

# Online Warehouse Application at PT. PLN (Persero) ULP Lhokseumawe City

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## Abstract

PT PLN (Persero) ULP Lhokseumawe City is one of the State-Owned Enterprises engaged in the provision of electricity for distribution to the community. PT PLN (Persero) ULP Lhokseumawe City has a warehouse that serves as a material storage facility, functioning as a transaction location for incoming and outgoing materials, as well as for monitoring material stocks. The warehouse serves as a storage facility for materials required by all companies. Materials are tools used to meet the needs of workers and the community in supporting the distribution of electricity. Without materials, activities related to electricity cannot be carried out; therefore, it is necessary to have information about material stocks to ensure the smooth operation of a job. At the PLN ULP Lhokseumawe City office, material data collection is still conducted manually using notes or transaction recording books. If you pay attention, the manual system is not safe, because if the data is lost it cannot be recovered. Additionally, materials can be shipped from the warehouse without the supervisor's knowledge, resulting in material stock reports that do not accurately reflect the material stock in the warehouse. Material inventory is a common issue that arises when material stocks run low and technical officers require materials to support the distribution of electricity to customers. In the warehouse, some materials are rarely issued by warehouse officers, resulting in a significant accumulation of unused materials. Therefore, an application is needed to control materials in the PT PLN ULP Lhokseumawe City warehouse based on the web. The purpose of creating this application is to enable the monitoring, management, and control of materials in the warehouse, allowing for the printing of reports based on the materials stored. This can facilitate the supervision of the release of goods that are not carelessly issued and technical officers are not short of material stock. These reports will later be compiled by the TUG (Warehouse Administration) as determined by PT.PLN (Persero).

**Keywords:** warehouse, storage, PT.PLN , material

## 1. Introduction

PT. PLN (Persero) ULP Lhokseumawe City is a State-Owned Enterprise engaged in the provision of electricity for distribution to all its customers or the public. PT. PLN (Persero) ULP Lhokseumawe City has a warehouse serving as a material storage area, where incoming materials are received, outgoing materials are dispatched, and material stock is monitored [1]. The warehouse serves as a storage facility for materials required by all companies. Materials are a tool used to meet the needs of workers and the community in supporting the distribution of electricity. Without materials, activities related to electricity cannot be carried out; therefore, information about material stock is necessary for the smooth operation of a job [2]. Materials stored in the warehouse include KWH Meters, MCB Limiters, Cables, PVC AW Pipes, Elbow Socks, Poles, Transformers, and many other materials. These materials are stored in the PT PLN ULP Lhokseumawe City warehouse [3]. At the PT PLN ULP Lhokseumawe City office, there is no computerized system for processing material data. The system used at PT PLN ULP Lhokseumawe City is still manual.[4] Newly arrived materials are recorded based on their name and code, and then entered into the warehouse. The following process involves storing the recorded materials before use. Materials removed from the warehouse are still very simple, with warehouse staff using arbitrary receipts to retrieve materials. Reporting to supervisors is then done in the form of receipts. All these activities,

including incoming material data, outgoing material data, and warehouse storage data, are still performed manually. Monitoring of materials in the warehouse utilizes books to record material data and reports on material activity, which are then submitted to supervisors and stored in the material transaction book. Material inventory is a common problem when material stocks run out and engineering staff need materials to support electricity distribution to customers. Furthermore, the warehouse contains materials that are rarely removed by warehouse staff. It should be noted that this manual system is unsafe, as lost data cannot be recovered.[5], [6] Materials can also be removed from the warehouse without the supervisor’s knowledge, resulting in material stock reports that do not match the actual stock in the warehouse. When engineering staff need materials but their warehouse supplies are depleted, the office must re-order, which takes a long time, resulting in delayed work.

To address this issue, a web-based Online Warehouse Application (WEGO) will be developed for the warehouse at PT PLN ULP Lhokseumawe City. This application is expected to facilitate warehouse staff in monitoring, managing, and controlling materials in the warehouse. It also allows supervisors and managers to more easily obtain information and reports on material stock in the warehouse. This will facilitate the monitoring of material expenditures and ensure that the engineering staff are aware of stock shortages. These reports will comply with the Warehouse Administration (TUG) established by PT PLN (Persero).

## 2. Methods

This section explains the research in detail.

### A. Data Collection Techniques

The data collection methods used in this study are as follows:

- Literature Review : Data collection and retrieval were conducted by reading books, journals, articles, and internet resources as needed.
- Interviews: Data collection was conducted through questions and answers or direct dialogue with relevant officers to obtain the necessary information and data.
- Observations : Data collection involved observing and recording the objects under study directly to obtain the necessary information for the research. The research location was PT. PLN (Persero) ULP Lhokseumawe City.

### B. Data Needs Analysis

One way to implement data analysis is through data needs analysis. The purpose of compiling a data needs table is to facilitate the process of creating a context diagram. The data needs for this application are as follows:

- User Data: User data is data that provides information about users who log in to the application. Users are the users of the application. User data requirements include: user ID, name, NIP, password, role, and telephone number.
- Material Data: Material data includes data about materials used to meet the needs of workers and the community. This data will form a dataset divided into training data and testing data.
- Incoming Material Data: Incoming material data records materials entering the PT PLN ULP Lhokseumawe City warehouse.
- Outgoing Material Data : Outgoing material data records materials leaving the PT PLN ULP Lhokseumawe City warehouse.

### C. Database Design

The database design stage will be carried out using an Entity Relationship Diagram (ERD). The ERD design is based on system requirements. The ERD design can be seen in the following figure.

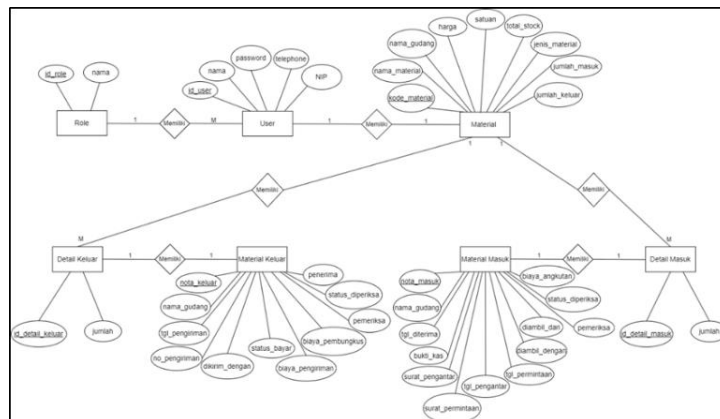


Figure 1. Entity Relationship Diagram

Figure 1 is a draft of the Entity Relationship Diagram (ERD) that will be implemented in the Online Warehouse Application (WEGO). The figure above shows the role table related to the user table, the inbound detail table related to the material table and the inbound material table, and the outbound detail table related to the material table and the outbound material table.

### 3. Hasil dan Pembahasan

The results and discussion cover the implementation of the application's user interface and the results of the application implementation.

#### A. Home Page

The home page is the first page displayed by the application after the user logs in. The home page can be seen in the following image.

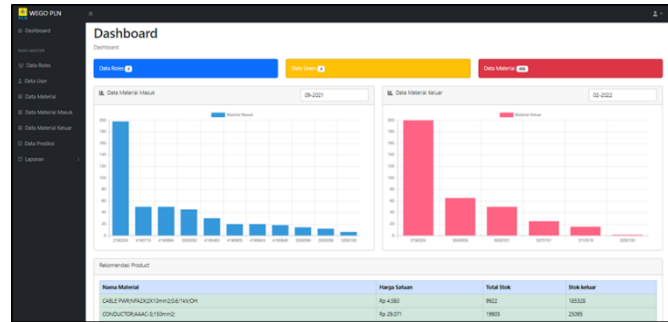


Figure 2. Dashboard

Figure 2 shows the main page display, which shows the user's main page containing a graph of incoming and outgoing materials each month. On this page, users can select a date to view a graph of the amount of incoming and outgoing materials. This page contains materials recommended by the application, so users can increase their warehouse stock for the future. The recommended material data is selected based on the most frequently issued materials.

#### B. Rules Information Page

The roles data page is an admin page for assigning different user levels. The roles data page can be seen in the following image.

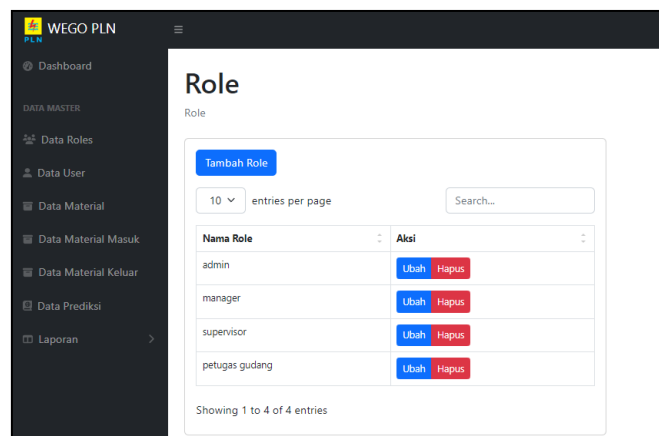


Figure 3. Data Roles Page

Figure 3 shows the Roles data page. It can be concluded that only admins can manage and view the user's access rights. Admins can add, modify, and delete roles in the application. The application has four roles: admin, warehouse clerk, supervisor, and manager. These four roles have different access rights.

#### C. User Page

The user data page contains four registered users: admin, warehouse clerk, supervisor, and manager. Only the admin can access user data, such as inputting, editing, deleting, and assigning levels to each user who logs in to the application. The user data page can be seen in the following image.

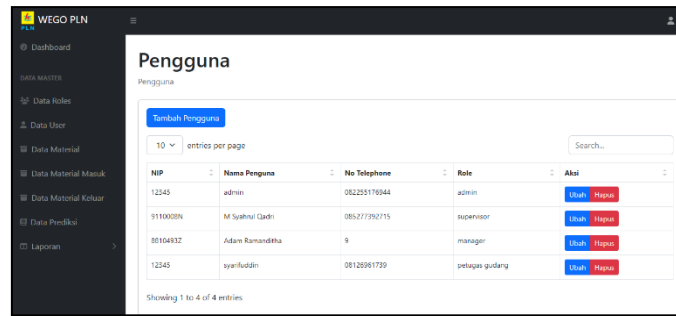


Figure 4. User Page

Figure 4 shows the User data page display. It can be concluded that on this page, only the admin can input, change, and delete information, as well as assign levels to each user. This page contains fields in the display table: NIP, Username, Telephone Number, Role, and options to change and delete. This page also includes a search button to quickly find a user's name.

D. Halaman Data Material

The material data page contains material data entered by warehouse staff. On this page, administrators and warehouse staff can add data, while supervisors can only view the materials in the warehouse. On this page, users can search for materials that have been entered and are available at the PT PLN ULP Kota Lhokseumawe warehouse.

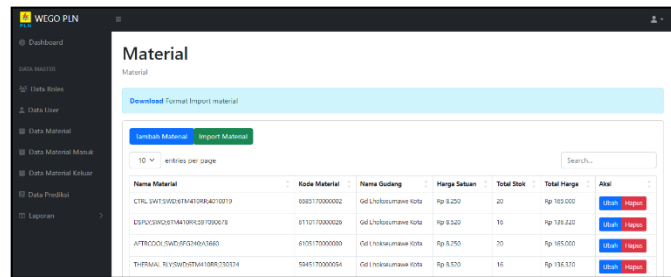


Figure 5. Material Page

Figure 5 shows the Material Data page display. This page displays material data in the warehouse. Admins and warehouse staff can add data on this page, while supervisors can only view the materials in the warehouse. The data displayed on this page includes Material Name, Material Code, Warehouse Name, Unit Price, Total Stock, Total Price, and options to delete and edit material data. The material data page features a search button for searching material data. This page also includes buttons for adding material and importing material. The import material button allows users to import an Excel file.

E. Incoming Material Page

The Incoming Material Data page contains incoming material data entered by warehouse staff. This page is accessible to administrators, warehouse staff, and supervisors.

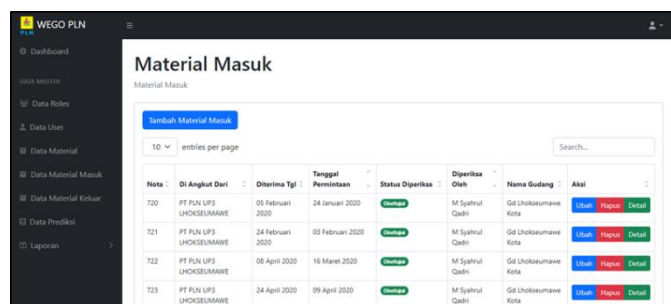


Figure 6. Incoming Material Page

Figure 6 shows the incoming material data page display, which can be concluded that this page can only be accessed by admins, warehouse officers, and supervisors. The incoming material data page can only be added by admins and warehouse officers, while supervisors can only view incoming material data. The incoming material data information page display consists of Note, Transported from, Received Date, Request Date, Checked Status, Checked By, Warehouse Name and there are options to change, delete, and detail. On this page, supervisors

have access rights to approve incoming materials to the warehouse. On the incoming material data page, there is a search button to search for incoming material data.

- Add Incoming Material

The Incoming Material Data page has an "Add Incoming Material" button to add incoming material data.

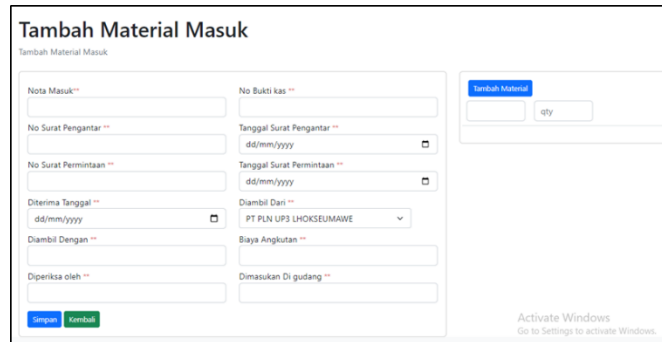


Figure 7. Add Incoming Material Page

Figure 7 shows the Add Incoming Material Data page display. The Add Incoming Material Data page contains several forms that must be filled out to add incoming material data. The form on the Add Incoming Material page is TUG 3 or Warehouse Administration, which can be printed after completing a transaction in the warehouse. On the "Add Incoming Material" page, warehouse personnel can add incoming material and complete the form. Then, select the Save button to save the incoming material data.

- Details Incoming Material

The incoming material details page can be accessed by admins, warehouse staff, and supervisors. On this page, unless approved by the supervisor, the material quantity cannot be increased in the application.

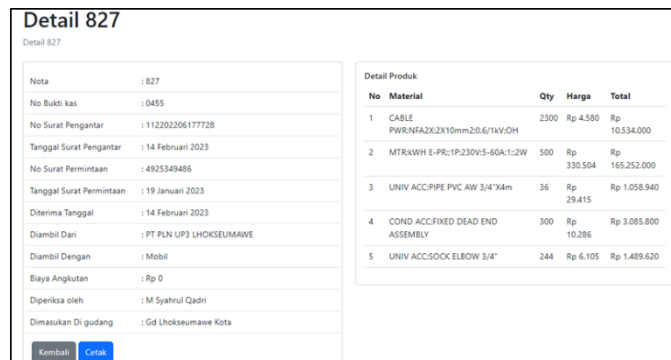


Figure 8. Details Incoming Material

Figure 8 shows the incoming material details page. It can be concluded that this page can only be accessed by admins, warehouse staff, and supervisors. On this page, if the supervisor has not approved it, the material quantity cannot be increased in the application. If the supervisor approves the incoming material, the warehouse staff can then select the print button to be directed to the page where they can print TUG 3 or Warehouse Administration after it has been approved by the supervisor.

- Outgoing Material Page

The outgoing material data page contains outgoing material data entered by warehouse staff. The outgoing material data page can be accessed by admins, warehouse staff, and supervisors. The outgoing material data information page displays the following information: Note, Sent to, Date Created, Payment Status, Checked Status, Checked By, and includes options for editing, deleting, and viewing details. The implementation of the outgoing material information page is illustrated in the following figure.

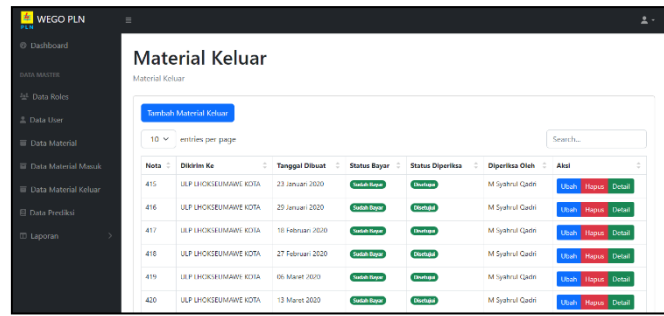


Figure 9. Outgoing Material Page

Figure 9 shows the outgoing material data page display. It can be concluded that the outgoing material data information page display consists of Note, Sent to, Date Created, Payment Status, Checked Status, Checked By and there are options to change, delete, and detail. On this page, the supervisor has access rights to approve materials that leave the warehouse. On the outgoing material data page, there is a search button to find outgoing material data.

E. Prediction Page

The prediction data page is used to perform KNN calculations and material predictions at the PT PLN ULP Lhokseumawe City warehouse. The prediction data page can be accessed by admins, warehouse staff, supervisors, and managers. Admins and warehouse staff can input material testing data and view material prediction results, while supervisors and managers can only view material prediction results. The implementation of the prediction data page can be seen in the following figure.

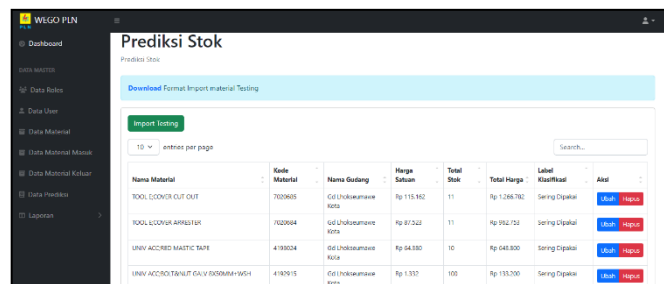


Figure 10. Prediction Page

Figure 10 shows the prediction data page display. It can be concluded that the user imports testing data by clicking the "Import Testing" button. The imported testing data is an Excel file containing material data input. The variables used in the prediction are the quantity of incoming material, the quantity of outgoing material, the stock amount, and the total price. After the testing data is entered, the application will generate a classification label in the form of a prediction.

F. Report Page

The material report page is used to view material stock in the warehouse.

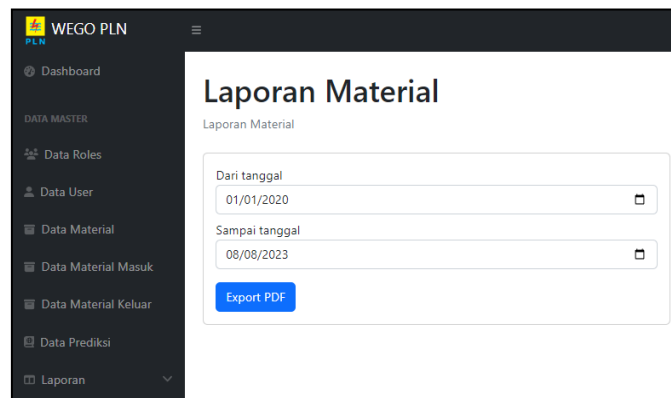


Figure 11. Material Report Page

The Material Report page can be managed by administrators, warehouse staff, supervisors, and managers. The material report page is shown in the following image. Figure 11 shows the material report page display, which shows a date range for printing data based on the entered date. Users can input the date they wish to view first. Then, select the Export PDF button, and the application will direct the user to the Print Material Report page to view the material stock in the warehouse.

- Material Report Print

The material report print page is used to print and view material stock in the PT PLN ULP Lhokseumawe City warehouse. The Material Report Print page can be managed by administrators, warehouse staff, supervisors, and managers. The material report print page is shown in the following figure.

Laporan Material							
Laporan Dari : 2020-01-01 To 2023-08-08							
No	Kode Barang	Nama Material	Harga Satuan	Total Stock	Stock Masuk	Stock Keluar	Total Harga
1		TRF DIS:D3,20kV/400V,3P,250kVA,DYN5,OD	Rp 141.253.716,00	2	4	2	Rp 282.507.432,00
2		TRF DIS:D3,20kV/400V,3P,250kVA,DYN5,OD	Rp 141.253.716,00	2	4	2	Rp 282.507.432,00
3		TRF ACC,RANGKA TEMPAT DUDUKAN TRAF0	Rp 3.710.730,00	15	25	10	Rp 55.660.950,00
4		TRF ACC,RANGKA TEMPAT DUDUKAN TRAF0	Rp 3.710.730,00	15	20	5	Rp 55.660.950,00
5		CT,380/220V,RING,200/5A,0,5,5VA,P	Rp 473.758,00	49	185	136	Rp 23.214.142,00
6		CT,380/220V,SQUARE;150/5A,0,5,5VA,P	Rp 305.250,00	15	28	13	Rp 4.578.750,00
7		CT,380/220V,SQUARE;150/5A,0,5,5VA,P	Rp 305.250,00	30	100	70	Rp 9.157.500,00
8		CT,380/220V,SQUARE;250/5A,0,5,5VA,P	Rp 305.250,00	39	150	111	Rp 11.904.750,00
9		CT,380/220V,SQUARE;300/5A,0,5,5VA,P	Rp 305.250,00	55	190	135	Rp 16.788.750,00
10		CT,20KV,K,10/5A,0,2S,30VA,OD	Rp 11.473.000,00	2	3	1	Rp 22.946.000,00

Figure 12. material report print page

Figure 12 shows the Material Report Export page. The Material Report Export page can be managed by administrators, warehouse staff, supervisors, and managers. On the Material Report Export page, users can print and view the available material stock in the warehouse. The Material Report Export page will print according to the date range selected by the user.

- Incoming and Outgoing Material Report Print

The export of incoming material reports is shown in the following image.

Laporan Material Masuk						
Laporan Dari : 2020-01-01 To 2020-12-31						
No	Nota	Di Angkut Dari	Diterima Tgl	Tanggal Permintaan	Status Diperiksa	Diperiksa Oleh
1	720	PT PLN UP3 LHOKEUMAWE	05 Feb 2020	24 Jan 2020	Disetujui	M Syahrul Qadri
2	721	PT PLN UP3 LHOKEUMAWE	24 Feb 2020	03 Feb 2020	Disetujui	M Syahrul Qadri
3	722	PT PLN UP3 LHOKEUMAWE	08 Apr 2020	16 Mar 2020	Disetujui	M Syahrul Qadri
4	723	PT PLN UP3 LHOKEUMAWE	24 Apr 2020	09 Apr 2020	Disetujui	M Syahrul Qadri
5	724	PT PLN UP3 LHOKEUMAWE	16 Jun 2020	05 Jun 2020	Disetujui	M Syahrul Qadri
6	725	PT PLN UP3 LHOKEUMAWE	21 Jul 2020	01 Jul 2020	Disetujui	M Syahrul Qadri
7	726	PT PLN UP3 LHOKEUMAWE	28 Jul 2020	01 Jul 2020	Disetujui	M Syahrul Qadri
8	727	PT PLN UP3 LHOKEUMAWE	07 Aug 2020	01 Jul 2020	Disetujui	M Syahrul Qadri
9	728	PT PLN UP3 LHOKEUMAWE	24 Aug 2020	02 Jul 2020	Disetujui	M Syahrul Qadri
10	729	PT PLN UP3 LHOKEUMAWE	26 Aug 2020	20 Aug 2020	Disetujui	M Syahrul Qadri
11	730	PT PLN UP3 LHOKEUMAWE	31 Aug 2020	02 Jul 2020	Disetujui	M Syahrul Qadri
12	731	PT PLN UP3 LHOKEUMAWE	02 Sep 2020	12 Aug 2020	Disetujui	M Syahrul Qadri
13	732	PT PLN UP3 LHOKEUMAWE	05 Oct 2020	14 Sep 2020	Disetujui	M Syahrul Qadri
14	733	PT PLN UP3 LHOKEUMAWE	08 Oct 2020	24 Sep 2020	Disetujui	M Syahrul Qadri
15	734	PT PLN UP3 LHOKEUMAWE	20 Oct 2020	18 Oct 2020	Disetujui	M Syahrul Qadri
16	735	PT PLN UP3 LHOKEUMAWE	29 Oct 2020	30 Sep 2020	Disetujui	M Syahrul Qadri
17	736	PT PLN UP3 LHOKEUMAWE	09 Nov 2020	27 Oct 2020	Disetujui	M Syahrul Qadri
18	737	PT PLN UP3 LHOKEUMAWE	12 Nov 2020	27 Oct 2020	Disetujui	M Syahrul Qadri
19	738	PT PLN UP3 LHOKEUMAWE	24 Nov 2020	10 Nov 2020	Disetujui	M Syahrul Qadri
20	739	PT PLN UP3 LHOKEUMAWE	25 Nov 2020	10 Nov 2020	Disetujui	M Syahrul Qadri
21	740	PT PLN UP3 LHOKEUMAWE	27 Nov 2020	10 Nov 2020	Disetujui	M Syahrul Qadri

Figure 13. the Incoming Material Report Export page

Figure 13 displays the Incoming Material Report Export page. The Incoming Material Report export page can be managed by administrators, warehouse staff, supervisors, and managers. The Incoming Material Report Export page allows users to print and view incoming materials. The incoming material report export page is helpful for supervisors and managers to determine the date of material arrival and view the materials that have been received in the warehouse.

Export Outgoing Material Report: The Export Outgoing Material Report page allows you to print and view materials leaving the warehouse. The export outgoing material report is shown in Figure 14.

Laporan Material Keluar						
Laporan Dari : 2020-01-01 To 2020-12-31						
No	Nota	Dikirim Ke	Tanggal Dibuat	Status Bayar	Status Diperiksa	Diperiksa Oleh
1	415	ULP LHOKESEUMAWE KOTA	23 Jan 2020	Sudah Bayar	Disetujui	M Syahnu Qadri
2	416	ULP LHOKESEUMAWE KOTA	29 Jan 2020	Sudah Bayar	Disetujui	M Syahnu Qadri
3	417	ULP LHOKESEUMAWE KOTA	18 Feb 2020	Sudah Bayar	Disetujui	M Syahnu Qadri
4	418	ULP LHOKESEUMAWE KOTA	27 Feb 2020	Sudah Bayar	Disetujui	M Syahnu Qadri
5	419	ULP LHOKESEUMAWE KOTA	06 Mar 2020	Sudah Bayar	Disetujui	M Syahnu Qadri
6	420	ULP LHOKESEUMAWE KOTA	13 Mar 2020	Sudah Bayar	Disetujui	M Syahnu Qadri
7	421	ULP LHOKESEUMAWE KOTA	26 Mar 2020	Sudah Bayar	Disetujui	M Syahnu Qadri
8	422	ULP LHOKESEUMAWE KOTA	15 Apr 2020	Sudah Bayar	Disetujui	M Syahnu Qadri
9	423	ULP LHOKESEUMAWE KOTA	24 Apr 2020	Sudah Bayar	Disetujui	M Syahnu Qadri
10	424	ULP LHOKESEUMAWE KOTA	04 Jun 2020	Sudah Bayar	Disetujui	M Syahnu Qadri
11	425	ULP LHOKESEUMAWE KOTA	26 Jun 2020	Sudah Bayar	Disetujui	M Syahnu Qadri
12	426	ULP LHOKESEUMAWE KOTA	10 Jul 2020	Sudah Bayar	Disetujui	M Syahnu Qadri
13	427	ULP LHOKESEUMAWE KOTA	27 Jul 2020	Sudah Bayar	Disetujui	M Syahnu Qadri
14	428	ULP LHOKESEUMAWE KOTA	30 Jul 2020	Sudah Bayar	Disetujui	M Syahnu Qadri
15	429	ULP LHOKESEUMAWE KOTA	05 Aug 2020	Sudah Bayar	Disetujui	M Syahnu Qadri
16	430	ULP LHOKESEUMAWE KOTA	19 Aug 2020	Sudah Bayar	Disetujui	M Syahnu Qadri
17	431	ULP LHOKESEUMAWE KOTA	25 Aug 2020	Sudah Bayar	Disetujui	M Syahnu Qadri
18	432	ULP LHOKESEUMAWE KOTA	04 Sep 2020	Sudah Bayar	Disetujui	M Syahnu Qadri
19	433	ULP LHOKESEUMAWE KOTA	11 Sep 2020	Sudah Bayar	Disetujui	M Syahnu Qadri
20	434	ULP LHOKESEUMAWE KOTA	23 Sep 2020	Sudah Bayar	Disetujui	M Syahnu Qadri
21	435	ULP LHOKESEUMAWE KOTA	05 Oct 2020	Sudah Bayar	Disetujui	M Syahnu Qadri
22	436	ULP LHOKESEUMAWE KOTA	14 Oct 2020	Sudah Bayar	Disetujui	M Syahnu Qadri
23	437	ULP LHOKESEUMAWE KOTA	15 Oct 2020	Sudah Bayar	Disetujui	M Syahnu Qadri

Figure 15. The Outgoing Material Report Export page

#### 4. Conclusion

Based on the results and discussions, several conclusions can be drawn, including:

1. This application simplifies warehouse personnel's input of incoming and outgoing materials, thus simplifying inventory control and reducing the accumulation of materials rarely removed from the warehouse.
2. This application facilitates warehouse personnel's presentation of material reports by TUG 3 and TUG 8.
3. Each user has four access rights, each with its distinct functions and display.

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