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INVENTORY MANAGEMENT PROCEDURE THROUGH SYSTEM APPLICATION AND PRODUCT (SAP) IN THE WAREHOUSE DIVISION OF PT GEO DIPA ENERGI UNIT DIENG 1

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Abstract

Inventory management is a process in the management of goods or material inventory in a company to ensure the amount of inventory. SAP has an ERP basis within it, making ERP the foundation for monitoring every material transaction. Based on these points, this research aims to understand the implementation procedure of inventory management using SAP and its working process, as well as provide knowledge regarding the implementation of inventory management in a geothermal power plant company. The research uses a qualitative methodology through interview and field observation techniques. Inventory management and SAP are two highly synergized elements implemented in the company's warehouse division. The implementation of inventory management, such as receipt, storage, issuance, and stock-taking of materials, follows a clear and sequential flow, which provides convenience for the employees. Synchronization between SAP and actual data is carried out through several T-Codes (Transaction Codes), which serve as the gateway for each part of inventory management. SAP becomes an integrated system across the company's departments, making information more transparent. This facilitates transactions by automatically updating the data in real-time.

Keywords: Inventory Management, Warehouse, System Application and Product

Introduction

Inventory management is a process of managing the inventory of materials in a company or organization to ensure the right products are available in the right quantity and at the right time. Inventory management is an important aspect of business operations that focuses on managing materials effectively and efficiently, including the use of technology and information systems to track and manage the availability of materials. Inventory can also be defined as the management of materials by the company which are then distributed to users. In manufacturing companies, this distribution is generally in the form of materials that have become finished goods to be marketed.Inventory Management is one of the elements of production and operational management, which must be considered and implemented appropriately to ensure the continuity of business or industrial operations while maintaining optimal product quantity (Julyanthry et al., 2020). Soleh & Vikaliana (2020) state, Inventory system is an activity or a process that processes data about goods in the warehouse (p. 124). This means that the inventory system or inventory management is closely related to the warehouse in the organization or company.

Warehouse is a crucial infrastructure facility in the company, because it can affect the financial stability of the company. Poor warehouse management can have an impact on company losses because the warehouse stores assets in the form of goods or materials that have value. For the purpose of storing materials and providing information on the status or condition of the materials stored in the warehouse, the warehouse can be considered as part of the company's SCM system that ensures that information on the condition & status of materials is always up-to-date and easily accessible to anyone with an interest.

A warehouse is a facility that acts as a place to distribute goods from suppliers to users. Companies need storage to match products with consumer needs. The goal is to reduce production and transportation costs, manage demand and supply, meet production needs, and also meet market needs (Puteri, et al., 2023, p. 46). With the warehouse as a storage facility within the company, it is also useful for the availability of stock materials that will be used for the production process, so there is no need to wait for materials to come from providers which will take time. He added, "A warehouse is a facility that has a role as a place to distribute goods from suppliers (suppliers) to end users (users)" (Puteri, et al. p. 40).

In monitoring inventory items in the warehouse, of course, each company has its own strategy. That is because between one company and another company has a culture that is not the same. Some use traditional methods such as being recorded in books with handwriting, some use manual recording using Microsoft Excel or Google Sheets, and some use integrated recording between divisions within the company, such as web systems or applications. One application that caught my attention in conducting research is SAP (System Application and Product). SAP (System Application and Product) is ERP

(Enterprise Resources Planning) software, which is an information technology and management tool to support companies in planning and carrying out their operational work more effectively and efficiently. SAP includes a number of application modules that have the ability to support all types of transactions that must be carried out by a company and each system in it works interrelated between one another (Halim, et al., 2024, p. 75). SAP is an application or software that has an ERP (Enterprise Resource Planning) base in it, which makes ERP the foundation in the transactions carried out, so that the monitoring of assets that are material and have value is always updated data on each part of the company.Simply put, ERP applications are multimodule software that has the advantage of being able to unify functions between departments, starting from product planning, purchasing parts, inventory control, to product distribution and order tracking (Diyasa, et al., 2021, p. 2). Activities carried out in SAP are called transactions. So, to enter transactions, it is necessary to enter certain codes according to the needs called T-Code (Transaction Code). PT Geo Dipa Energi is a State-Owned Enterprise (SOE) engaged and focused on developing power plants by utilizing geothermal energy to support the sustainability of clean energy as well as sustainability and national energy security. PT Geo Dipa Energi has two operational units that are already running, one of which is the Dieng 1 unit which is the object of this research.

Problem Formulation

How are inventory management procedures through System Application and Product (SAP) implemented in the warehouse division of PT Geo Dipa Energi Unit Dieng 1?

Research Objectives

Departing from the things that have been described above, this research has the aim of knowing the inventory management implementation procedures using SAP and how it works, and providing knowledge about the implementation of inventory management in a geothermal power plant company, because discussions related to inventory management have been dominated by its implementation in manufacturing companies where the end of goods or whole materials that enter the warehouse are consumers. Whereas in a geothermal power plant company, the material that enters the warehouse will be used by the company itself (users are only different departments), and will return to the warehouse when the material is no longer used (damaged and replaced with a new one). For this reason, this research focuses on the implementation of inventory management that occurs only in the warehouse division, without detailing the inventory management that occurs in other divisions.

Research Methodology

The methodology used is qualitative, through field observations and interviews with warehouse staff, as well as the warehouse supervisor who is the highest official in the warehouse division. Qualitative research is a type of research that produces findings that cannot be achieved using statistical procedures or other quantification methods. Basically, qualitative research has two objectives, namely: first, to describe and explain and second, to describe and explore (Wada et al, 2024).Interviews are activities of direct interaction between researchers and sources. The researcher asks questions which are then answered by the source (respondent) regarding various matters within the scope of the research, in order to collect the valid data needed.

Conducting interviews can be carried out through two approaches, namely free or structured. Free means that researchers can ask questions without having to follow written guidelines. Whereas structured means that the researcher must ask questions by following the guidelines of detailed and complete questions. There is also semi-structured where the researcher only follows the interview guidelines (Wada et al, 2024). Field observation is the focus on the object of research by utilizing the senses of the eye by seeing, hearing, smelling, touching, and feeling. Field observation is a direct observation of the occurrence of the phenomenon of the object of research. Field observation involves the utilization of human senses in the context of direct observation of the object of research which aims to collect the required data (Wada et al, 2024).

Results And Discussion

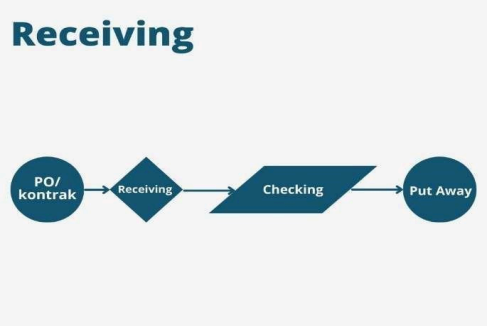
The Warehouse Division at PT Geo Dipa Energi Unit Dieng 1 is one of several divisions in the SCM (Supply Chain Management) department, while the SCM department is divided into three divisions namely purchasing, logistics and warehouse. SCM is one of several departments at PT Geo Dipa Energi Unit Dieng 1. The inventory management implemented in the warehouse division is inseparable from the other two divisions in the same department, as well as related to divisions in other departments. Inventory management implemented in the warehouse division includes:

a. Material Receiving
b. Material Storage (Put Away)
c. Material Expenditure (Issue)
d. Material Stocktaking

Activities carried out in the warehouse are monitored in material availability records through SAP which is integrated into every department in the company.

a. Material Receiving

Material receiving is one of the jobs performed in the warehouse division when partners (vendors/suppliers) deliver materials ordered by the logistics division or other departments through the purchasing division. The materials ordered will be used for operational needs, in order to maintain stability and increase geothermal production channeled to the generating machine, as well as repair or prevent certain parts.



Fihure 1
Flowchart of Receiving Material

The flowchart above is the process of receiving materials. Starting from the PO (Purchase Order) which then becomes a contract with the partner so that the material can be sent. After the partner sends the goods to the warehouse, the material is unloaded in the staging area for checking regarding the suitability of the material with the documents. For the warehouse division, the inspection is only quantity-based, meaning that it only calculates the amount of material and specifications on paper based on the PO issued by the purchasing team. Meanwhile, detailed quality checks are carried out by users who know better whether the material is in order and in accordance with what will be used in the field or not. If the quantity checked by the warehouse team and the quality checked by the user do not match, the material will be returned to the partner for reshipment, to make in-depth adjustments to the specifications according to the intended documents and materials. However, if everything is correct, the material will be put away in the warehouse.

b. Material Storage (Put Away)

Put away materials that have been inspected and will be placed into the warehouse, cannot immediately be done. This is because the quantity of the material has not yet entered SAP. For this reason, the material is still held in the staging area or moved into the quarantine room used for new materials with the same case, until GR (Good Receipt) is carried out by the logistics team.

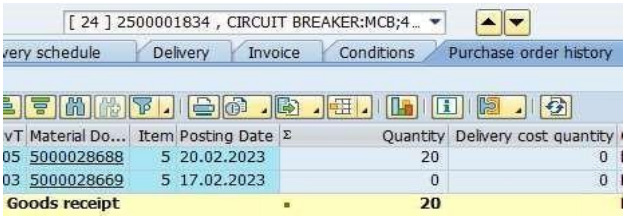


Figure 2
Good Receipt Status From ME2N

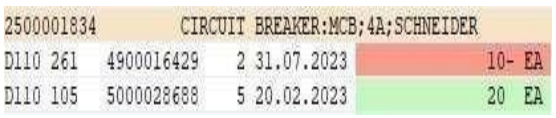


Figure 3

Good Receipt Status From MB51

To find out that the material has been GR, use T-Code ME2N based on the PO (Figure 2.0.1) which will then appear "Good Receipt" in the "Purchase Order History" tab. Can also use T-Code MB51, which if there is a green highlight, then the quantity of new material has been automatically added to SAP (Figure 2.0.2) There are several provisions in the put away material in its placement in the warehouse. First, the location placement (Storage Bin/Stor.Bin) is done by placing the material according to SAP.

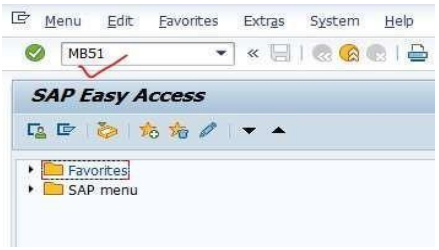


Figure 4
Input T-Code

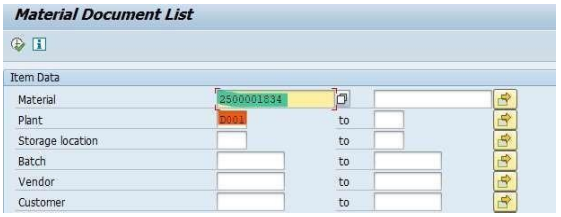


Figure 5
Input Plant & Unique ID in MB51

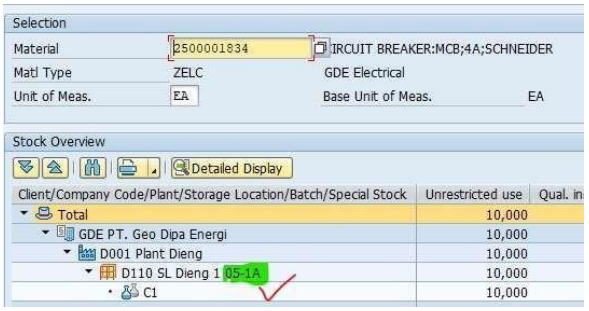


Figure 6
Storage Bin

To find out that a material already has a Stor.Bin or not in SAP, it is done by using T-Code MB51 (Figure 2.1) then inputting the unique identity of the material and also the corresponding plant (Figure 2.2).

Then the location where the material should be placed will be known. However, if in Figure 2.2 marked in green is still empty, it means that the material has not yet received a location. If the material does not yet have a location in SAP, the placement of the material must be placed on the shelf with the material category. With the example of the material above, if the material does not yet have a placement location in SAP, it must be placed on a shelf with the Electric category. In the company which is the object of this research has several material categories such as Electric, Welding, Instrument, Drill, and so on. However, there are some conditions where non-stor.bin materials cannot be placed into the appropriate shelf due to the shelf being full or overloaded. Therefore, the material is placed on the shelf that still has space and is located closest to the proper shelf. It also applies to new materials that already have a stor.bin but are full. For this reason, an alternative for the placement of shelves to be aligned with the system is to change the stor.bin in SAP.

Figure 7
First Page of MM02

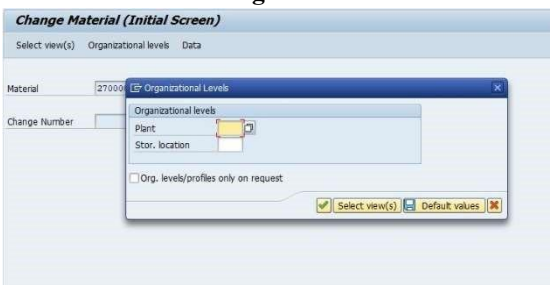


Figure 8
Input Plant & Stor Loc

The SAP T-Code used to change stor.bin is MM02 (Change Material). After pressing enter on the keyboard, a page will appear as Figure 2.4, then enter the unique identity of the material, and execute. In other T-Codes, execution uses the F8 key, while in T-Code MM02 uses the enter key. Enter the appropriate Plant and Stor Location (Figure 2.5), and a new page will appear (Figure 2.6).

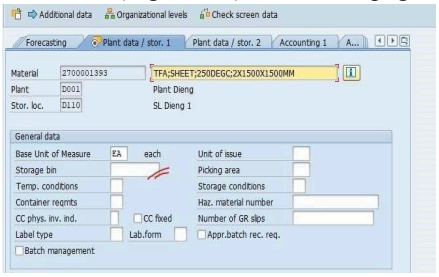


Figure 9
Storage Bin

If the Storage Bin is still empty, fill it with the name according to the location of the material. Meanwhile, if the Storage Bin is already filled, it can be deleted and replaced with the one according to the new location when the material is placed.

c. Material Issue

Inventory materials registered in the SAP inventory system are issued based on user requests which are also through SAP because this system is integrated between company departments. The request maker is called a planner for both the operations and maintenance departments. The following is a flowchart of material requests and expenditures:

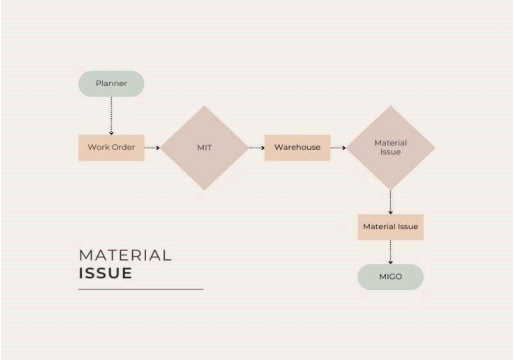


Figure 10
Flowchart of Material Issue

The request for outgoing materials begins with the planner as a user representative who makes a WO (Work Order) where a job will be carried out and requires materials from the warehouse to be used.

MvT	...	Material	Material description	Requirement Quantity	Difference Quantity
261	H	2400000410	Carbon bushing pejal OD 60 mm X L 300 mm	5	0
221	H	2600002687	STEAM,TRAP:FCD;BUCKET;1-1/2INX150LB;16K	2	0
261	H	2300001295	FILTER,FUEL:STEEL;FOR PERKINS 4 CYLINDER	4	4
261	H	2200002154	FILTER,FUEL:4587259;PERKINS	1	1
261	H	2600002812	DISC,RUPTURE:8IN,BP/TEMP;16,4BAR;205DEGC	1	1
261	H	2700001295	STUD,CONT:7/8 UNC X 15IN;B7;2 NUT	12	12

Figure 11
Material WO from MB25

Figure 11 is a display of T-Code MB25 which shows that the user needs material from the warehouse to do the upcoming work, and the planner has made a WO. However, the warehouse clerk cannot issue the intended material based only on Figure 3.2, but the user or representative in taking the material must bring a MIT (Material Issue Ticket) in the form of a physical sheet of paper based on the WO and signed by the person concerned (user) itself. The MIT is brought to the warehouse as a valid "means of payment", then "exchanged" for the material that has been ordered in the system. As stated by Triwijaya (2022), "To track the movement of raw materials from the warehouse to the production department, a document called a material requirement document is needed.". (p. 201). After the material leaves the warehouse (Material Issue), the warehouse clerk will update the stock card for each material. Next, do Good Movement (Posting) through the MIGO T-Code, after previously the WO has been approved by the authorized user official (generally equivalent to a manager position) so that the quantity of material in SAP is reduced to harmonize the actual amount with the system amount. Evidence that the material in the WO has been posted can be seen through T-Code MB51 (Figure 2.0.2) with red highlights. It is also possible to use T-Code MB25 (Figure 3.2) with the column "Difference Quantity" 0 (zero).

d. Stock-Opname

Stock Opname or Material Inventory or simply called inventory, is an activity carried out in the warehouse, by calculating Current Inventory and On-hand Inventory. Kusmindari et al. (2019) suggests that Current Inventory is the amount of material that is physically available in the warehouse at the beginning of the period. While On-hand Inventory is the amount of inventory at the end of the period, taking into account the amount of inventory on hand plus the amount of goods expected to be received or reduced by the amount of goods used / removed from inventory during the period. This activity is carried out with the aim of knowing the difference between the actual amount and SAP, because it is closely related to the accounting function within the company in calculating assets. In the company, the materials in the warehouse actually have value or "money in different forms". Inventories are conducted over a number of periods, starting around the 20th to the end of the month of each month. For monthly inventories, the inventory is conducted by taking a sample of materials that move only during that period, either in or out.

A major inventory is conducted around October-December each year, taking data from the total material population in SAP. Unfortunately, the authority to access the data is owned by the center, so the unit cannot view it. A periodic system is an inventory count carried out at certain intervals (periods) such as monthly or weekly, to determine the number of orders that need to be placed (Guritno & Harsasi, 2019).

e. Challenges

1. When receiving goods, there is often a misunderstanding in terms of inspection between warehouse officers and users. Warehouse officers only rely on the PO because they do not know enough about the application of materials in the field. On the other hand, users will still accept as long as the material is deemed applicable in the field even though the description in the PO and the identity of the material are different. This has an impact during an audit, because the audit team will inspect the material based on the system, where the PO is part of the system. Things like this can lead to findings by the audit team, that the material identity and the system have different specifications.
2. The material quarantine room is overloaded due to several GR late releases. Some material storage locations in the warehouse are also overloaded due to facilities that have not been expanded, while some materials are no longer used by users because in the field many parts have

been replaced or updated, which is different from the stock material in the warehouse. This is one of the causes of deadstock.Santoso et al. (2018) as cited by Dianto & Widati (2023) revealed that, "The occurrence of dead stock is caused by goods that accumulate in the warehouse for too long which makes the goods expire and accumulate with other goods until they are damaged."

Conclusions And Suggestions

Inventory management through SAP implemented in the warehouse division of PT Geo Dipa Energi Unit Dieng 1 is well structured, effective, and efficient. A clear process flow makes it easy for employees to know the implementation of inventory management starting from receiving, storing, issuing, and stocktaking materials. Thus, when an inventory management process occurs in the warehouse, employees are not clueless about what to do. The warehouse officers both staff and supervisors understand well the use of SAP which is the foundation of information in the company, as well as the integration of systems between departments which allows transparency of cooperation between one department and another. Even so, there are still several sectors that need to be improved so that inventory management can run better in the process. At the time of receiving goods (receiving), both users and warehouse staff should always make the PO issued by purchasing as an absolute guideline for both descriptions and specifications. Before the PO is issued, coordination between users and material purchase planners needs to be deepened so that there are no misperceptions so that there are no more pros and cons between users and warehouse staff.

In addition, GR issuance needs to be done in a more timely manner or the sooner the better while still paying attention to certain conditions for GR issuance to be met. Regarding overload, it needs to be a focus for the warehouse with authorized officials. Authorized officials should help maximally to expand the warehouse area or remove materials that are no longer used. That way, the warehouse will have more space to do better inventory management.

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