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Design Of A Web-Based Logistics Administration Information System Using The Prototype Method (Case Study Of Pt Pln (Persero) Upt Bengkulu)

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Abstract— The management of logistics administration at PT PLN (Persero) UIP3B Sumatra UPT Bengkulu has an important role in supporting operations, especially in the process of borrowing and requesting materials between units. However, the process is still carried out manually by the warehouse admin, causing problems such as service delays, difficulties in checking the availability and location of materials, and dependence on the existence of admins. This research aims to design a web-based logistics administration information system at PT PLN (Persero) UIP3B Sumatra UPT Bengkulu. The method used is a prototype method that allows the development of the system iteratively based on user needs. The designed system provides material data management features, recording borrowing and requesting goods, as well as material damage report information. The results of the research in the form of an information system are expected to help the logistics administration process become more structured, make it easier to find information, and support faster and more accurate data presentation.

Keywords- Logistics Administration, Materials, Prototype, Information Systems, Web.

I. INTRODUCTION

Advancements in information technology have encouraged organizations to transition from manual to computerized systems in order to improve the efficiency and accuracy of data management [1], [2]. Logistics administration is one of the essential operational functions that requires effective information management. At PT PLN (Persero) UPT Bengkulu, the management of incoming and outgoing goods is still performed semi-manually through spreadsheets and handwritten records. Moreover, inventory information is primarily controlled by the warehouse head, resulting in delays during the process of requesting or borrowing goods. These issues contribute to limited information accessibility, operational inefficiency, and a greater risk of data recording errors [3].

To overcome these challenges, this study proposes a web-based logistics administration information system capable of integrating logistics data management processes [4]. The system is intended to simplify inventory recording, monitor stock availability, and provide real-time access to logistics information [5], [6]. By utilizing a web-based platform, users can obtain information more quickly and independently, thereby improving operational efficiency and supporting timely decision-making [7].

The system is developed using the prototype method, which facilitates iterative communication between users and developers throughout the development process. This approach enables system requirements to be refined continuously based on user feedback, reducing potential development mismatches. Previous studies have demonstrated that web-based information systems enhance data management efficiency and minimize recording errors [8]. In addition, the prototype method is widely recognized for its effectiveness in providing an initial system representation and supporting continuous system improvement [9].

Therefore, this study aims to design and implement a web-based logistics administration information system using the prototype method at PT PLN (Persero) UPT Bengkulu. The proposed system is expected to improve the effectiveness, accuracy, and transparency of logistics management processes for warehouse personnel and related stakeholders.

II. RESEARCH METHOD

This study uses the prototype method as a system development method. The prototype method is a software development approach that is carried out by making an initial design of the system to obtain feedback from the user before the system is fully developed [10]. This method was chosen because it is able to adjust the needs of users more flexibly through a process of evaluation and repeated improvement [11], [12].

The research stage using the prototype method consists of several steps as follows:

1. Collection of Needs

   The initial stage is carried out by identifying the needs of the system through observation and interviews. Observations were made directly on the logistics administration process at PT PLN (Persero) UIP3B Sumatra UPT Bengkulu. Interviews were conducted with related parties, especially warehouse admins and material users, to find out the obstacles and system needs.

2. System Planning, Based on the results of the needs analysis, the system design was carried out using Unified Modeling Language (UML) modeling, including the Use Case Diagram and the Entity Relationship Diagram (ERD). This stage aims to describe the process flow,

relationships between entities, as well as key features of the system [13].

3. Prototyping, After the system design is completed, a web-based prototype is created that displays the main functions of the system, such as material data management, borrowing transactions, transaction history, and damage reports.
4. Prototype Evaluation, The prototype that has been created is then evaluated by the user. Feedback from users is used as a basis for improvements so that the system is in accordance with operational needs.
5. System Enhancements, The final stage is to improve the system based on the results of the evaluation until a system that meets the needs of users is obtained.

The data collection technique in this study was carried out through observation and interview methods. Observation was carried out by directly observing the logistics administration process running at PT PLN (Persero) UIP3B Sumatra UPT Bengkulu to understand the workflow and problems that occurred. In addition, interviews were conducted with related parties, especially the construction and distribution team, to obtain information about system needs and obstacles faced in the process of requesting, borrowing, and managing materials. Through these two methods, data was obtained that was used as a basis for designing a logistics administration information system.

III. Result And Discussions

A. System Planning

The system design was carried out based on the results of observations and interviews on the ongoing logistics administration process at PT PLN (Persero) UIP3B Sumatra UPT Bengkulu. The system is designed to overcome manual recording [illegible] fficulties in obtaining r

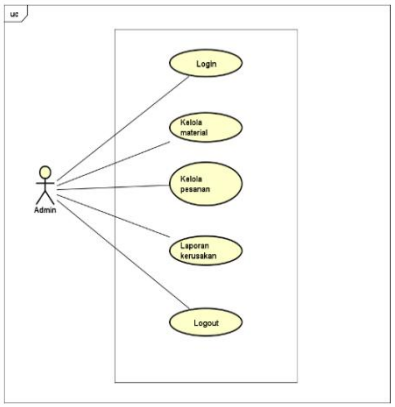


Fig. 1. Use Case Diagram

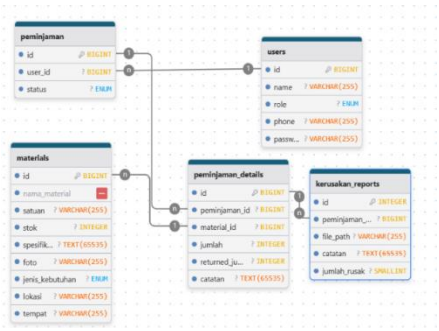


Fig. 2. Entity Relationship Diagram

Figure 1 shows the Use Case Diagram of the web-based Logistics Administration Information System. This diagram illustrates the interaction between the main actors, i.e., admins and systems. Admins have access rights to log in to the system, manage material data, manage loan transactions or request goods, view transaction history, make material damage reports, and log out. The Use Case Diagram shows that the entire logistics administration process is centralized in one integrated system, making it easier for users to manage logistics data and activities more effectively.

Figure 2 shows the Entity Relationship Diagram (ERD), which illustrates the database structure in the logistics administration information system. The ERD consists of several main entities, namely users, materials, lending, peminjaman_details, and kerusakan_reports. The users table is used to store system user data, materials stores material or goods data, borrowers store borrowing transaction data, peminjaman_details store details of goods on each transaction, while kerusakan_reports are used to store material damage reports. The relationships between the tables show that a single user can make multiple loan transactions, a single transaction can have multiple item details, and each transaction detail can have a breakdown report. The database structure allows logistics data management to be carried out in an integrated, systematic, and easily traceable manner.

B. System Interface Implementation

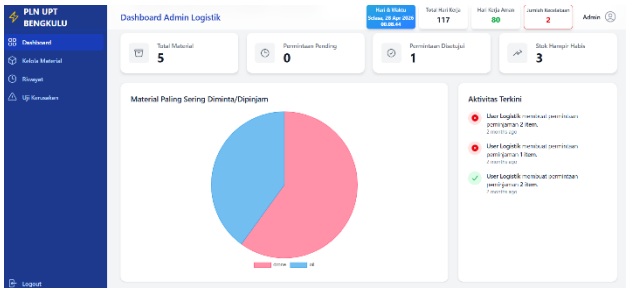


Fig. 3. Dashboard View

Figure 3 shows the main dashboard view of the logistics administration information system. Dashboards are designed to provide a quick and real-time summary of important information that admins need. The information displayed includes the total material, the number of pending requests, the number of approved requests, and the stock of materials that are almost depleted.

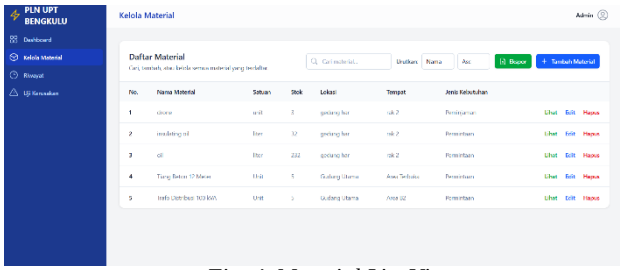


Fig. 4. Material List View

The material management page is used to view and manage the material data available in the warehouse. Admins can add, change, or delete material data. The information

displayed includes the name of the item, the amount of stock, the storage location, and the condition of the item.

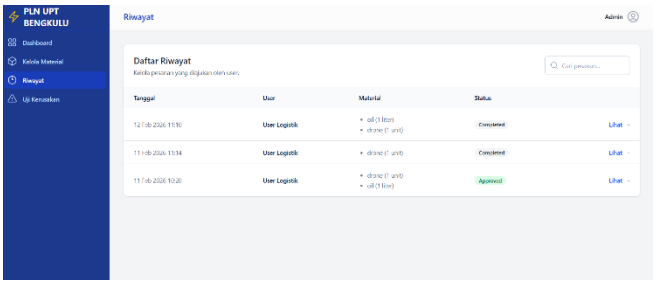


Fig. 5. History List View

The transaction history page is used to see all the borrowing activity or material requests that have been made. This feature makes it easier for admins to search for previous transaction data and monitor material usage.

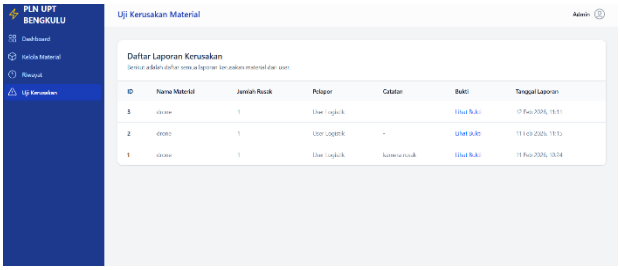


Fig. 6. Damage Report List View

Figure 5 shows the display of the damage list page used to display the material damage report. Through this feature, companies can find out the condition of damaged goods and immediately follow up in the form of repairs or replacements.

C. System Benefits Analysis

Based on the results of the design and implementation of the system, several potential benefits were obtained in the logistics administration process at PT PLN (Persero) UIP3B Sumatra UPT Bengkulu. The system is designed to help with the process of recording materials, loan transactions, and reporting damages digitally so that the administrative process becomes more structured.

In addition, the system can provide easy access to information because stock data and transaction history are available in one integrated platform [14]. The system also helps minimize the risk of recording errors, such as data loss, duplicate data, and stock mismatches.

IV. CONCLUSION

This study addressed the problems of manual logistics administration at PT PLN (Persero) UPT Bengkulu, which caused service delays, difficulties in retrieving material information, and potential data recording errors. To overcome these issues, a web-based logistics administration information system was developed to manage material data, borrowing activities, and damage reports in an integrated manner.

The results indicate that the application developed using the prototype method can support a more structured administrative process, facilitate data retrieval, and provide real-time information access. The proposed application is expected to improve operational efficiency, data accuracy, and decision-making processes within logistics activities.

Despite these advantages, the application still has several limitations, including the absence of automatic notification features and limited integration with other platforms. Future studies may focus on enhancing notification features, strengthening data security, and expanding integration capabilities to improve overall performance and usability [15].

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