INFORMATION SYSTEM MANAGEMENT PREVENTIVE MAINTENANCE ON BUS AT PT BHINNEKA SANGKURIANG TRANSPORT

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ABSTRACT

PT. Bhinneka Sangkuriang Transport is a company in the field of land transportation services. The running of a company in the field of transportation service highly rely by how to prevent damage to the bus fleet. All this time maintenance system still corrective, where maintenance was done after the bus engine already damaged. This certainly would make a lot of breakdown frequency of the bus fleet that will be detain the operational activities. Not only that, the corrective maintenance procedures will cause a difficulty for the Chief of Workshop to schedule a preventive maintenance in order to prevent damage to the bus fleet. It certainly leads the difficulties to Operations Manager in monitoring maintenance activities, which is based on monitoring result it will be use as a recommendation either for additional or replacement of engine's oil for the bus fleet.

This preventive system of management information system refers to the Plan Do Check Act (PDCA) cycle, where it is a series of activities that consist of work planning, work execution, work monitoring and work repair which happen continuously. The analysis methods will be used in this system is a structured analysis method, where the tools are Data Flow Diagram (DFD), used to model the flow of data using Entity Relationship Diagram (ERD), to model the relationship among the data.

Based on the test results it can be concluded that this system can help the Operational Department, as for the Chief of Workshop to schedule maintenance activities and the Operational Manager to monitor the maintenance activities.

Keywords: *Breakdown*, *Preventive Maintenance*, PDCA, *Monitoring*

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1. INTRODUCTION

PT. Bhinneka Sangkuriang Transport is a company in the field of land transportation services. The running of a company in the field of transportation service highly rely by how to prevent damage to the bus fleet. All this time maintenance system still corrective, where maintenance was done after the bus engine already damaged. This certainly would make a lot of breakdown frequency of the bus fleet that will be detain the operational activities. Not only that, the corrective maintenance procedures will cause a difficulty for the Chief of Workshop to schedule a preventive maintenance in order to prevent damage to the bus fleet. It certainly leads the difficulties to Operations Manager in monitoring maintenance activities, which is based on monitoring result it will be use as a recommendation either for additional or replacement of engine's oil for the bus fleet.

1.1. Problem Statement

Based on the background that has been said it can be formulated problem posed is how to build the information system management preventive maintenance to support operational activities at PT. Bhinneka Sangkuriang Transport.

1.2. Purpose and Objectives

The purpose of this research build the information system management preventive maintenance at PT. Bhinneka Sangkuriang Transport. The objectives expected from the construcion of this system such as:

1. Help the Chief of Workshop to schedul preventive maintenance activities where the maintenance is done prior to the occurrence of the damage.
2. Help the Operational Manager to monitor preventive maintenance activities in order to prevent damage to the bus fleet.

1.3. Limitations

The problems studied very widely, we need a boundary problem for the application to be more focused and achieve the intended purpose. The extent of the problem in this application as follows:

1. The type of maintenance that is done is preventive maintenance where the treatment is done before the occurrence of the damage.
2. The scope of information system management preventive maintenance covering the Operational departement of the Chief Workshop of, Operational Manager and IT Operation and Support.
3. Data used is the maintenance of the buss fleet in January to June 2014 related to damage to the piston and piston rings
4. The data bus fleet used in information system management preventive maintenance is a data bus AKDP (Inter City in the Province), which amounted to 179 units and operates daily
5. Procedures preventive maintenance refers to the distance traveled by bus AKDP calculated using balances PP (return).
6. As for scheduling is applied in the form of additional preventive maintenance and oil changes in accordance with the procedures used by the company in the form of the addition and replacement of engine oil.
7. The system handles data management are in the operational department care data to the existing bus fleet, the data scheduling preventive maintenance , preventive maintenance monitoring data conducted by PT . Bhinneka Sangkuriang Transport.
8. The output of this system displays information such as schedule preventive maintenance , preventive maintenance monitoring activities against each bus AKDP that will ultimately serve as a reference for management in recommending solutions to the bus fleet in order to prevent damage (breakdown) .
9. Analysis model used in building this system uses a structured analysis that includes ERD (Entity Relationship Diagram) and DFD (Data Flow Diagram) .

1.4. Research Methods

The research methodology is a process used to solve a logical problem , which requires the data of data to support the implementation of a study. The research methodology used is the method of data collection and software development methods .

1.4.1. Methods of Data Collection

Methods of data collection can be obtained directly from the object of research and references that have been obtained . At this stage of collecting information relating to the maintenance of existing business processes in the operations department.

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

a. Study of Literature
   This study was conducted by studying , researching and studying a wide range of literature from the library sourced from books , texts and articles related to the topic of research . Based on literature studies that have been carried out , the most effective treatment is a treatment that is preventive where treatment is done prior to the occurrence of the damage .
b. Observation
   Observation of directly observed treatment system bus is running at. Bhinneka Sangkuriang Transport to obtain a clear picture of the object under study . Based on the observations that have been made , the system bus maintenance PT. Bhinneka Sangkuriang Transport still corrective maintenance.
c. Interview.
   The interview is one of the techniques of data collection by conducting a question and answer directly to the operations department at PT . Bhinneka Sangkuriang Transport , Mr. Iwan Setiawan as Operations Manager . Based on interviews that have been made , the company experienced difficulties in scheduling maintenance activities, the difficulty in monitoring the bus maintenance activities that will be used as a reference in providing recommendations on the bus were damaged.

1.4.2. Software Development Methods

Software development method used in the study has several stages including:

1. Analysis System Requirements
   At this stage, an analysis of the system to be built . Description of the system requirements include requirements that must be adapted to the conditions of the company. As for the need of preventive maintenance management information system in PT . Bhinneka Sangkuriang Transport include:
   a. Scheduling preventive maintenance based on distance traveled by the bus fleet . The activities scheduled is the examination of the engine include the addition and replacement of the bus fleet engine oil .
   b. Monitoring activities of preventive maintenance as a reference in providing recommendations related to maintenance activities either addition or replacement of engine oil to the bus fleet in order to prevent damage .

   As for the analysis of functional requirements both in the flow of data and information by analyzing a database using

the ERD (Entity Relationship Diagram) and data flow analysis as well as the processes that occur in the system using DFD (Data Flow Diagram) . In addition to the analysis of functional requirements , there are also non-functional requirements which the analysis is performed to produce the details about what things are done when the system is implemented by analyzing the hardware , software analysis , user analysis and coding analysis . This phase should be done in full to generate a complete design.

2. System Design
   This phase is done after a needs analysis system in PT . Unity Sangkuriang Transport has completed collected in full . The design of this system was made to describe the working process the system is built so that it can be used as a reference at the time of implementing the system in the form of code .
3. Implementation System
   At this stage, the implementation of preventive maintenance management information system in PT . Unity Sangkuriang Transport. This stage is the code generation process . Coding or coding is a translation in the language of design that can be recognized by the computer . Translation phase data or solving problems that have been designed into the programming language PHP and MySQL as the database server that receives and transmits data.
4. Testing System
   After the coding phase is completed , the system already built must be tested to determine whether all of the functions in accordance with the needs that have been defined previously . The method used in the trials of this system in the form of black box testing with tests the functionality of the system built and beta testing using the techniques of data collection by interviewing users associated with the system that has been built . It aims to find faults of the system to then be corrected in the future.
5. Conclusions and Recommendations
   At this stage, drawing conclusions from the research that has been done . Conclusion is obtained by comparing the extent to which the effectiveness of maintenance activities at PT . Bhinneka Sangkuriang Transport before and after implementation of preventive maintenance activities . Based on the results of these comparisons , it can be concluded whether the results of the study are in accordance with the purpose of the research that has been predetermined and advice that can be given to the development of the system in the future

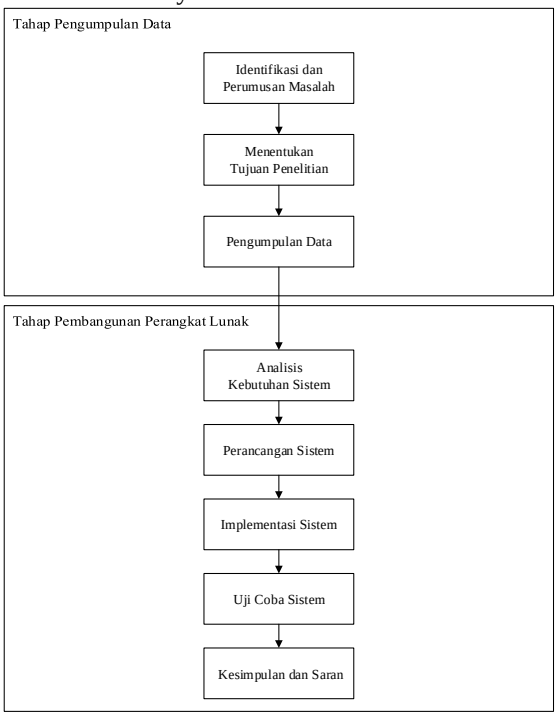


Figure 1 Research Methodology

2. CONTENT RESEARCH

2.1. Entity Relationship Diagram

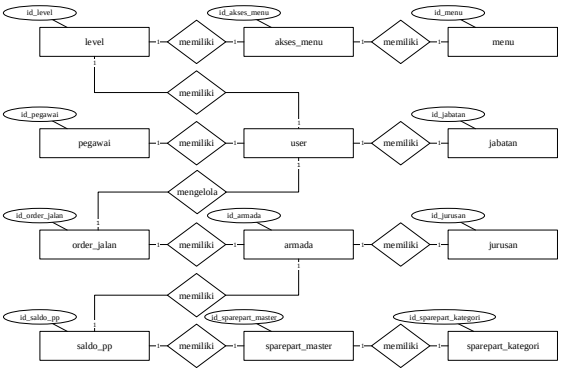


Figure 1 Entity Relationalship Diagram

2.2. Diagram Context

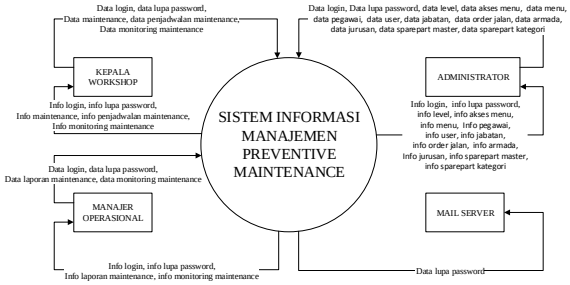


Figure 2 Diagram Context

2.3. DFD Level 1

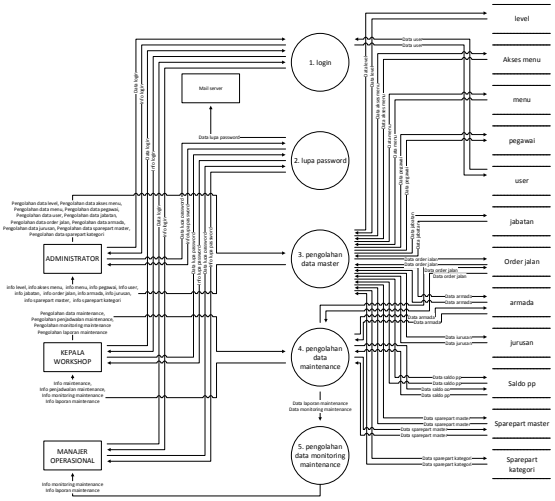


Figure 3 DFD Level 1

2.4. Relationship Diagram

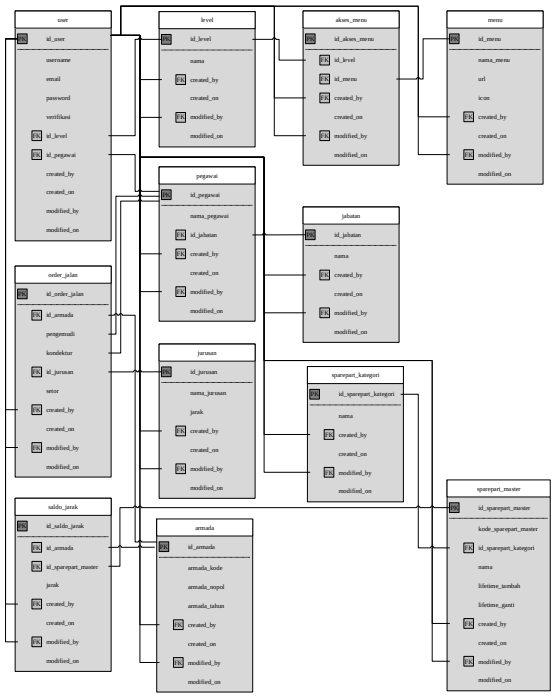


Figure 4 Relationship Diagram

2.5. Design Codes

The encoding process information management system preventive maintenance, there is a proposed encoding is the encoding of the bus fleet . The coding can be seen in the image below.

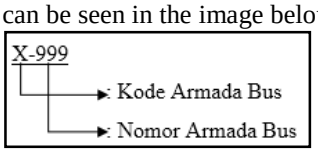


Figure 5 Encoding Bus Fleet

2.6. Designing Interfaces

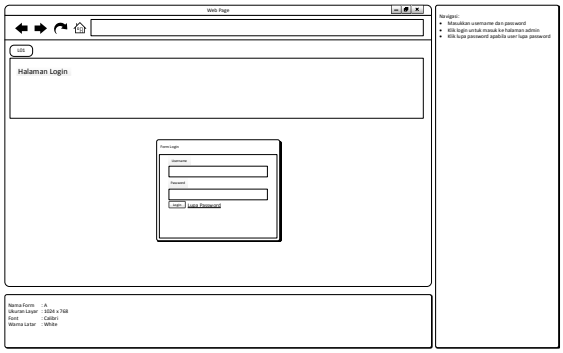


Figure 6 Designing Interface Login Design

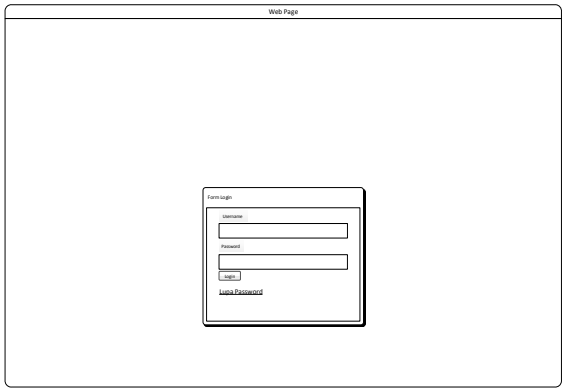


Figure 7 Designing Interface Forgot Password

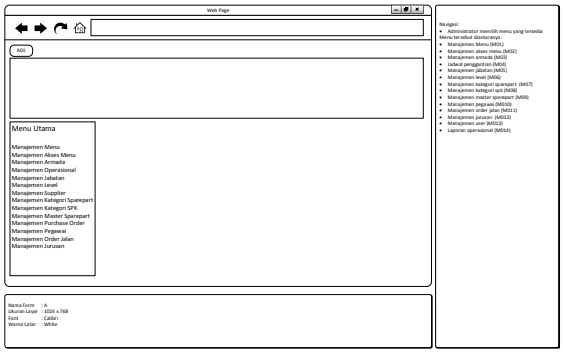


Figure 8 Designing Interface Administrator

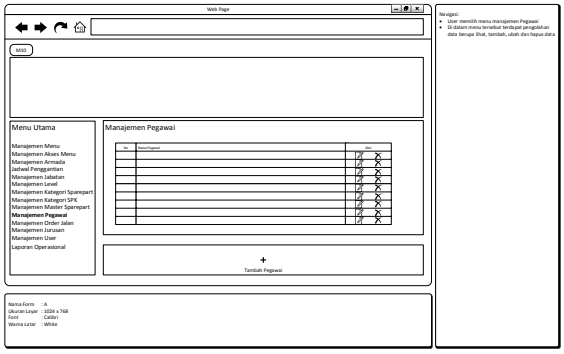


Figure 9 Designing Interface Chief of Workshop

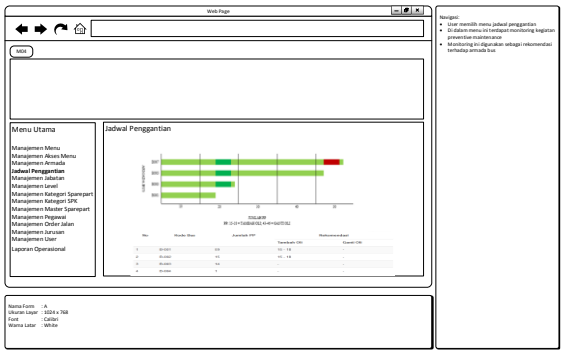


Figure 10 Designing Interface Operational Manager

2.7. Implementation Interface

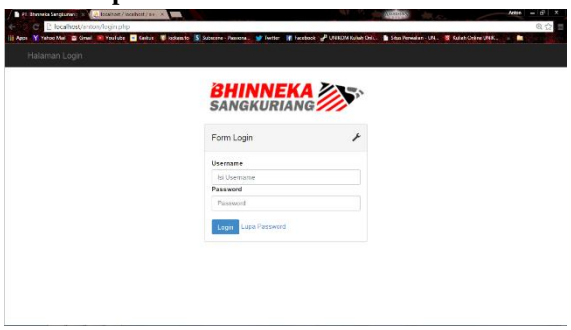


Figure 11 Implementation interface Login

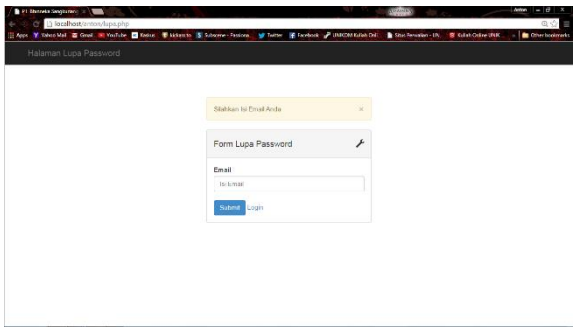


Figure 12 Implementation interface Forgot Password

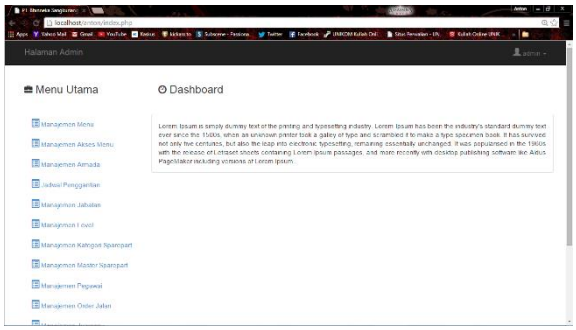


Figure 13 Implementation Interface Administrator

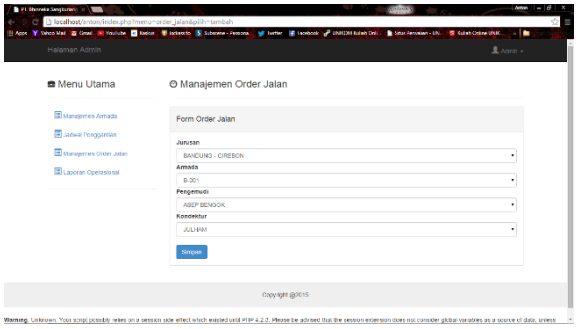


Figure 14 Implementation Interface Chief of Workshop

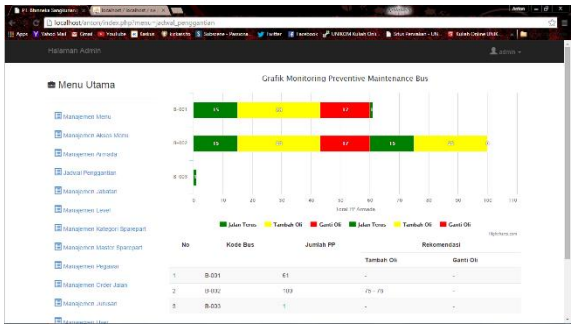


Figure 15 Implementation Interface Operational Manager

3. Test Results

3.1. Interface Administrator

Menu	Deskripsi	Nama File
Halaman Login	Halaman yang digunakan oleh administrator untuk melakukan login ke halaman administrator	index.php
Halaman Level	Halaman yang digunakan oleh administrator untuk mengelola data level	level.php
Halaman Akses Menu	Halaman yang digunakan oleh administrator untuk mengelola data akses menu	akses_menu.php

Menu	Deskripsi	Nama File
Halaman Menu	Halaman yang digunakan oleh administrator untuk mengelola data menu	menu.php
Halaman Pegawai	Halaman yang digunakan oleh administrator untuk mengelola data pegawai	pegawai.php
Halaman User	Halaman yang digunakan oleh administrator untuk mengelola data user	user.php
Halaman Jabatan	Halaman yang digunakan oleh administrator untuk mengelola data jabatan	jabatan.php
Halaman Order Jalan	Halaman yang digunakan oleh administrator untuk mengelola data order jalan	order_jalan.php
Halaman Armada	Halaman yang digunakan oleh administrator untuk mengelola data armada	armada.php
Halaman Jurusan	Halaman yang digunakan oleh administrator untuk mengelola data jurusan	jurusan.php
Halaman Sparepart Master	Halaman yang digunakan oleh administrator untuk mengelola data sparepart master	sparepart_master.php
Halaman Sparepart Kategori	Halaman yang digunakan oleh administrator untuk mengelola data kategori sparepart	sparepart_kategori.php
Logout	Halaman yang digunakan oleh administrator untuk keluar dari halaman administrator	logout.php

3.2. Interface Chief of Workshop

Menu	Deskripsi	Nama File
Halaman Login	Halaman yang digunakan oleh Kepala *Workshop* untuk melakukan login ke halaman Kepala *Workshop*	index.php
Halaman Armada	Halaman yang digunakan oleh Kepala *Workshop* untuk mengelola data armada	armada.php
Halaman Jadwal Penggantian	Halaman yang digunakan oleh Kepala *Workshop* untuk mengelola data penjadwalan	jadwal_penggantian.php

Halaman Order Jalan	Halaman yang digunakan oleh Kepala *Workshop* untuk mengelola data order jalan	order_jalan.php
Halaman Laporan Operasional	Halaman yang digunakan oleh Kepala *Workshop* untuk mengelola laporan operasional	laporan_operasional.php
Logout	Halaman yang digunakan oleh Kepala *Workshop* untuk keluar dari halaman Kepala *Workshop*	logout.php

3.3. Interface Operational Manager

Menu	Deskripsi	Nama File
Halaman Login	Halaman yang digunakan oleh Manajer Operasional untuk melakukan login ke halaman Kepala *Workshop*	index.php
Halaman Jadwal Penggantian	Halaman yang digunakan oleh Manajer Operasional untuk *monitoring maintenance*	jadwal_penggantian.php
Halaman Laporan Operasional	Halaman yang digunakan oleh Manajer Operasional untuk melihat laporan operasional	laporan_operasional.php
Logout	Halaman yang digunakan oleh Manajer Operasional untuk keluar dari halaman Manajer Operasional	logout.php

4. CLOSING

4.1. CONCLUSION

Based on the results of this thesis , it can be concluded as follows:

1. The information system management preventive maintenance can help Chief of Workshop in scheduled maintenance activities to the bus fleet either addition or replacement of engine oil .
2. The information system management preventive maintenance can help Operational Manager in monitoring the activities of preventive maintenance in order to prevent damage to the bus .

4.2. ADVICE

Based on the conclusions outlined above , takes suggestions for further development of the system . As for the advice necessary to the development of preventive maintenance management information system bus PT. Bhinneka Sangkuriang Transport is with the additional feature where the replacement of spare parts is carried out prior to the spare parts were damaged. This is because in this study , preventive action is only carried out on the lubrication of components in the form of the addition and replacement of engine oil.

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