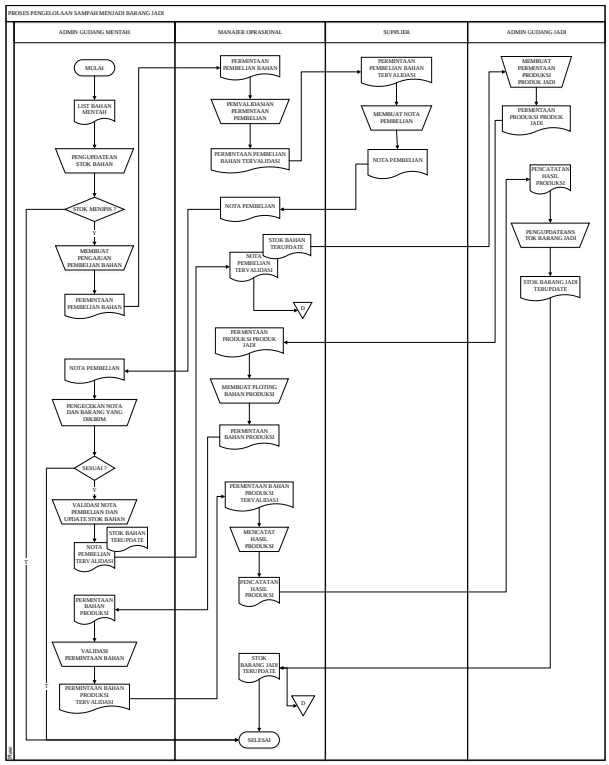

Figure 1. FOD (Flow Of Document)

3.2. SYSTEM USE CASE DIAGRAM

System use case diagrams are used to describe interactions between actors and systems to achieve certain goals can bee see in figure 2. The following is an explanation of the use case system diagram that was designed. Operational managers manage system user data, waste supplier data, raw material purchases, waste categories, waste data, finished product production and manage finished product data. Meanwhile, the finished warehouse admin will manage finished products and monitor the production of finished products and also the warehouse admin actor will manage the purchase of raw materials.

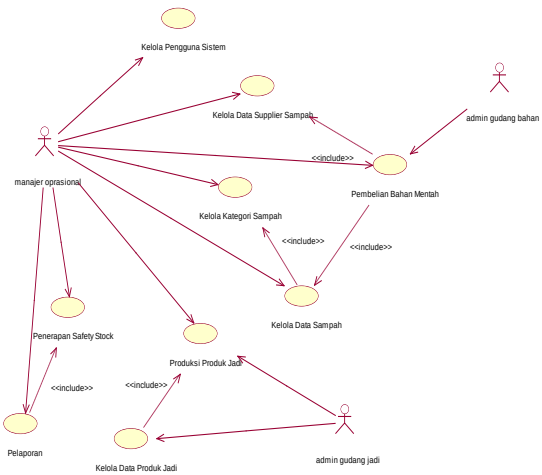

Figure 1. System Use Case Diagram

3.3. CLASS DIAGRAM

Class Diagram is a diagram used to show various classes in a system or software being developed. This diagram provides a

comprehensive overview of the structure of the system or software and the relationships between existing classes. The following are the stages in planning a Class Diagram is shown in figure 3. [8]

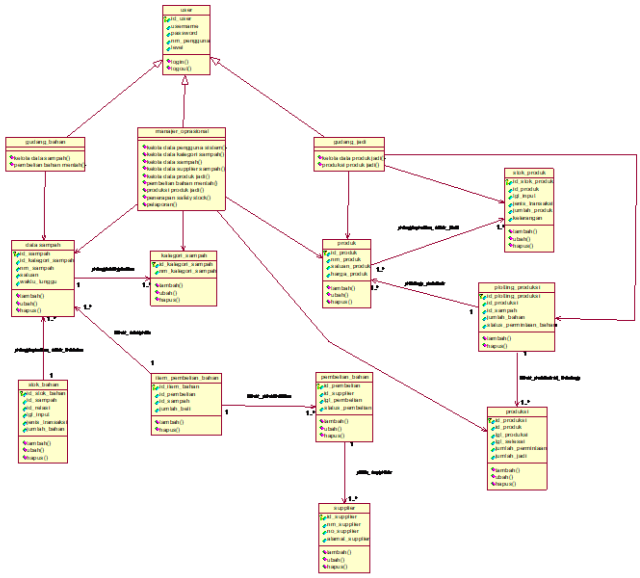

Figure 2. Class Diagram

3.4. DATABASE RELATIONS

Relationships in MySQL databases are relationships established between tables to ensure data integrity and query efficiency. Several tables are connected to each other by lines that indicate the relationships between the tables.[9] Each table is represented by a box containing the table name and the columns it contains. Relationships between tables are depicted by lines or arrows that show how data in one table relates to data in another table. [10]

The table relations formed in the database for the creation of the Information System For Management Of Plastic Recycling As A Raw Material For Manufacturing Plastic Bags At PT Jujur Barokah Plastik Using The Safety Stock Method is shown ini figure 4.

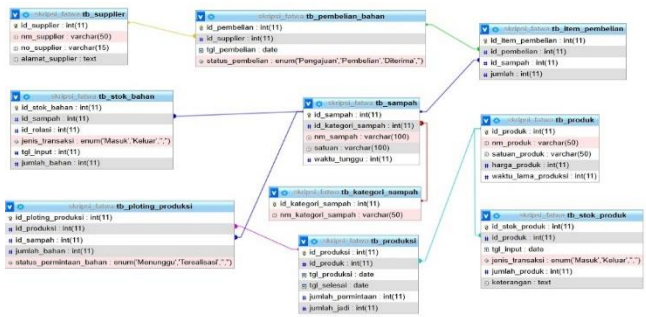

Figure 4. Database Relations

4. CONCLUSION

Based on the results of the application of the system developed at PT Jujur Barokah Plastik, it was concluded that to obtain safe stock, an approach was used, namely the safety stock method with the results of the application in the form of an average safe number of each item of goods of 15 - 17 pcs. The development of this system is needed, such as the application of the reorder point method which can ensure that the purchase or procurement of materials or finished products can be right so that stock does not occur too much or too little.[10]

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