

Support System of Quality Control for XYZ Company using PHP Laravel and React Native

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ABSTRACT

XYZ Company is a manufacturing company that makes diesel products. In the production process, there is a need for quality control so that the final product can meet the company's quality standards. The problem of the XYZ Company is the quality control process carried out by the company that still uses manual so that a lot of paper is wasted in the quality control process. The design and construction process carried out is using the waterfall method. The waterfall method consists of five steps is requirements, design, implementation, verification and maintenance. The framework for implementation process on the website is Laravel, and the CSS used is Tailwind CSS, and the framework for application is react native. The system that has been designed has succeeded in providing convenience in quality control.

ABSTRAK

Perusahaan XYZ adalah perusahaan manufaktur yang membuat produk diesel. Dalam proses produksi perlu adanya pengendalian kualitas agar produk akhir dapat memenuhi standar kualitas perusahaan. Permasalahan pada Perusahaan XYZ adalah proses pengendalian kualitas yang dilakukan oleh perusahaan tersebut masih menggunakan cara manual sehingga banyak kertas yang terbuang dalam proses pengendalian mutu tersebut. Proses perancangan dan konstruksi yang dilakukan menggunakan metode Waterfall. Metode air terjun terdiri dari lima langkah yaitu persyaratan, desain, implementasi, verifikasi dan pemeliharaan. Framework untuk proses implementasi pada website adalah Laravel, dan CSS yang digunakan adalah Tailwind CSS, dan framework untuk aplikasinya adalah react native. Sistem yang telah dirancang berhasil memberikan kemudahan dalam pengendalian kualitas.

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INTRODUCTION

In this modern digital era, information technology has changed the way companies operate and manage production. Especially companies involved in the production of physical materials or products (Cohen et al., 2019). Manufacturing is the process by which raw materials are converted into finished goods through a sequence of energy-intensive actions, each of which changes some

aspect of the material's physical or chemical properties. Manufacturing is the process of transforming raw materials into final products by utilizing a mixture of human labor, equipment and machines (Tita et al., 2024). In the manufacturing process there is a need for QC (Quality Control) to ensure the product complies with company standards and is suitable for consumer use (Ekonomi, 2021).

Quality control is a very important process to ensure that the product produced by the producer in a company that has made the finished product is tested so that the product is suitable for use (Of et al., 2024). Every time you carry out production, you must have initial raw materials to process them into a product (Sinar & Indah, 2024). All production that has been produced as a product must be quality controlled, so that the product is suitable for use by consumers or meets company quality standards (Çelik & Arslankaya, 2023). If quality control is not carried out there will be concerns that the product that has been produced does not completely done with company standards or has defects in the product that has been produced (Quality et al., 2023). Usually, sophisticated companies like XYZ company have sophisticated tools to carry out the manufacturing process.

The XYZ company was first developed by producing the first cooled diesel engine in Japan in 1937. This machine made the history of diesel engine development in the country of Sakura. For more than 80 years, XYZ has been producing world-class commercial vehicles and is number 1 in 34 countries. This all proves that Isuzu excels in innovation and is at the forefront of the 21st century automotive industry. Not only as a commercial vehicle manufacturer, XYZ is also known as the world's leading diesel engine manufacturer. Many companies around the world choose Isuzu diesel engines as their partners because they believe XYZ diesel engines are a combination of power, performance, and reliability. Consumers also recognize that XYZ diesel engine technology continues to improve its standards so that it becomes better in terms of noise levels and low pollution. This makes Isuzu a mainstay for consumers to develop their business.

Based on the interview results, XYZ company faced difficulties in the Quality Control (QC) process, the quality control process carried out still used paper or manually using materials that had been produced by the company. Due to the fact that they still use manuals up to now, the results that have been in quality control are often rejected by superiors because the production and checking processes are not appropriate, so it can take up a lot of paper forms if there are errors or are not appropriate in carrying out quality control records, therefore XYZ company needs a system support to carry out a digital quality control process. In the XYZ company work process, they receive orders from superiors, and carry out production, after that they carry out checks or quality control and send them to the company's superiors. In the design and construction process, the waterfall method is used for this system support. This waterfall method consists of five steps, there are requirements, design, implementation, verification, and maintenance (Aulia et al., 2024). The reason for using the waterfall method rather than a prototype is that when the waterfall work process will be carried out in accordance with the initial discussions and the work will also be more effective and efficient, if it is made with a prototype then in the middle of the work process there will be revisions at the request of the company so that the application creation process will be complete, the process will be longer than the waterfall method.

RESEARCH METHODS

The Waterfall method is an approach to software development that has sequential steps. This method is often used in software development that requires strong planning and documentation. The waterfall method has 5 stages, namely analysis, design, development, testing and maintenance (Aulia et al., 2024).

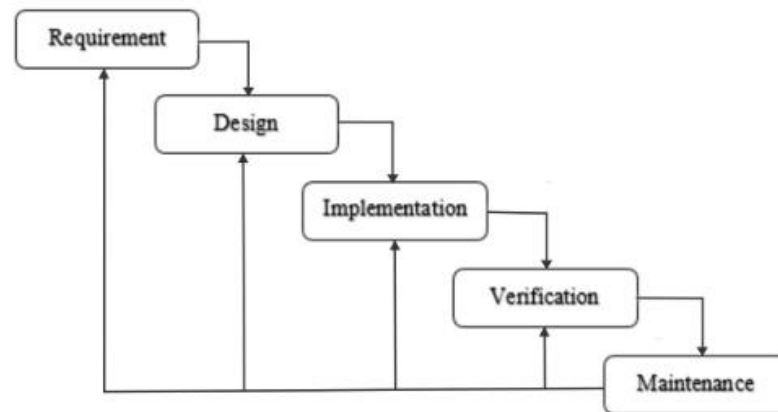


Figure 1. Waterfall model steps (Christanto & Singgalen, 2023)

The following is an explanation of the stages from Figure 1.

Steps 1 – Requirement

The first steps is requirement, where the development analyses with user to interview and understand business needs and requirements for the software to be built (Mahardika & Abdillah, 2024). Interview consist of the problem of the company, requirement of the development, and data form will be given by company to anylises the design for the output. The result of this stage is give the output of analyst requirement (Pothukuchi et al., 2023). In the case of needs it is necessary to carry out interview techniques to collect data and problems from the company. This interview can usually be carried out by meeting the research object onsite or online via zoom meetings and Google Meet.

Steps 2 – Design

The second steps after the requirements are collected from the interview with users, to carry out system design. This includes software architecture design, user interface design, as well as more detailed technical planning. Design is the stage to start a process before the development process (Kayande & Phadnis, 2024). Usually this will be done after conducting an interview with the user. A design process will be carried out according to the needs of the research object. This design process is to make it easier to build a company's support system. The design is intended to be understandable and easy for users to access (Engineering et al., 2023). Design is the stage to start a process before the development process. Usually this will be done after conducting an interview with the user. A design process will be carried out according to the needs of the research object. This design process is to make it easier to build a company's support system. The design is endeavored to be understandable and easy for users to access.

Steps 3 – Development

At this step, the process begins to develop software according to the design that has been created. This is the stage where the actual programming is done. In the development process, programmers will use a framework to build a support system for the company. in this development system support will use frameworks Laravel and react native (Dominikus et al., 2023). Implementation is the stage after carrying out the design process and getting approval. Implementation usually uses a method and framework to carry out the process of building the support system required by the company. At the implementation stage of this research, the waterfall method will be used.

Steps 4 – Testing

In the fourth stage there is verification. In this verification process, research needs to confirm to the user that the implementation process has been completed. Usually, you will set a schedule for the user acceptance test (UAT) process. After carrying out UAT, the research carried out is completed and feedback from the user is obtained (Santoso et al., 2023). In this testing process, research needs to confirm to the user that the implementation process has been completed. Usually, you will set a schedule for the user acceptance test (UAT) process. After carrying out UAT, the research carried out is completed and feedback from the user is obtained.

Steps 5 – Implementation

Once the software passes testing, it is ready to be implemented into a production environment or for use by end users. Before implementation user will demonstrate the system support by the development, and development will do User Acceptance Test (UAT) for the users. And users will be given user manual book to understand the system support that had made by the develop

Steps 6 – Maintenance

In the final steps, the final steps is maintenance. After receiving feedback from the UAT results, an improvement process will be carried out on the support system that has been created, so that the support system created is more optimal and can satisfy users who need the support system. After receiving feedback from the UAT results, an improvement process will be carried out on the support system that has been created, so that the support system created is more optimal and can satisfy users who need the support system.

RESULTS AND DISCUSSION

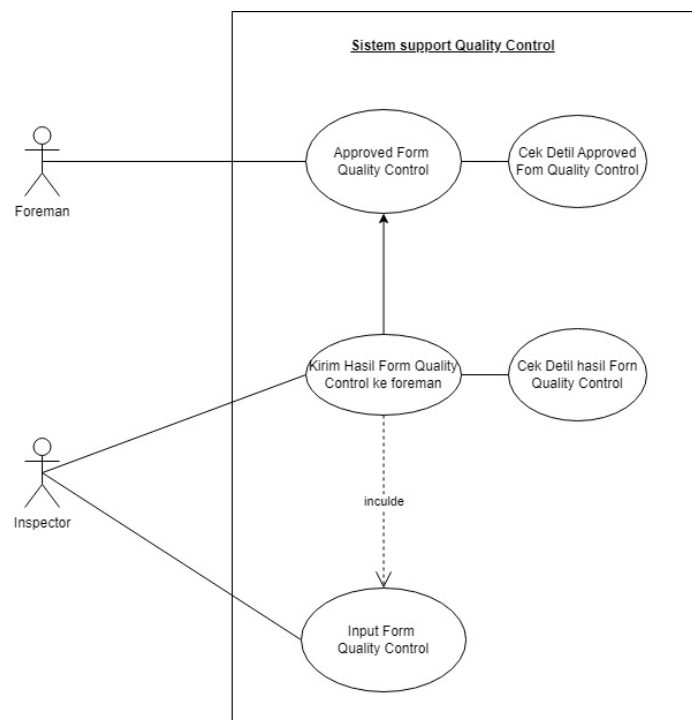


Figure 2. Usecase diagram

Steps 1 - Requirements of the waterfall model is requirement, the requirements process done by interview with the user of the company. Interview was conducted online by zoom

meeting. In the zoom meeting done by one participant quality control team from the company. The topic of interview is to find the problem, ask to find more information about company. From the result of the interview the company needs a system support for quality control team, their problem is their quality control team is done by manual so that many paper were wasted just because if they had wrong input for quality control. They need a digitalised for quality control team.

Steps 2 – Design In this second step, the design have seven diagrams, but in this system support will use the diagram two are usecase diagram, and activity diagram. Usecase diagram is a usecase that will show a user's or actors that will use the system.

Figure 2 is a use case diagram image that functions to display the flow of the foreman and inspector actors. The function of the foreman actor is to approve the quality control form that has been sent by the inspector. When the foreman has approved, he can check the details of the quality control approval form. The inspector actor enters the input data into the quality control form and sends the results to the foreman. The inspector can also see the results of the quality control form by checking the details of the quality control form results.

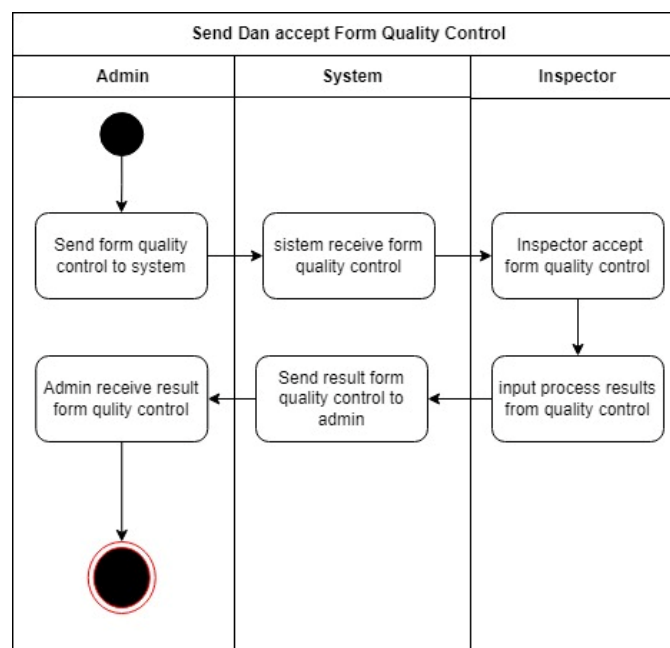


Figure 3. Form quality control

Figure 3 is an activity diagram regarding filling out the quality control form. Actors have two functions, namely admin and inspector. admin sends a quality control form from the results of creating a quality control form on the website to the inspector, the inspector gets a quality control form. The inspector carries out the process of inputting the results of the quality control form. After the inspector sends the results of the quality control form, the admin will receive the results of the quality control on the patrol results tab – need review.

Figure 4 is an activity diagram regarding sult patrol. The admin receives the quality control results from the inspector, the admin carries out the approval process for the patrol results - need review. After carrying out approval, the inspector will receive the approval results. And both admin and inspector actors will see the approval data in the patrol results tab - done.

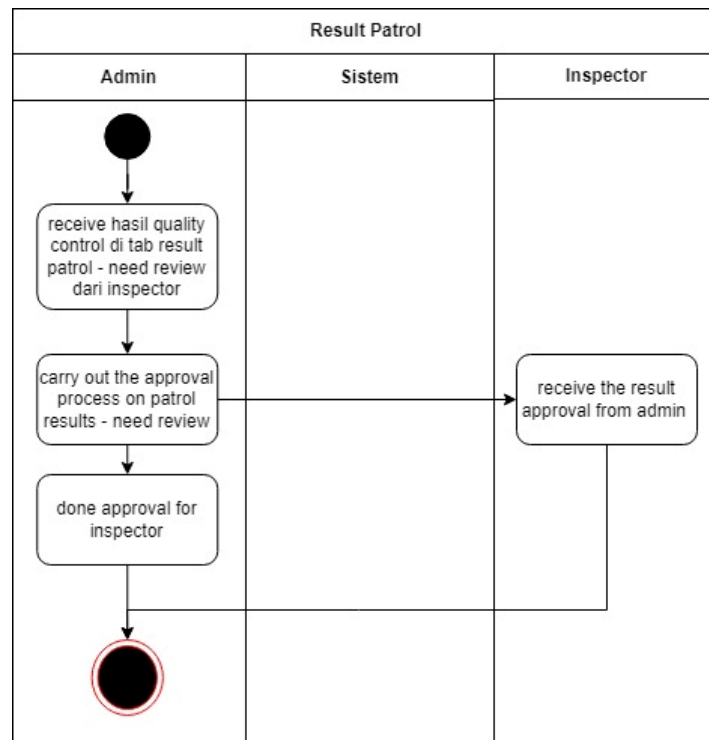


Figure 4. Result patrol

In the system support for XYZ Company will have website and application, website is use for admin. in XYZ Company admin is called foreman. If application is used to input quality control for foreman to approve the form quality control that have submit to the website. application users XYZ company team quality control is called inspector. Navigation menu on the website the here is a dashboard, patrol results, quality control form, six master data (checking frequency, measuring instrument, assembly line, pos type, pos, and model variant), and user consists of two roles, namely foreman and inspector. Foreman as admin, and inspector as quality control team. Figure 5 is a dashboard display that can be monitored by users.

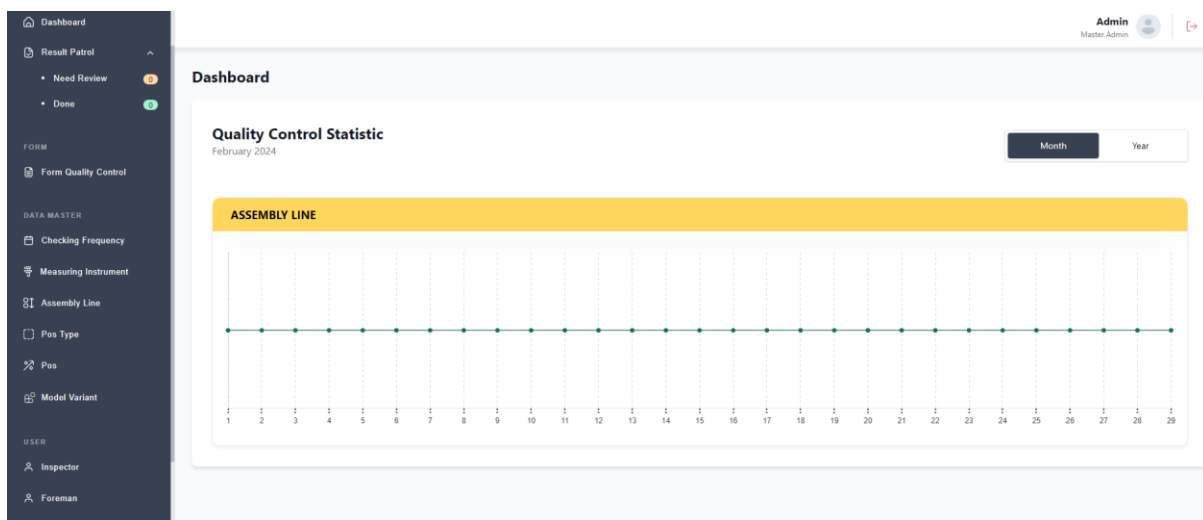


Figure 5. Dashboard admin

Figure 6 is the dashboard of this system. In the form quality control is use for the apps to input the result quality control by the quality control team as inspector, for the form quality control will made by admin as foreman. Form quality control is used to check the item check by the model

variant in the same category. Foreman must create master data, before create form quality control. Filter search is used to find the data that needed by category based on the tabel that has been made.

Figure 6. Form quality control admin

Based on the results of the user acceptance test (UAT) which was carried out wednesday, March 06 2024 with one of the quality control teams. The results are successful from all the features that the admin website has created. The following are the conclusions of the results of the UAT that have been carried out in table form:

Table 1. UAT result

Features	Test Cases	Feedback	Status
Login	Enter username and password	Can't log in on two devices	OK
Form Quality control	CRUD form quality control and item check	No duplication of form data	OK
Result patrol	Make an approval from tab result patrol – need review to result patrol - done	Good	OK
CRUD Master Data	CRUD six Master data	No duplication of form data	OK
CRUD User	User inspector and Foreman	Account user must be differences for foreman and inspector, foreman for admin, and inspector for application	OK

From the results conclusion of the User acceptance test (UAT) which was carried out on Wednesday, 06 March 2024, the Website was valid all features. The following consists of four main features, there are user login, result patrol, quality control form, and six crud master data. The user will create a Foreman account to log in to the admin website. The quality control form will be used to check the machine products that have been made. Result Patrol is used to view data that has been sent via application and approve the submission form from the application. Master data is used for the process of creating quality control forms because they have connected each other, if master data have not been created the form quality control cannot created too. The user will get two parts, namely foreman and inspector, foreman as admin, inspector as application. both cannot log in to each other.

CONCLUSION

The conclusion from this design is that it can be concluded that the website that was built is for the company PT XYZ, PT XYZ is a company that carries out machine processes to make

products. PT XYZ experienced problems namely carrying out the quality control process using manual so that the quality control process was not effective and efficient, so a website was built for PT XYZ. In the design and build process, an interview stage is carried out to question the company's problems and the website needs required by the company. The development method used is using Waterfall and the Laravel framework, and the programming languages used are Tailwind CSS and PHP Laravel. The system was designed based on the needs of PT Machine Isuzu Indonesia, the systems needed include dashboards, CRUD (Create, read, update and delete) master data, quality control forms, result patrol and reporting, these features were created based on the company's needs. From the results of the User Acceptance Test (UAT) it can be concluded that the support system for the PT Machine Isuzu Indonesia company is successful in all features. The main feature consists of four parts, namely login, patrol results, quality control form, master data, and user. The results of the display are easy for users to understand, so that users can understand the flow that has been created.

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