



Implementation of Raw Material Control Management System in Food Factories

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ABSTRACT

Raw material control is done to ensure that raw materials are available when needed and in compliance with expectations. An extremely significant issue with a company's production efficiency is overcoming raw material inventories. The corporation will be exposed to a significant cost risk if the amount of raw materials it owns exceeds the needs that are anticipated for the production process, including risks related to storage costs and material deterioration. The research goal is to develop a raw control management system based on the study problem by modifying the way raw materials are used in the warehouse using the FIFO (First in First Out) technique. The study's findings include a functional system analysis, which includes the ability to manage user data, raw material production order data, raw material management, and raw material purchasing management. System outputs include reports on production orders, raw materials, and financial data pertaining to raw material purchases. Five blackbox testing scenarios demonstrate that the system is reliable and operating as needed by users.

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INTRODUCTION

The impact of the current era of globalization is that it requires every company to be able to keep up with information technology advancements in order to be able to compete in the ever-changing marketplace. Additionally, the competition between business entities is intensifying as a result of consumers' increasing demands, necessitating that business entities establish precise controls in order to determine production accuracy (Eunike et al., 2018). Inventory control needs to be considered because it is directly related to the costs that must be borne by the company as a result of inventory, therefore the existing inventory must be balanced with needs, because the supply of raw materials is the main factor in the company to support the smooth production process, both in large and small companies (Wahyuningtiyas et al., 2021). Errors in determining the amount of investment

in controlling raw materials that are too large relative to the company's requirements will increase interest expenses, maintenance and storage costs in the warehouse, as well as the possibility of depreciation and unsustainable quality, thereby reducing the company's profits. And vice versa, if a corporation has an insufficient supply of raw materials, production would get congested, resulting in financial losses (Kurnala et al., 2018; Maulana & Rois, 2018).

Inventory management is a method of managing the acquisition, reception, and allocation of inventory items in a business so that the firm becomes effective, particularly in terms of the costs required for the efficient operation of the business or manufacturing. Given that inventory or raw materials play a very essential role in the firm (Febriningtias et al., 2021; Rambitan et al., 2018), the management of these materials must be well-designed so that they can provide acceptable service to employees and help provide information support for each employee. Therefore, an effective raw material management system is required. The company PT. Nusa Asri is involved in the food industry. The item generated is bread intended for immediate consumption. This enterprise has a daily flour production capacity of 250 sacks, with bread wholesalers, supermarkets, retail stores, traditional markets, and motorists as consumers. Utilization of raw materials in the production process that corresponds to market demand (Budiman et al., 2021). How to utilize the FIFO (First In, First Out) technique when utilizing raw materials in the warehouse (Ismail & Rosadi, 2022). The initial raw materials to enter the warehouse are the initial raw materials to be utilized. In the Raw Materials Warehouse segment, it is frequently challenging since many provided raw materials do not correspond with manufacturing needs. Additionally, raw materials frequently run out before new raw materials arrive, so impeding manufacturing. The individual in charge of this sector manually verifies the stock of existing raw materials, making the processing of these commodities inefficient and making it difficult to process arriving and outgoing raw material data. Due to the duration of the raw material inspection procedure, no report inspection activities are conducted at any time. Due to a lack of expertise about the technology, the existing computer equipment is not optimally utilized for data processing. Ultimately, it resulted in an inability to create bread in accordance with consumer demand, which also led to a delay in bread distribution from sales to customers. In order to improve the company's recording of raw materials, it is required to establish a system to handle detailed recording reports on raw materials, as well as to provide management with reports (Lowe, 2019).

The aim of this research is to develop an information system that can aid in the control of production raw materials, which can then be kept in a database. This system can also record the entry and exit of raw materials from warehouses to production and from suppliers to warehouses (Lestari et al., 2021). Additionally, the system displays alerts of raw materials to be used for production, and this system can simply display the amount of available stock, thereby eliminating delivery delays for bread. So that the extracted raw materials are in compliance with the system's requests. facilitating officers' ability to view all items that have been recorded.

RESEARCH METHOD

Management Control System

The internal control system is comprised of an organizational structure, a set of methods and measures, all of which work in tandem to ensure the security of organizational assets, validate the precision and dependability of accounting data, promote effectiveness, and incentivize compliance with management policies (Henri, 2016). One of the factors that affects whether or not a firm's financial statements can be relied upon is the effectiveness of the internal control system that is in place within that organization. As a result of this, it is essential to place a strong emphasis on the efficiency of the internal control system in terms of its ability to forestall the occurrence of significant errors in the accounting procedure (Simons, 2019).

Metode First In First Out (FIFO)

The First In First Out (FIFO) technique is a method that works under the presumption that the items that were purchased first will be sold first. Because of this, the approach calculates the cost of goods sold based on the cost of the goods that were purchased first (Utami et al., 2018). This strategy is in line with actual cost flow because it prioritizes selling off older inventory items first. Taking goods from the warehouse is based more on the arrangement of the goods, which means that the FIFO method is more visible on the calculation of the cost of goods rather than looking directly at the physical flow of the goods. This is because the FIFO method is based on the first in, first out principle. When using the FIFO approach, the cost that was used to make the initial purchase of goods will be recognized as the cost of goods sold, and the stock prices that were used in the previous transactions will be included in the calculation of the price (Fikri et al., 2020). According to the First-In, First-Out (FIFO) system, the merchandise that arrives first is the item that has to be sold first. As a result, the corporation will prioritize the sale of its older, initial stock items (Sembiring et al., 2019). In most cases, the value of the ending inventory of items is determined by the cost of the most recent inventory that was received.

Research Flow

The stages of research can be helpful to researchers in formulating problems through data collection to identify problem identification so that solutions can be formulated by analyzing user needs that can complement system feature requirements at the stage of implementing a raw material control system. In other words, the stages of research can facilitate researchers in formulating problems. The progression of the research is depicted in Figure 1 which may be found below.

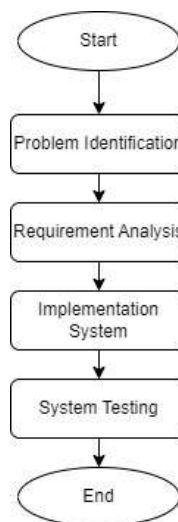


Figure 1. Research flow

According to Figure 1, the stages of problem identification are obtained from observation and interview to obtain research data related to the business process of recording raw materials in the stock book and managing data on expenditure and entry of raw materials in the form of manually typed receipts. After problem identification, a needs analysis adjusts conventional issues to be computerized. This subject helps identify system characteristics that can help organizations maintain raw material records, produce financial reports (Abdillah, 2017), and manage raw materials. The final step is blackbox testing system functionality and button functions to prevent errors.

RESULTS AND DISCUSSIONS

System Requirement Analysis

Incoming Raw Material Management Flow System

There is a process flow from the management of incoming raw materials which can be explained in Figure 2 below.

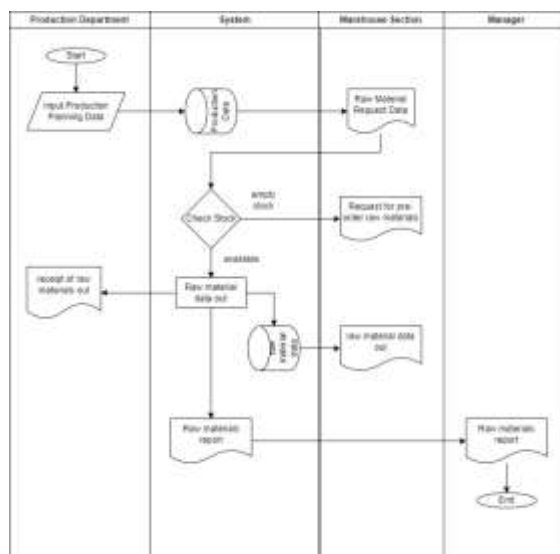


Figure 2. Incoming raw material management flow system

Figure 2 illustrates how the computerized management of raw materials begins with the raw material order that is received by the company in accordance with the raw material pre-order data. This may be understood by looking at the diagram. will offer a record of the differences in orders; alternatively, if the raw materials are suitable, then the warehouse will record these raw materials in the records of the incoming raw material; After that, a receipt for the raw materials will be provided by the warehouse department to the supplier. After that, the production department will review the previous steps and create a report on the raw materials. After that, the report is going to be handed in to the management.

Outgoing Raw Material Management Flow System

There is a process flow from the management of incoming raw materials which can be explained in Figure 2 below.

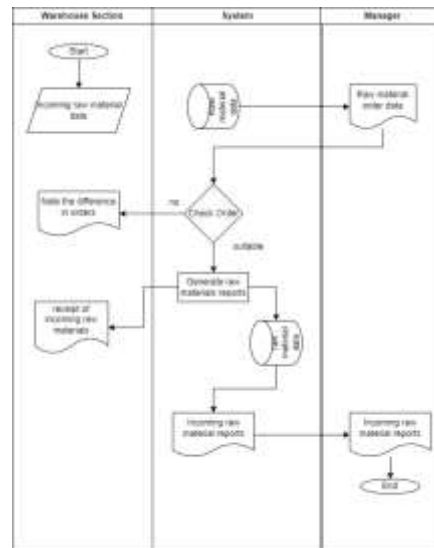


Figure 3. Outgoing raw material management process flow system

Figure 3 indicates that the process of managing the expenditure of raw materials begins with the creation of production planning data by production department staff. Then it is transported to the warehouse for raw materials. The warehouse department will then verify the availability of the specified raw materials. If there are available raw materials, the warehouse will record raw materials out. However, if raw materials run out, the warehouse department will ask the purchasing department to pre-order replacements. Along with the requested raw materials, the warehousing department also provides the manufacturing department with invoices for the requested raw materials. The warehouse department will then summarize and produce a raw materials report. The report will then be sent to the manager.

Database Design Analysis

The raw material control system is comprised of the following tables: user tables, raw material tables, stock tables, supplier tables and order tables, purchasing tables, check orders tables, purchase details tables, order details table, and product table. All of these tables make use of the Physical Data Model (PDM), which makes it simpler to determine the relationships between tables (Arsana & Lestari, 2021; Sudipa et al., 2020). The graphic clearly shows the connections that exist between the tables. Figure 4 provides a visual representation of the PDM system's overall architecture.

No	Gambar	Nama	Kode	Status
1		Bumbu Dapur	001	Active
2		Bumbu Dapur	002	Active
3		Bumbu Dapur	003	Active
4		Bumbu Dapur	004	Active

Figure 6. Product data interface page

3. Raw Material Report Page


The raw material report page is used to organize report data, making it easier to retrieve report information in the future. As depicted in Figure 7 on this page, a manager can print a report on raw materials.

No	Nama	Jenis Bahan	Supplier	Berat
1	Bumbu Dapur	Bumbu Dapur	PT. JALUR LESTARI	10 kg
2	Bumbu Dapur	Bumbu Dapur	PT. JALUR LESTARI	10 kg
3	Bumbu Dapur	Bumbu Dapur	PT. JALUR LESTARI	10 kg
4	Bumbu Dapur	Bumbu Dapur	PT. JALUR LESTARI	10 kg
5	Bumbu Dapur	Bumbu Dapur	PT. JALUR LESTARI	10 kg
6	Bumbu Dapur	Bumbu Dapur	PT. JALUR LESTARI	10 kg
7	Bumbu Dapur	Bumbu Dapur	PT. JALUR LESTARI	10 kg
8	Bumbu Dapur	Bumbu Dapur	PT. JALUR LESTARI	10 kg
9	Bumbu Dapur	Bumbu Dapur	PT. JALUR LESTARI	10 kg
10	Bumbu Dapur	Bumbu Dapur	PT. JALUR LESTARI	10 kg
11	Bumbu Dapur	Bumbu Dapur	PT. JALUR LESTARI	10 kg
12	Bumbu Dapur	Bumbu Dapur	PT. JALUR LESTARI	10 kg

Figure 7. Raw material report page

4. Raw Material Purchase Report Page

The raw material buy report page is used to manage report data so that it is easier to retrieve report information in the future. This report is one of the report outputs for tracking raw material purchase-related financial transactions. As shown in Figure 8, the manager can produce a report about acquiring raw materials from this page.



Periode Awal

Periode Akhir

Penjualan

Periode: Sampai Periode

No	By User	Bahan Baku	Jenis	Jumlah	Satuan	Tanggal	Dibutuhkan
1	Bumbu Dapur	TELUR KAKA	TELUR	1000	kg	08 Desember 2020	11 Desember 2020
2	Bumbu Dapur	GULA PASIR	GULA	200	kg	10 Desember 2020	14 Desember 2020
3	Bumbu Dapur	TERUNG TERUNG	TERUNG	25	kg	10 Desember 2020	17 Desember 2020

Cetak Laporan Pembelian

Figure 8. Raw material purchase report page

5. Production Order Report Page

The production order report page is used to organize report data, making it easier to retrieve report information in the future. Figure 9 depicts the presentation of manufacturing section order report data.

No	No Item	Kode Material	Kode Produk	Uraian	Jml	Tgl Masuk	Tgl Keluar	Tgl Validasi	Tgl Input	Tgl Output	Status
1	10001	10001	10001	10001	10001	10001	10001	10001	10001	10001	10001
2	10002	10002	10002	10002	10002	10002	10002	10002	10002	10002	10002
3	10003	10003	10003	10003	10003	10003	10003	10003	10003	10003	10003
4	10004	10004	10004	10004	10004	10004	10004	10004	10004	10004	10004
5	10005	10005	10005	10005	10005	10005	10005	10005	10005	10005	10005
6	10006	10006	10006	10006	10006	10006	10006	10006	10006	10006	10006
7	10007	10007	10007	10007	10007	10007	10007	10007	10007	10007	10007
8	10008	10008	10008	10008	10008	10008	10008	10008	10008	10008	10008

Figure 9. Production order report page

6. Raw Material Stock Report Page

The raw material stock report page is used to handle report data, making it easier to retrieve report information in the future. As seen in Figure 10, the data display for the stocktaking report includes a method for selecting a period.

No	No Item	Kode Material	Kode Produk	Uraian	Jml	Tgl Masuk	Tgl Keluar	Tgl Validasi	Tgl Input	Tgl Output	Status
1	10001	10001	10001	10001	10001	10001	10001	10001	10001	10001	10001
2	10002	10002	10002	10002	10002	10002	10002	10002	10002	10002	10002
3	10003	10003	10003	10003	10003	10003	10003	10003	10003	10003	10003
4	10004	10004	10004	10004	10004	10004	10004	10004	10004	10004	10004

Figure 10. Raw material stock report page

System Testing

Blackbox testing is a kind of testing that is used throughout the phase of system testing. This testing method checks the appropriateness of system functioning as well as the overall success of button operations and features on the system when accessible by the user. The results of blackbox testing are presented in Table 1 down below.

Table 1. Blackbox testing scenarios

Number	System Function	Scenario Result	Description of testing
1	Login Page	Valid	According to the test results, the system's functionality and menu buttons functioned appropriately.
2	Dashboard page	Valid	According to the test results, the system's functionality and menu buttons functioned appropriately.

Number	System Function	Scenario Result	Description of testing
3	Production Order Page	Valid	According to the test results, the system's functionality and menu buttons functioned appropriately.
4	Product Interface Page	Valid	According to the test results, the system's functionality and menu buttons functioned appropriately.
5	Report Page	Valid	According to the test results, the system's functionality and menu buttons functioned appropriately.

According to Table 1, there are five blackbox testing scenarios for system functionality; as a consequence, all system functions have been operating properly and according to user requirements.

CONCLUSION

A raw material control management system has been successfully built in the company to make it easier for the production department to manage product data and production orders, for the warehouse department to manage incoming raw material data and outgoing raw material data, and for the company to be able to adjust to the raw material needs of each production process. This was accomplished by making it simpler for the warehouse department to manage incoming raw material data and outgoing raw material data. In addition to the ability for managers to obtain information beginning with production orders and continuing through the fulfillment of incoming raw materials and outgoing raw materials, various system features related to output reports can also assist managers in overseeing the management of raw materials. These system features include production orders, raw material reports, and financial reports related to purchases of raw material. At the stage of system testing, blackbox testing is carried out for five different scenarios in order to test the functionality of the system. The results of this testing indicate that the entire system is functioning as expected and in accordance with user needs in terms of increasing raw material control capacity and generating information for management levels in controlling raw materials according to orders production and reducing losses in terms of financial transactions.

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