Web-based E-Report Application Design For Reporting Gas Pipeline Sector In PT. Cipto Sarana Nusantara

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Abstract: E-Report application information system is a system that can help and facilitate users in making performance reports for a company. In this study, a web-based e-report system was developed and designed for digital reporting by field employees at PT Cipto Sarana Nusantara, which specifically operates in the gas pipeline installation sector. Previously, the company generated field workers' performance reports through a manual system, in the form of hard copies or sent through chat applications. This led to poorly organized reports received by the administrator. To overcome this problem, the author developed a web-based E-Report application that aims to facilitate field workers and administrators in sending and collecting reports. By using this system, it is expected that reporting performance is significantly improved in terms of speed, accuracy, and ease of reporting. In addition, the system makes it possible to generate daily, monthly, and annual reports more efficiently and effectively.

Keywords: E-Report; Web-based System; Reporting; Information System; PT. Cipto Sarana Nusantara;

INTRODUCTION

Organizations often face increasing task complexity and data capacity in the growing world of modern business. The existence of task complexity and increasing data capacity is a major obstacle. Manually handling and analyzing data in job reports can be complicated and time-consuming. To overcome this challenge, companies need an efficient and fast solution, which makes the implementation of a web-based e-reporting system very relevant. By adopting a web-based e-reporting system, companies can simplify this process through automation, structured data management, and more advanced analytical capabilities (J. Deo & A. Smith, 2023).

Web-based e-report systems allow companies to simplify the process of managing work reports through automation and structured data management. By implementing this technology, companies can manage and present information more efficiently, minimize the risk of human error, and improve data accuracy. Advanced analytics capabilities can also provide deeper insights to help management make better decisions.

Speed of response is becoming critical to business decisions. In the context of work report management, rapid response can improve operational efficiency and enable management to respond more effectively to changing situations. Web-based e-reporting systems can provide real-time access to the necessary data, speeding up the decision-making process (Laudon & Laudon, 2016).

Effective collaboration between teams is essential when creating and analyzing work reports. Web-based e-reporting systems provide easy access to all stakeholders, enabling better collaboration and rapid information exchange between different departments or teams (Shania Alya et al., 2023). In an increasingly mobile workforce, employees and managers often work from different locations. Web-based e-reporting systems ensure quick and easy access to data from different locations via the Internet, facilitating the productivity of distributed teams (O' Brien & Marakas, 2018).

Information security and regulatory compliance are top priorities when managing work reports. Web-based e-reporting systems must be designed with strong security features to protect sensitive data and ensure compliance with applicable regulations (Laudon & Laudon, 2016). Therefore, web-based e-reporting system technology is needed to simplify the job report management process for organizations.

At PT Cipto Sarana Nusantara the reporting process still uses a semi-manual system. Where field officers send performance reports in the field after completing tasks using the Whatsapp chat application. Then the Operator or admin collects these reports which then makes the report. Sometimes reports sent by officers are often not

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recapitulated properly due to chat reports that are illegible or overwritten. For this reason, it is necessary to create a web-based system that can facilitate reporting for field officers. Web-based E-Reporting System is one solution that can help field officers in the gas pipeline installation sector at PT Cipto Sarana Nusantara.

LITERATURE REVIEW

Information System

   The e-report information system is a technological framework that uses a web-based platform for the electronic management and documentation of work reports. This system includes data collection, centralized storage, and distribution of reports. It utilizes the latest information technology. According to Doe and Smith, by providing a responsive user interface and global accessibility, the e-report system accelerates the reporting process and supports the company's operational efficiency (J. Deo & A. Smith, 2023). Web-based e-report information system is an information system used to collect, process, store, and distribute student reports or grades electronically via the Internet. This system uses web or internet technology in the process of processing and distributing information (Maulana et al., n.d.).

PHP

   PHP (PHP: Hypertext Preprocessor) is an open-source scripting language designed specifically for developing web-based applications. PHP was first developed in 1994 by Rasmus Lerdorf. It has become one of the most popular web programming languages in the world. Developers can easily create dynamic and interactive web pages because the language can be inserted directly into HTML. PHP's main advantage is its ability to interact with databases, such as MySQL. This allows for the development of powerful and efficient web applications (Tatroe & MacIntyre, 2020).

   The use of PHP is also expanded through various frameworks such as Laravel, CodeIgniter, and Symfony. These frameworks provide a working structure to accelerate web application development. Performance improvements, new features, and security enhancements have been added in recent updates to PHP, most notably PHP 8. PHP has received some criticism regarding its performance and syntax style. However, it remains very popular among web developers (Sotnik et al., 2023).

MySQL

   MySQL is a popular open source relational database management system (RDBMS). MySQL provides an efficient way to store, manage, and access data in databases and was developed by Oracle Corporation. As an RDBMS, MySQL uses a structured table model to store data. This makes it suitable for web applications and many other business applications (Appigatla, 2018).

   Key features of MySQL include support for the Structured Query Language (SQL) language to manage and manipulate data, support for indexes to improve the performance of data searches, and the ability to manage transactions, which ensures the consistency of data within the database. MySQL also provides further flexibility in database design and management with support for replication, partitioning, and storage procedures. MySQL is a popular choice among developers and organizations due to the presence of an active community and support from Oracle (Mehta et al., 2018).

CRUD

   CRUD stands for a set of four basic operations that can be performed on data in a relational database management system (RDBMS) or other similar system. The four operations are often associated with basic application development processes and involve manipulating data at a fundamental level (Muqorobin et al., n.d.):
1. Create: An operation to add new data into the database.
2. Read: Operations to read or retrieve data from the database.
3. Update: Operations to change or update data that already exists in the database.
4. Delete: Operation to delete data from the database.

   CRUD is a fundamental aspect of application development, particularly in web applications that involve databases. Advanced frameworks and technologies, such as ORM (Object-Relational Mapping), offer built-in support to execute CRUD operations with utmost efficiency (Loli et al., 2020; Michail & Christos, 2022).

   When analyzing the input and output of the e-reporting system, including the input page and reporting the necessary outputs to the user, it is pivotal to ensure a seamless transport of data. In accordance with each administrator's level, each user's output will differ and meet their individual needs.

METHOD

   The aim of this study is to develop a web-based application for report generation that automates the work report management process and structured data management. The research process encompasses the following stages:

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1. Data Collection. The workers are currently collecting data on their manual work reports. The reports are submitted both in written form and through a reporting process to supervisors. The data is being collected at PT. Cipto Sarana Nusantara, located in Medan City, for further analysis.
2. Application Design. At this stage, we conduct system design using previously collected manual data. This data serves as a benchmark for digitizing the e-report application that we will develop during phase
3. Development. At this stage, the coding and programming process takes place according to the results of the previous system design stage.
4. Testing. Once the application development is completed, the subsequent step is testing. At the testing stage using Blackbox Testing to see if the system still has bugs/errors or not.
5. Implementation. The aim is to develop a bug-free system, encompassing programming and logic errors. In the 5th stage, the tested applications will be deployed in the field.
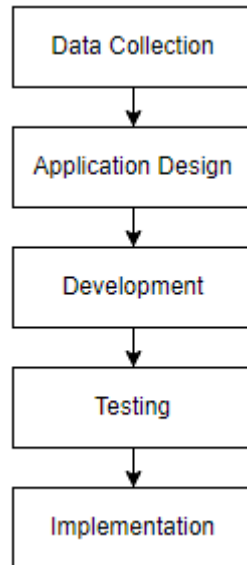
Fig 1. Diagram of Research Process Stages

For further details during the design phase, the application's Entity Relationship Diagram will be presented.
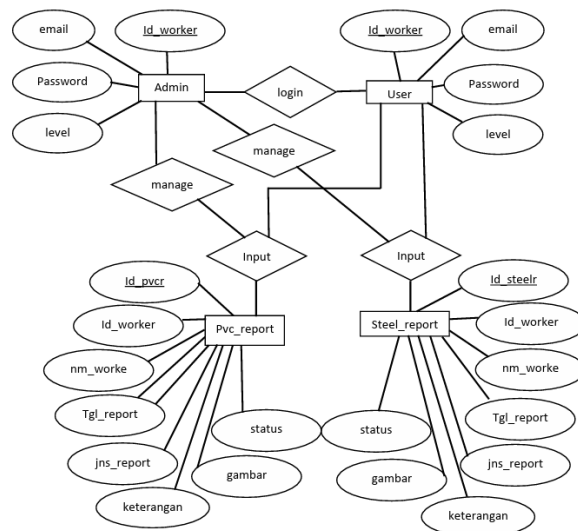
Fig. 2 Entity Relationship Diagram

Fig 1 presents the blueprint of the planned database for the e-report website, which comprises three tables: pvc report, steel report, and user. The user table features two levels: the user and admin. For a more comprehensive database design encompassing three tables, refer to Fig 2 below.

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Fig 2 Database Tables Design

RESULT

Based on the described design, the e-report information system generates display design results. Initially, one must log in to access the e-report.
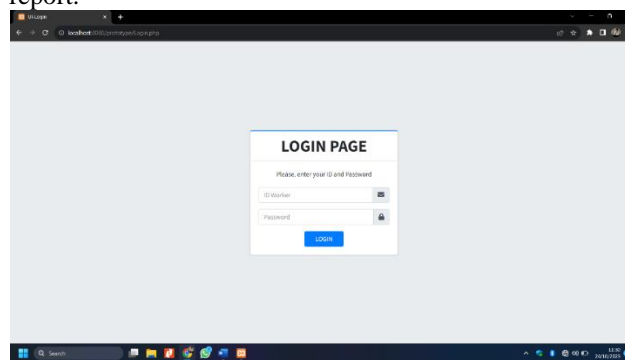

Fig 3 Login Page Aplication

Beforehand, the administrator assigns access permissions according to the needs. If logged in as an administrator, the user will be redirected to the admin page, and if logged in as a regular user, they will be directed to the user page. The login page displays the login form name, as well as the input fields for username and password, which need to be filled in to access the system.

Then, navigate to the homepage, where users are presented with two options: PVC PIPE REPORT for inputting data on PVC pipes and STEEL PIPE REPORT for inputting data on steel pipes. This can be seen in Fig 4.
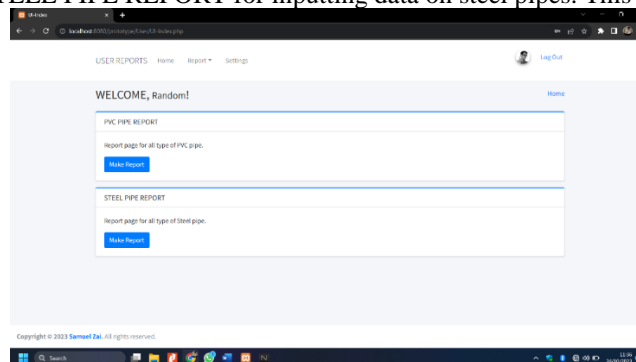

Fig 4 Home Page Aplication

If the user clicks on the Make Report button on the PVC PIPE REPORT page, they will be redirected to the PVC Pipe reporting form. On this page, officers can fill in the process of gas pipeline installation activities, any obstacles faced during the work process, and can upload proof of performance, or problems encountered. However, this section is only filled in during PVC pipe installation work.

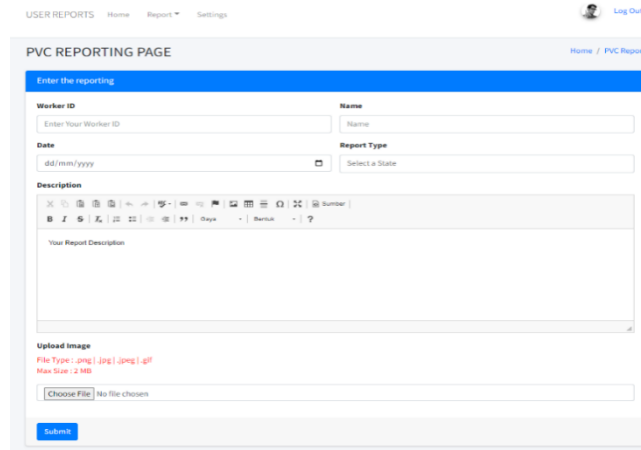*name of corresponding author

Fig 5 PVC Reporting Page

Clicking on the Make Report button in STEEL REPORTING will redirect to the STEEL pipe reporting form page. On this page, officers can fill in the process of gas pipeline installation activities, any obstacles faced during the work process, and can upload proof of performance, or problems encountered. However, this section is only filled in during steel pipe installation work.
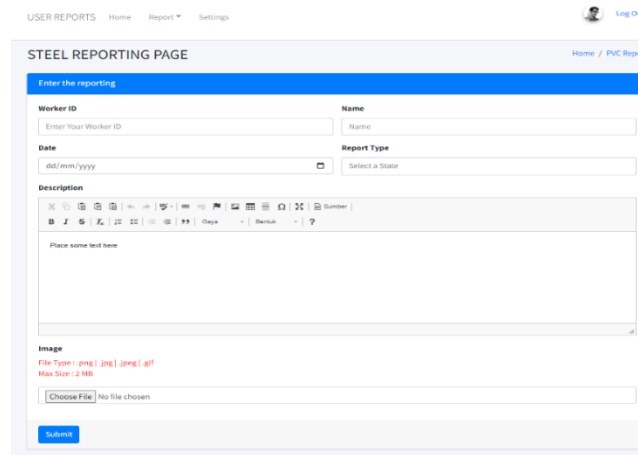
Fig 6 STEEL Reporting Page

Then, the report menu contains two submenu options: PVC Pipe Report and Steel Pipe Report, which display the history or collection of all user data reports related to the respective pipe types shown in Fig 7.
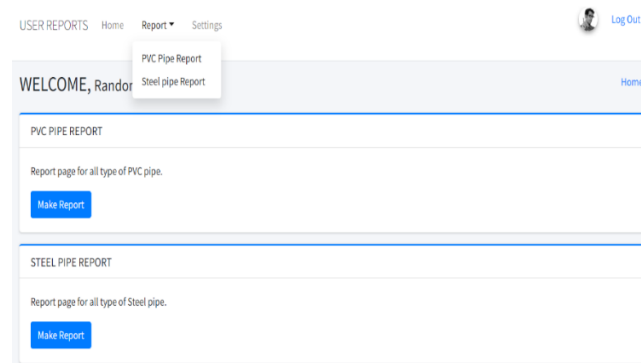

Fig 7 E-Report Sub Menu

On the PVC Pipe Report sub-menu within the Report page, there is data for user 111. Additionally, there is a View button in the Report Description column, which functions to display the report results.
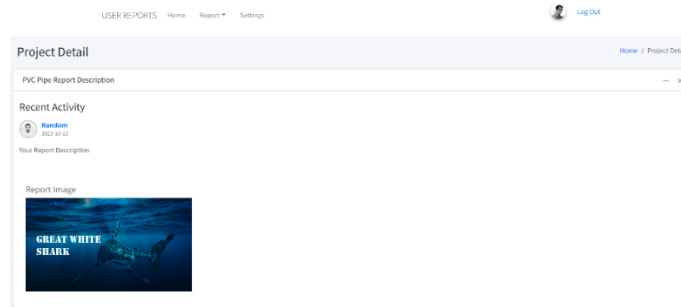
*name of corresponding author

Fig 8 Report Description Page

From Fig 8, the Report Description display includes the user's name, date, report description, and previously inputted image. The same Report Description function and display exist in the Steel Report. PVC Report and Steel Report.

When a user logs in as an administrator, they will be directed to the admin page with two menu options: PVC Report and Steel Report. In the menu, the administrator can update the status of the report to either completed or in progress. The admin page can be viewed in Fig 9.
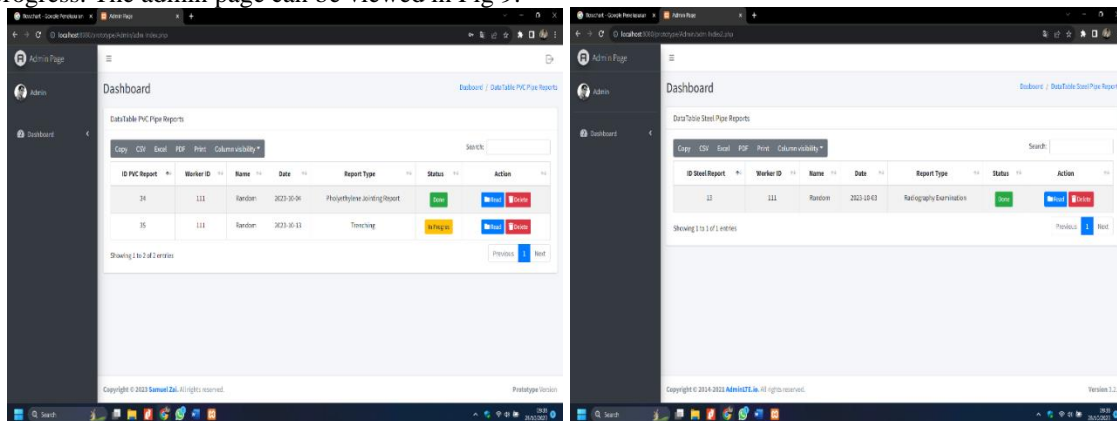

Fig 9 Admin Page

To view the contents of the report, the administrator, as a user, can click the Read button, and the page view is displayed in Fig 10.
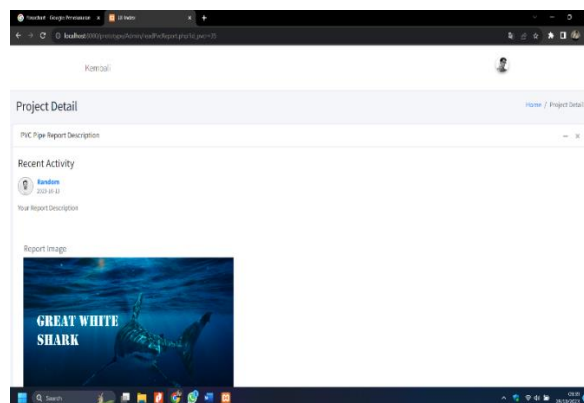

Fig 10 Project Detail Page

DISCUSSIONS

From the developed and user-tested e-report application by both developers and employees in the field division of PT Cipto Sarana Nusantara, it can be concluded that the e-report application is suitable for the implementation of project activity reporting. It greatly aids in the recording of performance reports for field employees at PT. Cipto Sarana Nusantara. Some obstacles faced include internet connectivity issues when accessing the application in regions with poor internet access. The number of field employees using the application is 20, while the number of administrators is 2. Performance reporting has increased to 93%, compared to the previous 75% using the manual reporting system. This improvement extends to reporting speed, reporting accuracy, and reporting ease.

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CONCLUSION

With the implementation of the e-reporting system based on the website, daily, monthly, and yearly reports that were previously prepared manually are now available on the website, which is responsive. Additionally, the website-based e-reporting system improves the reporting process for PVC and Steel as well as presenting data in a more organized manner. Overall, the e-reporting system enhances efficiency and effectiveness for users in PT. Cipto Sarana Nusantara.

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