

Web-Based Field Work Report Information System at ULP PLN Helvetia

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ABSTRACT

Every fieldwork activity report made by the employees of ULP PLN Helvetia is still fairly ineffective because it does not have a good information system. Employees solely generate reports by completing forms provided by their superiors. The impact of this problem lies in the lack of neatness in the data and fieldwork activity reports generated by employees, which naturally leads to ineffective and unstructured work activity reports for the company. To address this issue, we are developing a web-based system for fieldwork activity report information, which simplifies the process for employees and superiors to access neat and structured report data. The implementation of this system has a significant impact on improving efficiency, accuracy, and transparency in managing fieldwork activity reports. The process of recording and managing data becomes faster, more organized, and reduces errors. This study's findings suggest that a web-based system for fieldwork activity report information can streamline data collection for both employees and supervisors. It facilitates the creation of well-structured reports, complete with fieldwork evidence photos, employee work activity entries, and supervisor approval. The system also allows for PDF printing of the report results.

Keywords: Information System, Web Application, Fieldwork Report, Fieldwork Management

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1. INTRODUCTION

Nowadays, information flows around the world very quickly. Information is spread through various media and in multiple forms. Generally, the information form can be image, sound, or video. The Internet is a tool for rapid information dissemination. The information is transmitted through a portal called a website. A website portal can be accessed anytime, anywhere via the internet (Rostiani et al., 2021). PLN Helvetia's Customer Service Unit (ULP), as part of PLN that focuses on direct services to customers, has a great responsibility in ensuring the smooth distribution of electricity, customer service, and recording and reporting of daily operational activities. One of the main challenges faced is the management of fieldwork activity reports that are still done manually or using less integrated methods. The information system should be able to provide information about employees' work activities, and the sequence of their work activities so that employees can fill in their work reports. It

would be better if the information system could export work activity data into a field work activity report format (Yulianto & Firdaus, 2021).

The development of information technology is currently progressing very rapidly. This technological advancement has made many organizations and educational institutions use computer-based technology to improve the quality of their information systems. Its use is not only as an automation process for information access, but also creates accuracy, speed, and completeness of an integrated system so that the processes that occur will be efficient and effective (Rahmawati & Eryando, 2021). The web-based fieldwork activity report information system comes as a solution to overcome these problems. This system is designed to provide convenience in recording, managing, and reporting fieldwork activities in real time (Fitria Dewi Rahmawati, 2019). By utilizing web technology, this system can be easily accessed by all parties involved, both from the fieldwork team and the management of ULP PLN Helvetia.

Through the implementation of this system, it is expected to create efficiency in the work process, time savings, increased data accuracy, and ease in monitoring and evaluating operational activities. The web-based approach also allows for centralized data integration, thus supporting better and data-driven decision-making (Febriani et al., 2022). Practical work (KP) is a direct activity in the workplace with partners such as industry, government or private agencies, community groups, business entities, or other organizations. This activity aims to help students understand and master skills that are in accordance with their field of study. Through KP, students are expected to recognize the real world situation and contribute to solving problems in the institution where they do KP (Yulian, 2022).

2. LITERATURE REVIEW

Web-based information systems are one of the effective solutions in managing data and information in various sectors. This system allows real-time data management with flexible access via the internet. This provides advantages such as time efficiency, ease of access, and better data integration compared to traditional desktop-based systems (Sitanggang, 2019). In the context of reporting fieldwork activities, manual report management often faces obstacles such as data loss, delays, and low recording accuracy (Trisnadoli, 2021). This manual process also makes it difficult to monitor activities directly, which can hinder performance evaluation and quick decision-making. Therefore, web-based information systems can be the right solution to overcome these problems.

The development of web-based information systems often utilizes modern technologies such as Laravel or CodeIgniter frameworks for the backend, and frontend technologies such as HTML5, CSS, and JavaScript. According to (Suryadi, 2020), the use of these frameworks enables faster and safer system development, and supports various features such as efficient data management and responsive interfaces. This responsiveness is important so that the system can be accessed through various devices, including smartphones, which are the main needs for users in the field.

The implementation of information systems in organizations has also been proven to have a significant positive impact. (Kristania & Yulianti, 2019) show that web-based systems can increase transparency, efficiency, and data accuracy in company operations. This system also allows real-time monitoring and evaluation of performance, making it easier to make data-based decisions.

Several relevant case studies support the successful implementation of web-based information systems. (Putri et al., 2022) showed that the implementation of a similar system in field project management was able to increase efficiency by 30%. This success was achieved through centralized data integration, automation of the reporting process, and ease of access for all users.

In the context of ULP PLN Helvetia, challenges in managing field work reports can be overcome by implementing a web-based system. This system is expected to provide solutions to improve accuracy, efficiency, and transparency in report management, as well as support the mobility of field workers (Ardiyansyah, 2019). Based on the existing literature, the application of this technology is very relevant and is expected to have a positive impact in supporting the operational performance of ULP PLN Helvetia.

The implementation of web-based information systems in various studies has shown significant results in increasing organizational productivity. (Anggoro & Hidayat, 2020) explain that the advantage of this system lies in its ability to integrate data from various sources centrally. With extensive accessibility features, web-based systems allow users in the field to record and update data directly, reducing the risk of information loss or delay. This is especially important for operational sectors such as ULP PLN, which require fast and accurate data flow to support decision making.

In a study conducted by (Wulan Riyadi, 2020), manual processes previously used for fieldwork reporting often lead to inefficiencies due to unstructured data collection. With a web-based system, data can be managed automatically using digital form features and relational databases. These features allow for more systematic data collection and more secure storage. This advantage provides added value for organizations with dense operational activities such as PLN.

(Santoso, 2021) highlights the importance of using modern frameworks such as Laravel in the development of web-based information systems. Laravel not only provides an organized structure for application development but also supports the implementation of security features such as data encryption and user authentication management. This makes Laravel an ideal choice for building reliable and dependable systems, especially for organizational needs that deal with sensitive data such as field work reports.

The success of web-based systems is also inseparable from their ability to facilitate communication and collaboration between teams. According to (Azirah, 2020), features such as interactive dashboards and real-time reports allow management to monitor activities directly without having to wait for physical reports from field teams. This speeds up the evaluation process and helps organizations identify and resolve operational issues faster.

(Alfonsius et al., 2023) study is a clear example of the successful implementation of web-based systems in fieldwork management. The study showed that the integration of this technology was able to reduce recording errors by 25% and increase customer satisfaction through faster and more transparent services. This success can be used as a foundation for implementing a similar system in ULP PLN Helvetia. With the support of modern technology and features, web-based information systems can be an effective tool to improve operational efficiency and organizational competitiveness.

3. METHODS

The research method used in developing a web-based field work activity report information system at ULP PLN Helvetia focuses on a software engineering approach. This approach includes the stages of needs analysis, system design, implementation, testing, and evaluation. This method is designed to ensure that the resulting system can meet user needs and run effectively in accordance with predetermined goals (Bahrudin & Izmi Badruzzaman, 2021).

The needs analysis stage begins with identifying problems in the current fieldwork activity reporting process. Data collection is done through interviews, observations, and document studies to

understand the workflow and specific needs of users. This analysis aims to formulate system specifications that are able to overcome obstacles, such as inefficiencies, delays, and potential data loss.

In the design stage, the system is designed using appropriate models, such as the Unified Modeling Language (UML) to describe the process flow. This design includes aspects of the user interface, database structure, and system logic that supports recording, managing, and reporting data in real-time. The technologies used include the Laravel framework for the backend and Bootstrap for the user interface to make the system responsive on various devices (Apriani et al., 2022). The results of implementation and testing are evaluated to ensure the system meets the operational needs of ULP PLN Helvetia. By using this method, the web-based field work activity report information system is expected to increase efficiency, accuracy, and transparency in report management, while providing easy access and monitoring for management and field teams (Puspitasari et al., 2021).

3.1. Research Stages

The waterfall method is a sequential process, cascading downward (like a waterfall) through the phases of planning, modeling, implementation, and testing (Rostiani et al., 2021).

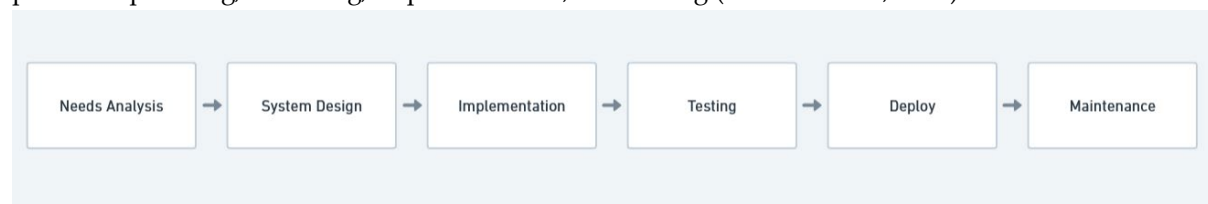


Figure 1. Stages of the Waterfall Method

1. Needs Analysis: Identify user requirements, such as login, report filling, data storage, and PDF report generation. The result is a system requirement specification document.
2. System Design: Design the user interface, database, and system architecture. Prototype the dashboard design, work report form, and PDF report format.
3. Implementation: Build the system based on the design that has been created. Use technologies such as HTML, CSS, JavaScript for the front-end and PHP or Python for the back-end. Integrate the system with a database (for example, MySQL).
4. Testing: Test the functionality of each feature such as login, data entry, and PDF reports. Perform performance and security testing.
5. Deploy: Install the system on a web server. Ensure that the system runs smoothly in a production environment.
6. Maintenance: Fix any bugs or issues found after the system is implemented. Add additional features as needed in the future.

3.2. Data Collection

Data collection in the development of a web-based field work activity report information system at ULP PLN Helvetia is carried out to comprehensively understand system requirements and ensure the system is built according to user needs. Data is collected through the following methods:

1. Interview: Interviews were conducted with relevant parties at ULP PLN Helvetia, such as operational managers, administrative staff, and field work teams. The purpose of the interview was to explore information about the current reporting workflow, the obstacles faced, and the expected system needs.

2. Direct observation: is conducted to understand the actual fieldwork and reporting process. This activity involves direct monitoring of the field work team while carrying out tasks and the process of recording reports in the office.
3. Document study: it was conducted by reviewing related documents, such as previous fieldwork reports, manual report formats, and standard operating procedures (SOPs). This document analysis helps understand the data structure needed in the system, as well as determine the report format that will be applied in the information system.
4. Questionnaire: The questionnaire was given to potential users of the system, including the field team and administrative staff. The purpose of the questionnaire was to collect quantitative data on user needs, level of satisfaction with current reporting methods, and expectations of the new system.

4. RESULTS AND DISCUSSION

4.1. Needs Analysis

Requirements analysis is an initial stage that aims to identify the functional and non-functional requirements of a web-based field work activity report information system at ULP PLN Helvetia. This stage is carried out to ensure that the system built is able to overcome existing problems and support operations optimally. Functional requirements include the main features of the system, such as real-time recording of field work reports, structured report data management, automatic report generation, and system accessibility by field users and management. The system should also provide data search, notification, and report status tracking features.

4.2. System Design

System design is a stage that refers to planning the structure and workflow of a web-based field work activity report information system at ULP PLN Helvetia. This design includes the creation of Use Case Diagrams and Activity Diagrams that describe the interaction between users and the system, as well as the flow of processes that occur in the system.

1. Use Case Diagram

Use Case Diagrams depict the interaction between actors (users) and the system. In this context, the main actors include "Field Team," "Administrative Staff," and "Management." Field teams can enter activity reports, check report status, and update report data. Administrative staff have access to verify, save, and manage submitted reports. Management can monitor report status, generate summary reports, and access historical data for analysis. This Use Case Diagram helps understand the main functionality of the system and the relationship between users.

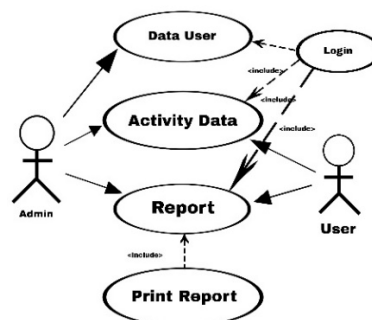


Figure 2. Use Case Diagram

2. Activity Diagram

Activity Diagrams illustrate the workflow or steps taken in a process. For example, for the process "Recording Field Work Reports," it starts with the field team filling out the report form, then the system validates the data entered. Once the data is verified, the report is submitted to the administrative staff for approval and saving. Management can then access the report to monitor progress and perform analysis.

This Activity Diagram provides a clear picture of how the process flow is carried out in the system, making it easier to identify potential improvements or automations in the workflow.

1. **Login:** The process begins with the user (either field team, administrative staff, or management) logging into the system. The user enters a username and password. The system verifies the credentials entered. If the login is successful, the user can proceed to the next step. If the login fails, the user will be prompted to try again.
2. **User Data Input:** After a successful login, the user will enter personal data or user data related to the activities carried out. For example, field teams enter information such as name, user ID, or work location. This data is stored in the system for further reference.
3. **Activity Data Input:** Next, field teams or administrative staff enter data on activities that have been carried out, such as implementation time, type of work, work results, and problems encountered. This process ensures that all information related to field activities is properly recorded and ready for further processing. This data is then stored in the system database.
4. **Testing:** After the activity data is entered, the system performs a testing or validation process to ensure that the data entered is in accordance with the correct format and there are no errors. If the data is valid, the process continues to the next step. If the data is invalid, the user will be asked to correct the incorrect data.
5. **Report:** After successful testing, the system will generate a report based on the data that has been entered. This report can be a summary of the activities that have been carried out, analysis, and evaluation that are useful for management and administrative staff. This report is prepared in a format that is easy to understand and in accordance with the specified standards.
6. **Print Report:** The reports that have been generated can then be printed by users who have access rights, such as management or administrative staff. This report can be used for documentation, further analysis, or to be delivered to parties in need.

4.3. Home Page Display

The image depicts a login interface for the ULP PLN Helvetia Reporting System, designed to facilitate the submission of fieldwork activity reports. It features a logo, a title, a brief system description, input fields for a username and password, and a login button labeled "MULAI AJUKAN LAPORAN" (Start Submitting Report). The clean, blue-themed design emphasizes usability and professionalism, tailored for field personnel of PLN Helvetia.



Figure 3. App Start View

4.4. Login Page Display

The image shows a login interface for the ULP PLN Helvetia Reporting System, featuring fields for entering a username and password. It includes a logo at the top, the system name, a brief description, and a login button labeled "MASUK". The clean design and blue background emphasize simplicity and user-friendliness, ensuring easy access for authorized users.



Figure 4. Login View

4.5. Admin Dashboard Page Display

This is the admin dashboard shows the user interface of a report management system for ULP PLN Helvetia, where the administrator can monitor and manage fieldwork reports. The dashboard displays the status of reports in four categories: "Pending Reports," "Responded Reports," "Completed Reports," and "Report Data." Currently, the system shows no pending or responded reports, one completed report, and one report data. The interface allows the administrator to navigate through different sections, including Dashboard, Master Data, Reports, Telegram, and User Management.

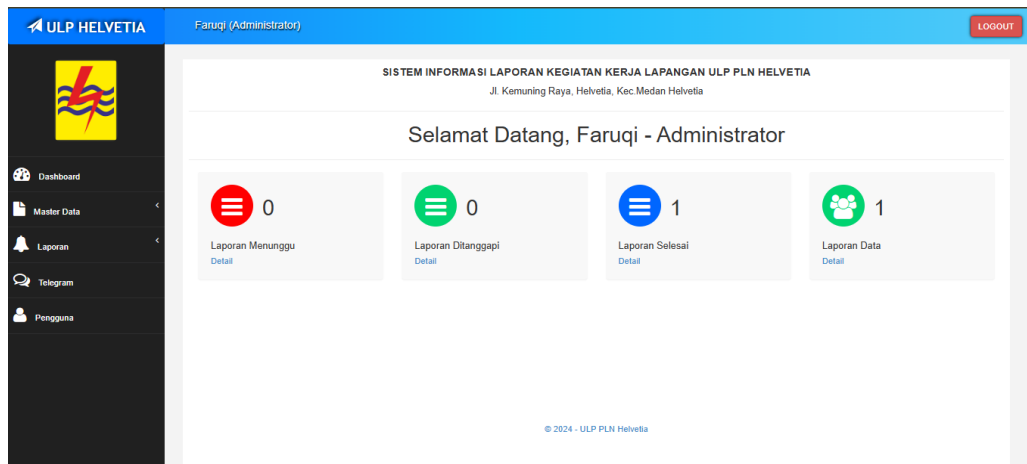


Figure 5. Dashboard View

4.6. Add Report Page as User

This form appears to be for reporting work activities in the field for the ULP PLN Helvetia branch. This form is designed for reporting work activities in the field, allowing the user to provide information about the employee performing the work, the unit involved, potential hazards, the location, and a description of the activity. It also allows for uploading a photo.

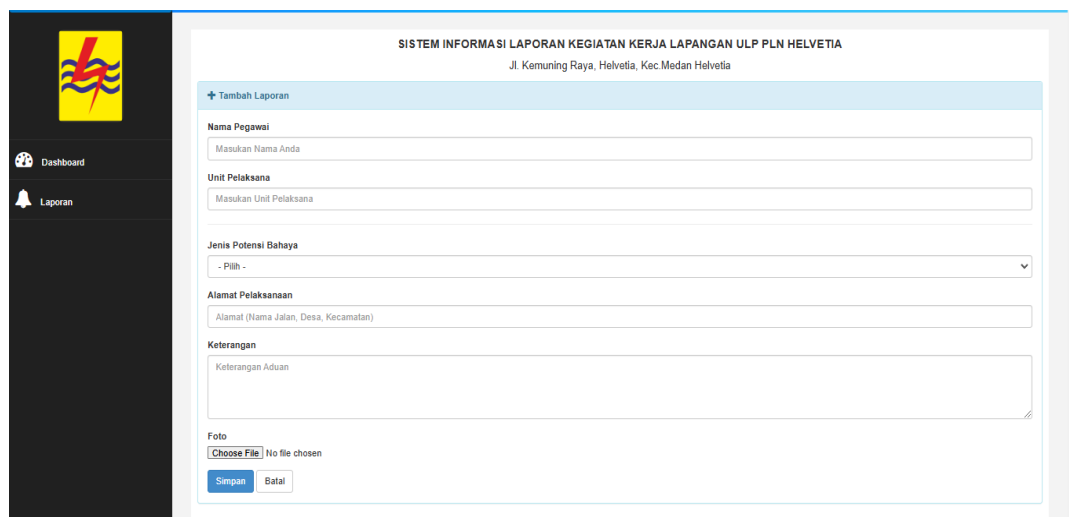


Figure 6. User Report Page

4.7. Page Provides Report Responses

The page responds to reports that are only made by the admin, where the admin gives approval to the report that has been entered by the user and the admin will provide information. To respond to this report, there are only 2 statuses entered by the admin, namely completed and responded to

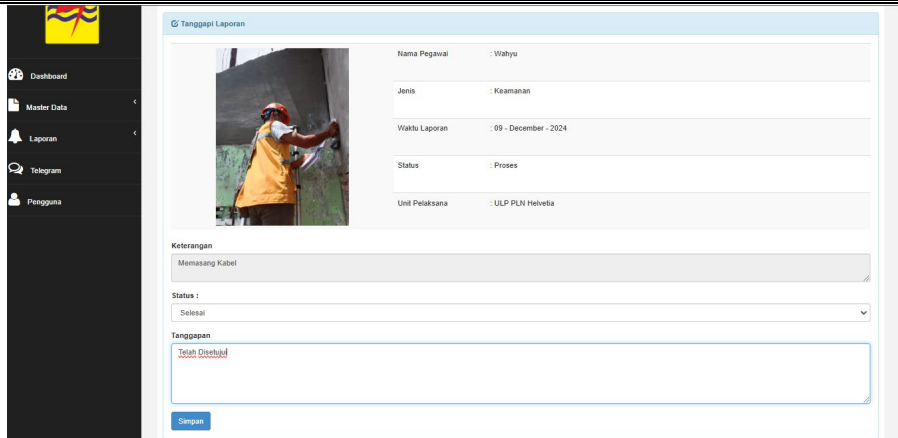


Figure 7. Respond to Reports

4.8. Display of Reports by User

This page displays a dashboard for an administrator of a system likely used to track work activities or reports. The information presented on the dashboard suggests it is a platform used for managing work activities and reports.

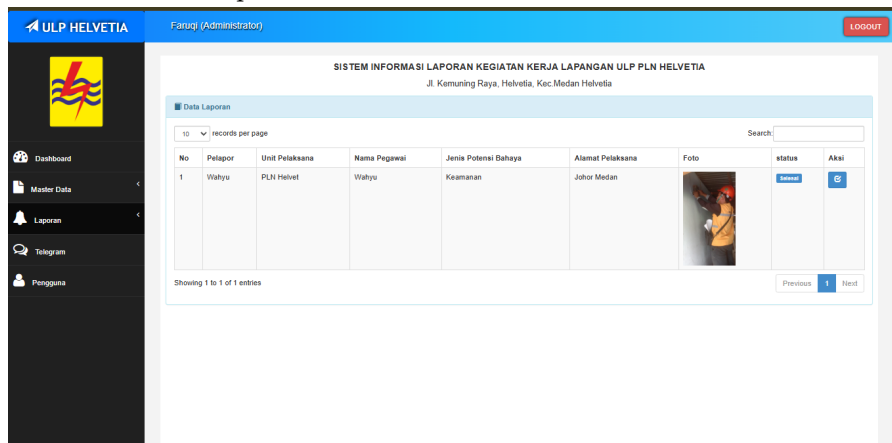


Figure 8. Data Report

4.9. Page Print the Report

This page is a page for printing report results that have been approved by the admin which displays all the report data that has been entered as well as the status of the approved report. This page only appears when the admin has approved the report.

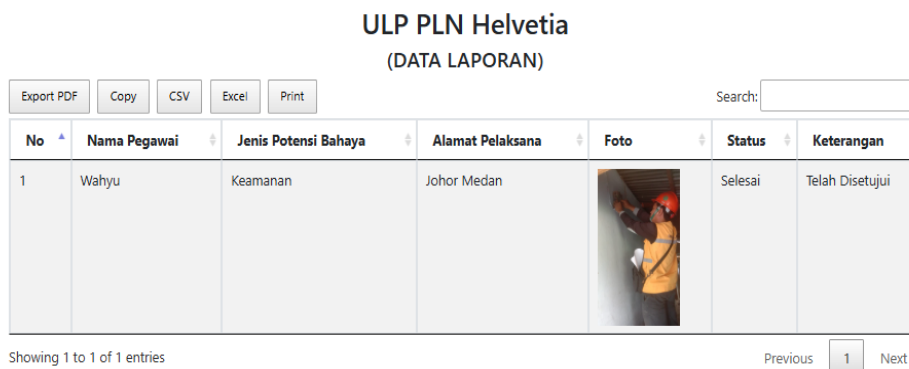


Figure 9. Printed Page

4.10. Testing Result

1. Functional testing

Functional testing was conducted to ensure that each feature works according to the specified requirements. The detailed testing results are as follows:

Table 1. Functional Testing

No.	Feature	Test Scenario	Expected Results	Testing Results	Conclusion
1	Login	User enters correct username and password	System successfully logs in and displays dashboard	Dashboard is displayed	Passed
2	Login	User enters incorrect username or password	System displays an error message	"Username or password is incorrect"	Passed
3	Input Report Data	User fills out the report form with valid data	Data is saved to the database and shown in the table	Data successfully saved	Passed
4	Input Report Data	User submits an empty report form	System displays a warning "Fields are required"	Validation works correctly	Passed
5	Report Verification	Admin verifies submitted reports	Report status changes to "Verified"	Status updates successfully	Passed
6	Generate PDF Report	User generates a PDF for a specific report	PDF file is generated with complete data	PDF generated successfully	Passed
7	Dashboard Monitoring	Admin views report statuses (Pending, Completed)	Reports are displayed according to categories	Data appears correctly	Passed
8	Upload Image	User uploads an image in the report form	Image is saved to the database	Image uploaded successfully	Passed
9	Report Status Notifications	Admin changes the report status	Status notification is sent to the user	Notification delivered	Passed

2. Performance Testing

Performance testing was conducted to evaluate the system's efficiency under specific conditions, such as multiple active users and large data loads.

Table 2. Performance Testing

Parameters	Testing Method	Expected Result	Test Result	Status
Response Time	Input 100 report entries	Response time ≤ 2 seconds	Average response time: 1.2 seconds	Passed

Parameters	Testing Method	Expected Result	Test Result	Status
User Load	20 simultaneous users	System remains stable	System stable without errors	Passed
Data Load	1,000 reports in the database	Reports can be accessed without delay	Access time: 1.8 seconds	Passed

3. Security Testing

Security testing was conducted to ensure that the system is protected from external attacks and data manipulation risks.

Table 3. Security Testing

Test Scenario	Method	Expected Result	Test Result	Status
SQL Injection (SQLi) Validation	Input special characters in login form	System rejects malicious input	Input not executed	Passed
Brute Force Login Attempt	Attempt 10 failed login attempts	System blocks access after 5 failed tries	Access is blocked successfully	Passed
Malicious File Upload	Upload non-image files in the form	System rejects invalid file types	File upload denied	Passed

Based on the results of functional, performance, and security testing, the web-based field work report information system operates as expected and meets user requirements. All features were tested with a "Passed" result, with no significant errors or issues detected.

5. CONCLUSION

This research aims to solve problems in managing field work activity reports at ULP PLN Helvetia through the development of a web-based information system. The steps taken to solve the problem begin with a needs analysis to identify problems and formulate system requirements, both functional and non-functional. Next, the system design is carried out using Use Case Diagram and Activity Diagram to describe the process flow and interaction between users and the system. After that, the system is implemented using web-based technologies such as Laravel for the backend and Bootstrap for the interface, which ensures the system is responsive and easily accessible from various devices. This process is followed by testing using black-box testing to ensure the system runs according to specifications and meets user needs. The implementation of this system has a significant impact in improving efficiency, accuracy, and transparency in managing fieldwork activity reports. The process of recording and managing data becomes faster and well-organized, and minimizes errors. In addition, real-time data access from various devices allows management to monitor and analyze reports more easily, thus speeding up decision making.

The results of research and testing show that this information system successfully meets user needs and functions according to the initial design. Testing with the black-box testing method proves that all

features run well and according to specifications, such as login, activity data input, validation, creation, and printing of reports. The results of User Acceptance Testing also show that the system is well received by users because it provides convenience, speed, and accuracy in managing activity reports. Therefore, this web-based fieldwork activity report information system is an effective solution to replace the previously used manual process. This system not only improves the work efficiency of the field team and administration, but also supports management in obtaining accurate and timely reports for the evaluation and decision-making process.

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