



Building Materials Management Information System using the Web-Based Perpetual Inventory System

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ABSTRACT

Company that is engaged in construction contractors, has a project warehouse that is located moving around following the project being worked on. The problem faced is that the recording of material inventory is still done manually using a stock control card, then after that it is recorded it is entered into Microsoft Excel, it causes a long recording of material data stock because it has to open the parts one by one first for report generation. The research objective is to produce a system that can speed up the process of recording stock of building materials in the construction project warehouse, and can produce various material inventory reports that can control the availability of material inventory in the project warehouse. The method used is the Perpetual Inventory System, namely material management is carried out by controlling the stock of material inventory directly per periodic and continuously updating the stock every time material enters or exits. With this system, it will help the administration, foremen and project leaders to speed up various reports on stock control of material supplies that are fast, accurate and thorough and can improve the performance of officers in presenting reports.

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Introduction

Raw Material Inventory is a company's valuable asset that plays an important role in supporting various company activities, both production activities and field activities (W.Y.R. Karamoy, 2022). Technological developments are very easy to access in the era of digitalization and all online. Online inventory recording is needed for data mobilization. When recording material inventory stock, stock recording still uses a manual system where when the material enters the warehouse after being ordered from the supplier, it gets a purchase receipt and the material out of the warehouse is used for project needs, the logistics administration officer records the material inventory on the inventory card form and then inserts it into Microsoft Excel which can result in wasting too much time and the reports given to the leadership are often late and it is still constrained to find inventory data which must open the building material inventory data sheet by sheet so that it is less effective and efficient in presenting reports. For contractor companies, the upper and lower limits of material inventory are needed to be used as a reference for purchasing project materials needed in the future. The upper limit is to find out what items are still in the project warehouse while the lower limit can be used to find out the amount of material stock that is almost out so that it can be reordered to the material supplier, so the stock that can still be used first is then bought back so that all workers the project can work well without anyone being unemployed because the amount of material inventory is always available and not over stocked, just right for the project needs. Of all the problems the author fixes the old system of recording the inventory of building raw materials with website-based programming supported by a MySQL database that can be directly online. The recording of inventory control of building raw materials is carried out using the Perpetual Inventory System method where stock recording is carried out continuously per period so that it can know in detail the amount of inventory stock and can facilitate various material inventory monitoring reports. By using an information system, a company can find out the amount of good inventory needed by the company at the most efficient cost possible. It can also be known security stock (safety stock) and the most appropriate time to hold a re-purchase (reorder point) (Febryantahanuji, 2018).

Literature Review

a. System Definition

The system is a network of a set of procedures that are interconnected, and jointly carry out an activity or complete a certain goal. The system has elements, components, or variables that are organized, interact with each other, depend on each other and are integrated to display information (Sutabri Tata, 2016).

b. Definition of Information System

Information system is a system consisting of a collection of systems in the form of software, hardware and brainware that can process information into an output that is useful for the organization in an effort to achieve a certain goal to manage daily transactions within an organization (Heri Kuswara, 2017).

c. Definition of Accounting Information System

Understanding Accounting Information Systems according to (Mulyadi, 2016) suggests that an accounting information system is an organization of forms, records and reports that are coordinated in such a way as to provide financial information needed by management to facilitate company management.

d. Definition of Raw Material Inventory

Raw material inventory is an item that is stored and will be used by the company to fulfill other purposes. Inventory Information System is used to maintain inventory records and notify managers when certain types of goods require addition. (Herjanto, 2015).

e. Website Definition

Website is a system with information presented in the form of text, images, sound, etc. which is stored on an internet web server which is presented in hypertext form. Website is used to retrieve and present information. The website can be used for the development of HTML, PHP and MySQL databases (Sibero, 2015).

Methods

The Perpetual Inventory System is a method of monitoring goods management by controlling stock per period in detail, updating the stock every time there are goods coming in or goods out, buying or selling (Rudianto, 2015).

The following is the formula for the Perpetual Inventory System method:

Table 1 Formula for the Perpetual Inventory System Method

Incoming Items = Current Stock + New Stock	(10 items + 10 items = 20 items)
Items Out = Total Stock - Type of Items Issued	(20 items - 10 items = 10 items remaining in stock)
Stock Monitoring Report = Incoming Goods - Outgoing Goods	(20 items - 10 = 10 items remaining stock)

Source : (Rudianto, 2015)

Result and Discussion

Model Development using the Research and Development System method is a research development procedure that is carried out intentionally, systematically, to find, then improve, develop, produce, or test the effectiveness of products, models, or methods or strategies in a way that is superior, new, effective, efficient, productive, and meaningful (Nusa Putra, 2015). In this study the author only uses 6 stages of R&D.

The following are the six stages of the R&D development method (Borgh & Gall, 1983):

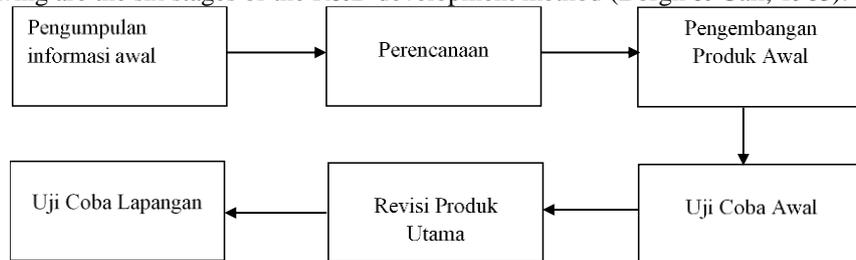


Image 1 R&D Development Method

a. Initial Information Collection (Research and Information Collecting)

- 1) The author conducted interviews with company leaders, foremen, logistics administration officers related to the management of material inventory in the PT. Semarang Prosperous Mataram Star.
- 2) The author makes observations related to the criteria for the type of material that is determined as a determination of material inventory management in the project warehouse.
- 3) The author conducted a literature study to obtain theories related to the developed system.
- 4) The author develops a framework for solving programmed problems based on the theory of R&D and its development.

b. Planning (Planning)

The author arranges all the necessary equipment needed related to the design of the Material Inventory Information System program by making product specifications that are developed by making product specifications and making activity schedules.

c. Initial Product Development (Develop Preliminary Form of Product)

The researcher plans to design a product development system description by making flowcharts, DFD, ERD and creating a new material inventory system with web-based online programming with a system database that is stored online and a database using PhpMySQL. Making stock menus for material supplies, supplier menus, purchasing menus, expenditure menus, minimum stock menus and maximum project material stock menus in developing a website-based project material stock inventory system as required by the user (company).

d. Preliminary Field Testing

The initial trial is the initial stage of the application for programming the stock of raw materials for building a web-based project that is developed, evaluated, and validated first by experts from the campus, expert lecturers who understand FOD, DFD, ERD. Normalization of systems and programs is tried by validator users from the company, there are three users of the project administration, the project foreman and the head of the company.

e. Main Product Revision

Revise improvements and refinements to the main product of the website-based material inventory program application system which was developed after obtaining validation test results from campuses and companies, what is lacking and what needs to be added in system development to suit the wishes of company users.

f. Field Testing (Main Field Testing)

Conducting product prototype trials in the field or direct testing in warehouses is appropriate or not for the needs of the PT. Bintang Mataram Sejahtera Semarang regarding the effectiveness of web-based material inventory monitoring programming applications in helping to accelerate the preparation of various stock reports for building raw materials inventory in the project warehouse.

The following is the development of a Building Materials Management Information System using the Web-Based Perpetual Inventory System method.

a. Login Menu Form

Function: To provide security access rights to each user



Image 2 Login Form

Procedure :

- 1) Select the user level of administration, foreman and leadership.
- 2) Enter your username and password then click the login button to enter the main menu.
- 3) Enter the main menu page which is different for each user.

b. *Main Menu Form*

Function: To make it easier for users to create user data, master data, transaction data and open various reports.



Image 2 Main Menu Form

Procedure :

- 1) Select the desired menu.
- 2) Input various data, user data, company data, material data, purchase data, material expenditure data and various material inventory stock monitoring reports.

c. *User Data Menu Form*

Function: To give access to anyone who can use the application.

DATA USER

No	Id User	Password	Level	Tanggal	Aksi
1	Ir. Gede Ary, MM	...	Pimpinan Proyek	2022-07-04	Edit Hapus
2	Ir. Suharto	...	Mandor	2022-07-04	Edit Hapus
3	Kholil	...	Administrasi	2022-07-04	Edit Hapus

Image 3 User Data Menu Form

Procedure :

- 1) Enter username.
- 2) Enter the user's password.
- 3) Select user level.

d. *Company Data Input Menu Form*

Function: To inform company data and the address of the project being worked on.

ENTRY DATA PERUSAHAAN

Nama Perusahaan :

Alamat Proyek :

Nomor Telpon :

Nomor Fax :

Email :

Image 4 Company Data Input Menu Form

Procedure :

- 1) Input company name, project address, telephone number, fax, and email.
- 2) Save company data to inform company name and project address.

e. *Material Data Menu Form*

Function: To input the name of the material, unit, price, minimum and maximum stock of material.

DATA MATERIAL								
No	Kode Material	Nama Material	Satuan	Harga	Stok Minimal	Stok Maksimal	Tanggal	Control
1	MT001	Besi Beton	mm	Rp.44.500,00	5	35	2022-05-20	Edit Hapus
2	MT002	Besi Embeded Plate	pcs	Rp.6.000,00	4	500	2022-05-20	Edit Hapus
3	MT003	Besi 6	btg	Rp.30.000,00	3	35	2022-05-25	Edit Hapus

Image 5 Material Data Menu Form

Procedure :

- 1) Input add material data.
- 2) Enter the name of the material, unit, price, minimum and maximum stock of material

f. Supplier Input Menu Form

Function: To store various supplier data that cooperate in purchasing project materials.

Image 6 Supplier Input Menu Form

Procedure :

- 1) Input add supplier data
- 2) Enter the name of the material, the address of the supplier and the telephone number of the supplier.
- 3) Save supplier data for material purchases.

g. Material Purchase Transaction Input Menu Form

Function: To store various material purchase transaction data.

Image 7 Material Purchase Transaction Input Menu Form

Procedure :

- 1) Add material purchase data.
- 2) Select the supplier name and material code.
- 3) Input the desired material purchase, the number of stock and material prices will appear.

h. Material Expenditure Transaction Input Menu Form

Function: To create expense reports in the project warehouse.

Image 8 Material Expenditure Transaction Input Menu Form

Procedure :

- 1) Select the material code, then the name of the material will appear along with the current stock of material inventory.
- 2) Input or output the amount of material you want to remove.
- 3) The process of material expenditure will display the amount of material issued

i. Material Inventory Book Report Menu Form

Function: to display the amount of material inventory stock in the project warehouse based on the name of the material, along with incoming, outgoing material data and the final material stock.



LAPORAN BUKU STOK PERSEDIAAN MATERIAL

PT. Bintang Mataram Sejahtera Semarang Proyek Perumnas Dramaga Bogor
Jl. Raya Leuwiliang KM 17 - Bogor, Cimanggu 1, Kec. Cibungbulang, Bogor, Jawa Barat 16630

Kode Material: MT001 -- Nama : Besi Beton				
Tanggal	Keterangan	Masuk	Keluar	Stok Akhir
2022-05-20	TB. Mega Baja Indonesia	35	0	35
2022-05-20	Pengeluaran	0	7	28
2022-05-21	Pengeluaran	0	7	21

Image 9 Menu Form for Material Inventory Book Reports

Procedure :

- 1) Choose a material name.
 - 2) Automatically display incoming and outgoing material data in the inventory stock book.
- j. Material Inventory Monitoring Report Menu Form (Perpetual Stock)

Function: To display the stock of material inventory per period.



LAPORAN DATA MONITORING MATERIAL (PERPETUAL STOK)

Tanggal : 1 Maret 2022 -30 Agustus 2022
PT. Bintang Mataram Sejahtera Semarang Proyek Perumnas Dramaga Bogor
Jl. Raya Leuwiliang KM 17 - Bogor, Cimanggu 1, Kec. Cibungbulang, Bogor, Jawa Barat 16630

No	Kode Material	Nama Material	Satuan	Pembelian	Pengeluaran	Stok
1	MT001	Besi Beton	mm	35	34	1
2	MT002	Besi Embedded Plate	pcs	500	497	3
3	MT003	Besi 6	btg	35	33	2

Image 10 Menu Form for Material Inventory Monitoring Report (Perpetual Stock)

Procedure :

- 1) Input date, month, year.
 - 2) Automatically display data inventory monitoring reports for material inventory purchases, expenditures and the remaining stock of material supplies.
- k. Material Purchase Transaction Report Menu Form

Function: To display the material purchase transaction along with the name of the supplier, the number of purchases and the number of sub-total purchase prices of materials.



LAPORAN DATA PEMBELIAN MATERIAL

PERIODE : 1 Maret 2022 -30 Agustus 2022
PT. Bintang Mataram Sejahtera Semarang Proyek Perumnas Dramaga Bogor
Jl. Raya Leuwiliang KM 17 - Bogor, Cimanggu 1, Kec. Cibungbulang, Bogor, Jawa Barat 16630

Nama Supplier: TB. Mega Baja Indonesia Alamat : Jl. Raya Cibanteng No 88 Ciampea, Bogor							
No	Nomor Pembelian	Tanggal	Kode material	Nama material	Harga	Banyak	Subtotal
1	PO00000001	20 Mei 2022	MT001	Besi Beton	Rp.44500	35	Rp.1557500
2	PO00000027	14 Juni 2022	MT027	Bak Besi	Rp.400000	10	Rp.4000000
TOTAL							Rp.5557500

Image 11 Material Purchase Transaction Report Menu Form

Procedure :

- 1) Input date, month, year.
- 2) Automatically display material purchase report per period that has been inputted.

l. Material Expenditure Transaction Report Menu Form

Function: To display material expense reports.



LAPORAN DATA PENGELUARAN MATERIAL

PERIODE : 1 Maret 2022 -30 Agustus 2022
PT. Bintang Mataram Sejahtera Semarang Proyek Perumnas Dramaga Bogor
Jl. Raya Leuwiliang KM 17 - Bogor, Cimanggu 1, Kec. Cibungbulang, Bogor, Jawa Barat 16630

No	Nomor Pengeluaran	Tanggal	Kode Material	Nama Material	Banyak
1	FK00000001	20 Mei 2022	MT001	Besi Beton	7
2	FK00000002	21 Mei 2022	MT001	Besi Beton	7
3	FK00000003	22 Mei 2022	MT001	Besi Beton	7

Image 12 Material Expenditure Transaction Report Menu Form

Procedure :

- 1) Input date, month, year.
- 2) Automatically display material expenditure reports per period that have been inputted along with the amount of material issued.

m. Minimum Stock Report Menu Form

Function: To display the minimum stock amount of material inventory.



LAPORAN DATA STOK MATERIAL MINIMAL

PT. Bintang Mataram Sejahtera Semarang Proyek Perumnas Dramaga Bogor
Jl. Raya Leuwiliang KM 17 - Bogor, Cimanggu 1, Kec. Cibungbulang, Bogor, Jawa Barat 16630

No	Kode Material	Nama Material	Satuan	Stok Minimal	Stok Akhir
1	MT001	Besi Beton	mm	5	1
2	MT002	Besi Embedded Plate	pcs	4	3
3	MT003	Besi 6	btg	3	2

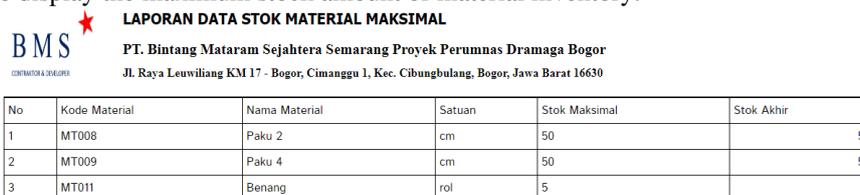
Image 13 Minimum Stock Report Menu Form

Procedure :

Select the minimal stock report menu, it will automatically display the minimum stock along with the final stock of material inventory.

n. Material Maximum Stock Report Menu Form

Function: To display the maximum stock amount of material inventory.



No	Kode Material	Nama Material	Satuan	Stok Maksimal	Stok Akhir
1	MT008	Paku 2	cm	50	51
2	MT009	Paku 4	cm	50	51
3	MT011	Benang	rol	5	6

Image 14 Maximum Stock Report Menu Form

Procedure :

Select the maximum stock report menu, it will automatically display the maximum stock material inventory report and the final stock of material inventory.

Conclusion

- The information system built makes it easier to monitor the recording of the inventory of building raw materials in the project warehouse.
- The information system built makes it easy for project admin officers in the project warehouse to check the inventory of building raw materials that are almost running out and building raw materials that are still in order to avoid over-stock inventory.
- The information system built makes it easier for project officers to find data on building raw materials according to the desired criteria.
- The information system built makes it easy to make reports on material inventory stock data, supplier reports, purchase reports, expense reports, minimum and maximum stock reports of material supplies and reports can be directly printed.
- An online website-based inventory information system can make it easier for project officers who are in the field and project/company leaders who are in different offices from the project being worked on.
- The information system that is built has security access rights for every user of the application user.

Suggestion

- The author suggests to the next author that the next website-based inventory monitoring information system can be further developed to the maximum for adding other menus that are not yet in the system such as sales data and sales returns, because the information system developed by the author is still simple.
- The author suggests to the next author to develop a report menu that is in accordance with the user's needs about what is asked for in the future regarding a website-based inventory information system.
- The author suggests to the next writer due to time constraints and system development carried out by researchers to develop an advanced inventory information system according to the wishes of the user in full.

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