POLITEKNIK UNGKU OMAR

## **DIGITAL SITE DIARY**

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(01BCT20F3018)

## **CIVIL ENGINEERING DEPARTMENT**

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## MUHAMMAD MUZAKKIR AIMAN BIN NAZRI (01BCT20F3018)

A project report/thesis submitted in partial fulfillment of the requirements for the award of the degree of Bachelor in Civil Engineering Technology with Honors

## **CIVIL ENGINEERING DEPARTMENT**

**SESSION 2 2022/2023** 

#### STATEMENT OF AUTHENTICITY AND PROPRIETARY RIGHT

#### DIGITAL SITE DIARY

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- 2. I hereby declare that the work in this thesis is my own except for quotations and summaries which have been duly acknowledged.
- I hereby agree to let go the intellectual property ownership of this project to Ungku Omar Polytechnic in partial of the requirement for the award of the Bachelor of Civil Engineering Technology with Honors.

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(.....)

As the project supervisor, dated .....

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#### Abstract

The creation of new products is essential to economic development and gaining a competitive edge. The product life cycle is getting much shorter, and the trend is getting shorter every year. This indicates that innovation is a key economic driver. Innovation is crucial for the construction and engineering industries to develop and prosper. The planning, design, earthworks, and construction of roads, subdivisions, buildings, municipal services, and large infrastructure are all covered under the field of civil engineering technology. One of the crucial parts of a construction project is data gathering and documentation, and the documentation record will be crucial from the start to the finish of the project. Therefore, the purpose of this project is to develop site diary software in the use of the latest technology in line with the Technology Revolution 4.0 (IR 4.0) technology. The aim of this research is to study the issue about the method of collecting data for site diary at this company and to develop the digital site diary for efficiency analysis. This can evaluate the effectiveness and efficiency of this application toward the project. This product is developed using "android studio" software and been tested by 30 employees in Pembinaan Tetap Teguh (PTT) which consists of Project Manager, Consultant, Project Engineer, Site Engineer, Supervisor, Safety and Environment Officer and Site Clerk.

Keywords: data gathering, documentation, software, earthwork, IR 4.0, site diary

#### Abstrak

Penciptaan produk baharu adalah penting untuk pembangunan ekonomi dan memperoleh kelebihan daya saing. Kitaran hayat produk semakin pendek dan trend semakin pendek setiap tahun. Ini menunjukkan bahawa inovasi adalah pemacu ekonomi utama. Inovasi adalah penting untuk industri pembinaan dan kejuruteraan untuk membangun dan berkembang maju. Perancangan, reka bentuk, kerja tanah, dan pembinaan jalan, pembahagian, bangunan, perkhidmatan perbandaran, dan infrastruktur besar semuanya diliputi di bawah bidang teknologi kejuruteraan awam. Salah satu bahagian penting dalam projek pembinaan ialah pengumpulan data dan dokumentasi, dan rekod dokumentasi akan menjadi penting dari awal hingga akhir projek. Oleh itu, tujuan projek ini adalah untuk membangunkan perisian diari tapak dalam penggunaan teknologi terkini selaras dengan teknologi Technology Revolution 4.0 (IR 4.0). Tujuan kajian ini adalah untuk mengkaji isu tentang kaedah pengumpulan data untuk diari tapak di syarikat ini dan untuk membangunkan diari laman digital untuk analisis kecekapan. Ini boleh menilai keberkesanan dan kecekapan aplikasi ini terhadap projek. Produk ini dibangunkan menggunakan perisian "android studio" dan telah diuji oleh 30 orang pekerja di Pembinaan Tetap Teguh (PTT) yang terdiri daripada Pengurus Projek, Perunding, Jurutera Projek, Jurutera Tapak, Penyelia, Pegawai Keselamatan dan Alam Sekitar dan Kerani Tapak.

Kata kunci: pengumpulan data, dokumentasi, perisian, kerja tanah, IR 4.0, diari tapak

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#### **CHAPTER 1: INTRODUCTION**

Innovation is one of the main factors for economy growth. The application of information technology in construction is a major international research and innovation to establishments and industry. Recent advance technology in the construction field, increasingly global nature of the construction market and a renewed demand for quality and productivity in construction are making the issue of integration more critical than ever.

During Work based learning (WBL) that I had been place at Pembinaan Tetap Teguh, I had experience variety of technology that can make work been done efficiently. This technology is very helpful in the construction that is being carried out by Pembinaan Tetap Teguh who already known has a relatively large construction area.

Pembinaan Tetap Teguh (PTT) is a construction business specializing in earthworks and infrastructure projects. Kota Elmina, Elmina, Alam Impian, MCKIP, Serenia City, Ampar Tenang, and Bukit Raja are among PTT's active projects. As we know, every industry or construction are having issues and problems to manage or find solutions with the respect to achieve the organization's goals

Pembinaan Tetap Teguh project that has been assigned is in section 5 located in Gebeng Kuantan which been divided into 2 zone. Total of distance for both zone is 30km and this will make the work of data collection quite difficult and will cause this task to be slow to complete.

#### **1.1 Problem Statement**

During WBL at section 5 Gebeng Kuantan, I did some observations at the site project which was identifying issues that were related to the project to make sure this site progressed flawlessly. By using the design thinking process, I was able to point out and identified the issues at the site project. There were many issues and problems that I found during the observation including minor and major issues. One of the issues was we still need to collect the data manually due to the unsystematic management and the distance between each site was too far from each other. Thus, the collection of data took too much time which slower the progress for this project. The management from the company was not in a good form when lack of information gained from all responsible parties which led to many miscommunications. When I collected the data for every activity every day, I found out it was very unsystematic because I need to many problems when submitted to the Project Manager to be checked. After I was able to identify the issue from this company, I need to think of the best solutions and alternative ideas to solve this issue which can help to ease the progress of this project.

#### 1.2 Objective

The objectives of this project are to produce a systematic form application management for site diary project site at Section 5 Gebeng Kuantan. It is an application package software, that can be easily access at anytime and anywhere which make it user-friendly because it just using smartphone application that can be carry along with us anywhere. This was also to study the issue about the method of collecting data for site diary at this company and to develop the digital site diary for efficiency analysis. This can evaluate the effectiveness and efficiency of this application toward the project.

- To study the issue about the method of collecting data for site diary at this company.
- To develop the digital site diary for efficiency analysis
- To evaluate the effectiveness of this application toward the project.

#### 1.3 Research Background

It is based on the objective of study that had been pointed out above. The first objective is to study the issues about the method of collecting data information at this company. Design thinking process is being used to able to pointing out and identify the issues at the site project. The issue that was found in this company is still not managed properly for instance lack of information gained from all responsibility party which led to miscommunication. During time to collecting the data for every progress on site that happen daily, it was very unsystematic, unmanageable and also hard to get the information because must go find every person in charge that involve to know the progress that had been done that day. This problem will be led to more issue for instance during submission and checking by the Project Manager.

Secondly, I had mentioned to develop some application software that can be used to help in collecting data information. The software that I mentioned to use in develop this application is by using the software of "App Builder". This software is really easy to use in developing the application because this software does not need the skill of the programming skill, and the cost to create this application is not too expensive.

After the product is been released, I need to evaluate the effectiveness of this application toward the project. The method that I been used to know the effectiveness of this application is allow the company to use it on site and then I will collect the result and compared it with the system of data collection that this company had been used before then. Besides, the effectiveness of this application also can be measured by creating some questionnaire about this application software and get the responded to express about how this application can be a help during to ongoing project.

#### **1.4** Significance of the Study

The findings of this study will give benefits to Pembinaan Tetap Teguh company, considering this application is important for their management and collecting data when on site. The results of this application along with the current method in this company may help Project Manager, Site Engineer, and Site Supervisor to get a better way to gathering data implement their work progress and daily report on site. It can also increase the efficiency of data analysis that had been gathered by person in charge and making it easier and more become smoother. This is also can prevent from data losing or inaccurate information that had been given by person in charge.

#### **1.5** Scope of Study

The location of study area for the data collection is at Pembinaan Tetap Teguh ECRL Section 5 Gebeng Kuantan. This study is about making an application to see the effectiveness when been used on site. It also to make collection data work become easier and easy to access. Based on the figure, it is shown the area of the office and construction site of Section 5 ECRL. Here where all employee and staff doing their daily work to ensure all work runs smoothly.



Figure 1.0: ECRl Section 5 Site

#### **1.6 Expected Outcome**

Based on the objective, the first objective is to identify the method of collecting data at this company. From the first objective, I expected that the method of collecting the data information can be improved appropriate with the suggestion based on the second objective which is to develop a product. I also expected that after doing the evaluation of the product to test the effectiveness of the product toward the company, it can solve the problem that exists in this company which is the problem of getting information and data about the progress that happens every day on the site.

#### **CHAPTER 2: LITERATURE REVIEW**

#### 2.1 Introduction

This chapter presents a comprehensive review of the existing literature related to digital site diaries in construction projects. By examining a wide range of scholarly articles, research papers, industry reports, and case studies, this review aims to provide a deep understanding of the current state of knowledge regarding the implementation and benefits of digital site diaries. The literature review serves as a foundation for identifying research gaps, theoretical frameworks, and practical insights that will guide the subsequent chapters of this thesis.

Construction projects are complicated and time-consuming. A project's overall development is usually broken down into various phases, each of which necessitates a different set of specialized services. From initial planning to project completion, a typical job goes through several stages that require input from a variety of sources, including financial institutions, government agencies, engineers, architects, lawyers, insurance and surety companies, contractors, material manufacturers and suppliers, and construction tradesmen

During the construction process, even a tiny project necessitates a vast array of knowledge, resources, and hundreds of distinct procedures. Natural occurrences must occur in the right order for the assembly process to proceed, which results in a complicated pattern of individual time needs and sequential constraints among the structure's many segments. Numerous unpredictable, highly variable, and oftentimes surprising factors have an impact on the construction process. The construction team is made up of an architect, an engineer, workers in the building trades, subcontractors, material suppliers, and others. (Construction Project Management, 2011)

#### 2.2 What is Site Diary

Site diary is construction log or site journal. The site diary is a record of a construction project's whole worksite progress, covering all occasions and actions that might influence the progress of the project and the caliber of the finished project. In addition, site diaries make it possible to monitor work progress rather than relying solely on memory. All on-site stockholders benefit from daily records, which make all tasks easily traceable and with the appropriate accountability. (Lim, B.T., and Alum, N. 2017)

#### 2.3 How Site Diary Work

Records must demonstrate that tests were performed on samples of the materials in order to confirm that the quality of the materials and workmanship meets the specification. It is typically crucial to demonstrate that checks were made to ensure that the materials were positioned correctly within the works. In many contracts, the contractor will be paid periodically during the project. To justify the levels of payment made in each period, a thorough evaluation of the work completed and an assessment of rights to contractual claims are required. These calculations and the paperwork they result in can be thought of as the financial records.(L Milton, 2015)

The records that attempt to prove what actually occurred during the construction phase (the progress records) might be the most challenging to define. Ideally, these records will give a thorough account of when the various operations occurred, what resources were used, and the effects of any delays or disruptions. The focus of this paper will mostly be on progress records, although it should be noted that even if a record may be preserved ostensibly for one purpose, it may actually serve other functions. If it is impossible to determine from the site diaries (progress record) when, for example, the wearing course for a section of roadway was laid, it will be obvious that it must have been laid by the date at which the levels of the pavement course were checked. In addition, site diary recordings may include information about agreements for payments to be made.

#### 2.4 Why Old Method Not Effective

Several issues were found with the site diaries reviewed from the preliminary investigation previously stated, both on the 'live' site and on the contract where the records had been saved. The main problems involved accessibility and legibility.

There are issues with accessibility because it takes a lot of time and effort to access some sorts of information from the web diaries. The data may be available, but due to the way it was recorded, it is challenging to locate specific items, and subsequent attempts to extrapolate a complete picture of progress from the diaries are tediously slow. Lack of meaningful headings and a failure to link completed work to programmed activities are two specific issues.

Because of the handwriting's illegibility or close to it, some of the records analyzed were particularly challenging to comprehend. This exacerbates accessibility issues and will only make anyone who is attempting to find information in such diaries more frustrated.(Huang, G.Q. and Zhong, R.Y. (2018)

#### 2.5 Progress Report

One of the most crucial aspects of construction project management is the monitoring and control of project progress. Every team member needs to be aware of how the project is moving in a timely and accurate manner. Where are we presently in relation to the initial plans, and are deadlines, budgets, needed quality, alterations kept to a minimum, and safety precautions being followed.

#### 2.6 Advantage

This would be the scheme's most significant advantage since information in machinereadable format could be found using a computer search. This app's search function enables users to look up any alphanumeric string, and it will display every date on which that code appeared in the diary.

#### 2.7 Claim

A claim, according to Seeley (2007), is a request by the contractor for compensation for some loss or expense he has incurred, or an attempt to avoid paying the liquidated and established damages. When the regular progress of the work is slowed, claims are filed. According to Bubshait and Cunningham (2011), delays in building projects might be caused by the owner, the contractor, an act of God, or a third party.

#### 2.8 Design Thinking Process

Design thinking is typically described as a creative and analytical process that offers chances for experimentation, model creation and prototyping, feedback gathering, and redesign. Leifer Meinel. (2012). The goal of this ideology, which is based on designers' processes for outlining design stages, is to give all professionals access to a standardized innovation process to come up with original solutions to issues.

Design thinking's key benefit is that it provides a clear approach for creativity. Trial and error are a good technique to experiment and evaluate what works and doesn't, but it's sometimes time-consuming, expensive, and ultimately ineffective. On the other hand, adhering to the specific design thinking phases is an effective technique to create fresh, creative solutions. Design thinking favors producing prototypes and testing them to determine their effectiveness rather than spending a lot of time investigating an issue without coming up with a solution.

#### 2.8.1 Empathy

The designer observes customers in the initial stage to better understand how they interact with or are impacted by a product or issue. Empathy-based observations must be made, which entails refraining from passing judgement and refraining from suggesting what the customer needs. Empathic observation is effective because it can reveal problems that the client was either unaware of or unable to express. From this vantage point, it is simpler to comprehend the human need for designer to create. By soliciting feedback from the study's target employees, including the project manager, assistant project manager, site engineer, and site supervisor, the empathy component was launched. The next step is to identify the research's problems through observations, a questionnaire, and interviews related to the challenges of site-to-site data collection.

#### **2.8.2 Define**

After first-stage observations, this second step is to identify the issue that were attempting to tackle. Consider the challenges that customers face, what they struggle with frequently, and what had been learned from their reactions to the problem. The issue can be identified once been encounter findings.

A stage in building our own and other people's perspectives on the situation is defining the problem. The information will be gathered by the researcher. A problem with data collection can be resolved after collecting data using

#### 2.8.3 Ideate

The following stage is to generate solutions for the issue that had been identified. These brainstorming sessions can be done alone, in a group setting where team meets in an office that fosters innovation and collaboration, or in an innovation lab. The important things is to come up with a tonne of unique ideas. That obviously can get a couple ideas to move forward with at the end of this procedure.

Designers are prepared to generate ideas at this point. Understanding necessary consumers and their needs is the goal of the empathy stage. In the define stage, observations are analysed to create a user-centric issue statement. The chosen approach for solving the issue is to create an application called Digital Site Diary for Site Management

#### 2.8.4 Prototype

This stage is where concepts become practical solutions. The goal of prototypes is not perfection. The purpose of a prototype is to swiftly produce a tangible representation of the concept to gauge user reaction. A landing page to evaluate consumer interest in a product or a movie showcasing improved logistical procedures are two examples of prototypes.

Following the system application software's completion, a variety of procedures and tests will be done to ensure that this product is extensively tested on site to guarantee that the application's execution is free of compile or runtime faults. Additionally, in order to assess the product's efficacy, the researcher asked several questions of the testers to see whether the solution was successful in resolving the problem at the project site.

#### 2.8.5 Testing

Customers should be given a prototyped solution, and the usage of the prototype need to be monitor. During this testing phase, the work process needs to be comment by the customer. Design thinking is an iterative process, not a linear one. After the fifth step, it probably needs to revisit one or more of the earlier levels. Perhaps the testing has revealed that it needs to create a new prototype, in which case it would go back to stage four. Or perhaps it demonstrates that it misdescribed the needs of the customer. If so, it would need to go back to the beginning of the procedure.

Testing is the last step in the Design Thinking process. The goal of testing is to determine whether or not a product or service is effective. Start creating, don't spend too much time on one prototype, and keep the user in mind as you go. Prototyping, for example, can be performed at an appropriate stage in the work prior to ideation in order to learn more about the user. Basic models can be constructed, test ideas, and learn more about how people work on a daily basis.

#### 2.9 Correlation Analysis

This analysis was done to find out how a variable could be in a bivariate relationship with another variable. To ascertain the link between two variables, Spearman correlation has been employed (Cavana, et al., 2001). Only the relationship's strength and significance are determined by this test. When a questionnaire contains several Likert scales questions, Spearman correlation is most frequently employed. This analysis would be used to create the scatter diagram.

#### **CHAPTER 3: METHODOLOGY**

#### 3.1 Introduction

This chapter will go through the methodology of the system as well as the development process of the application software. In addition, from the beginning to the end of the project, this chapter will describe the methods utilized to identify the problem and the appropriate system that was used. This chapter's goal is to lay out the techniques and approaches for gathering data in order to identify the construction-related document that needs to be formatted. This chapter covers the study site, population and sample size, sample size, research design, sampling design, data collection, data analysis, and hypothesis. In addition, the study's goals will be converted into data collection from both primary (survey questionnaire) and secondary (website) sources (literature review). For future investigation, many of the findings of this proposal have been published in reviewed journals.

While working on the task, the implementation would do the observation to determine the application software effectiveness. Design modelling of the software application is also covered in this chapter. Feasibility studies were conducted using primary and secondary sources to add value to the project. It was conducted via a questionnaire and observation for the primary source. Data collection and processing are used to create the secondary source. Furthermore, the methods to be employed will be discussed thoroughly based on the challenges and the issues that have been found, as well as the selection of appropriate systems to be used and applied within the site condition. This is based on all available evidence, which includes interview, site investigation and based on the past research.

For this application software that have been proposed, it may be accessed by the main contractor at any time and from any location and also the workers also can access some part as addition to give support in doing the site diary by using this software application. It can be browsed from a smartphone to see how the work is progressing on site at any given time. It just only needed a stable line connection to accessed this software. This software contains all of the work progress records that have been updated by the staff and workers at the site. This website also saves time when it comes to reporting and data analysis. Determine the issues with the work inspection system and the effectiveness of the work inspection system compared to the traditional approach in order to remedy the problem at the construction site and complete the project on time. The questionnaire will be distributed to PTT employees who are involved in the construction site's progress so that they can provide feedback or comments on the database's success in resolving the Site Diary progress report issues.



#### **3.2** System Design and Development of Digital Site Diary



Figure 2.0: System Flow and Development

#### 3.1.1 Phase 1

The design and analysis of the project that will be generated are the most important aspects of this phase. Gathering information for the project's growth and discover what the problem that actually become the main issues at the site, as well as meeting with the supervisor and mentor, is the focus of this phase and also doing some site investigation at the site. Also, the researcher can do some literature review by doing some research about past people that had doing this research too. The researcher was using the journal that can been found in google scholar also in the research gate. This stage takes at least two weeks to complete. To conclude the biggest or the major problem at the site, the researcher is collecting some issue that happen at the site and doing some analysis which is doing some questionnaire for the people at the site to answer it. In this part of the process of Empathy were most likely used in during the project design process which is to create and finding the problems and issues also create a few alternatives to their problem. To raise awareness of the issues, observations were made around the construction site and placement office, and additional interviews were done with the site supervisor, site engineer, project manager, and project coordinator.

#### 3.1.2 Phase 2

For primary sources, in order to acquire challenging information, the questionnaire was conducted to doing the interview and observation. This interview method is required to obtain and strengthen certainty and detailed information about the factors being investigated based on survey results. Interaction with persons involved in construction projects by asking them in person.

Secondary information acquired from other sources. This data emphasizes the significance of this study. These data are also required in order to gather further information for this project. As part of the project's content, additional information was received. The study's sources included journals, the Internet, and the company's data collection. The interface sketch, as well as the drawing of proposed idea of the application design, are necessary at this stage. In this phase, design a prototype that will be delivered to the mentor and supervisor using sketches of mobile app output and input as a guide. The system is next built as a programmer that can execute all of the programmed in the implementation phase, using the "Apk Builder Generator" and also other applications that has been identified.

#### 3.1.3 Phase 3

After the completion of the product system application software, a number of actions and testing will be carried out to guarantee that this product is thoroughly tested at the site to ensure that this application's effectiveness is free of compile or runtime defects. Also, to conclude the effectiveness of the product, questionnaire had been distributed to the tester of the product to see whether the product is effectiveness toward solving the issue at the site project.



Related searches

Figure 3.0: Example of Google Scholar Research

Posit	ion in company
O F	Project Manager
0 5	Site Engineer
$\bigcirc$	Site Supervisor
$\bigcirc$	Supervisor Assistant
$\bigcirc$	Dther:
Work	ing Experience
	ess than 2 year
0 3	8-5 year
0 6	5-10 years
O r	nore than 10 year

Using Digital Site Diary on progress at daily site project will enable the staff to get the information on the site quickly	Using Digital Site Diary on progress at daily site project will enable the staff to get the information on the site quickly
O Agree	O Agree
O Neutral	O Neutral
O Disagree	O Disagree
Using the Digital Site Diary allow the staff to follow up the progress work at site project from anywhere	Using the Digital Site Diary allow the staff to follow up the progress work at site project from anywhere
O Agree	O Agree
O Neutral	O Neutral
O Disagree	O Disagree
Digital Site Diary is useful in collecting data information of daily progress at site project	Digital Site Diary is useful in collecting data information of daily progress at site project
O Agree	O Agree
O Neutral	O Neutral
O Disagree	O Disagree
Using the Digital Site Diary allow the staff to follow up the progress work at site project from anywhere Agree Neutral Disagree Agree Agree Agree Neutral Disagree	Using the Digital Site Diary allow the staff to follow up the progress work at site project from anywhere  Agree Neutral Disagree Digital Site Diary is useful in collecting data information of daily progress at site project Agree Agree Neutral Disagree

Figure 3.1: Questionnaire That Distributed

## 3.3 Prototype Design

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Figure 3.2: Conventional Method



Figure 3.3: Digital Site Diary Method

#### 3.3.1 Digital Site Diary Storyboard

- The first step after opening the application, users will see the Pembinaan Tetap Teguh company logo and users need to enter their email and password to access the Digital Site Diary.
- 2. After that, the user will be able to see a 'create' symbol where the user needs to press the symbol to start entering data into it.
- 3. After pressing the 'create' symbol the user will see an empty space to be filled. Among the things that need to be filled in are:
  - i. The name of the project that is being carried out.
  - ii. The name of the supervisor or person in charge who looks after the project area.
  - iii. The current date of the project.
- 4. After all blank fields are filled in, the user needs to press the 'save' button to save the information that has been entered.
- 5. Then, another display will appear where the user needs to enter some information by simply filling in multiple answers. Among the information that needs to be filled in by the user is:
  - i. Weather conditions during the project. If the weather in the morning is sunny, the user needs to tap the fine button while if the weather changes to rain in the afternoon, the user needs to add the weather condition by typing "add weather" on the display. The time when the weather condition also needs to be filled in and can be changed from time to time.
  - ii. The labor force used on that day also needs to be filled in with a multiple answer method, where there are various types of positions and also operators who use machines the number of employees working that day also needs to be filled in by the user.

- iii. The number of machines used such as excavators, bulldozers and so on also need to be filled in. The number of machines used that day must also be filled in the blank space provided.
- 6. Then, the user needs to tap the 'save' button and another display will appear where the user needs to enter data such as:
  - i. Activities carried out on that day.
  - ii. Safety on duty that day.
- iii. Surveyor on duty that day.
- iv. Machines that are not used that day.
- 7. Finally, users can enter photos of the activities carried out on the day into the application and press the 'save' button.
- 8. Users can also look back at the activities carried out on the previous day by searching for the date and also the name of the project carried out.

## **3.3.2** Process developing the Digital Site Diary

PRODUCT			SITUATION
	An and accounted      Appendix of the end of the e	949, 9999, 800	Coding part for the interface log in application part
			Coding part for next interface such as update progress work and other
drawable drawable-hdpi drawable-hdpi drawable-ndpi drawable-x11 drawable-x14 drawable-xhdpi drawable-xchdpi drawable-xchdpi drawable-xchdpi drawable-xchdpi drawable-xchdpi drawable-xchdpi mipmap-andqi mipmap-xhdpi mipmap-xchdpi mipmap-xchdpi mipmap-xchdpi y values xmi	25/5/2022 2:07 AM 25/5/2022 2:07 AM	File folder File folder	Important file and template that been used in developing Digital Site Diary
PEMBI TE	NAAN TETAP GUH		Logo icon that been used for Digital Site Diary application

Table 1.0: Process developing product

#### 3.3.3 Result of The Product

Interface	Description
NSS 2421 REGIN Login Sign In	Firstly, sign in or log in to access the Digital Site Diary
1050-30 M     Create        Project     Contract No     Contractor     Date     Save	On this page, can start fill the empty form. Which need to fill in project, contract no, contractor name and the date of the project activity.

Todas   Project   T   Contract No   T   Contractor   T   Date   03/06/2023   Add Labour Force   Add Machinery   Activities   Drainage	Here can start to state update on site such as weather, labor force and machinery that been used
Activities       Drainage       Telekom       Safety & Enviroment       Land Survey       Other Machine's Activities	Next, can start update the work progress that been took place that day. Fill in the form that activity been done
Ideal and the second of the chosen     Upload File     File     Close     Save     File     Close     Save     File     Close     Close </td <td>Here for uploading some file such as picture of the site when work has start. Also, can put file such as weather condition on the site</td>	Here for uploading some file such as picture of the site when work has start. Also, can put file such as weather condition on the site



Table 1.2: Digital Site Diary Interface

#### **3.3.4** Testing the Product

After the digital site diary is produced, the product is tested by several staff members who work at ECRL Section 5, Gebeng, Kuantan. The activity of testing the products produced is to ensure that the staff is exposed to the use of the digital site diary and then the level of satisfaction and use of the product can be expressed in the questionnaires that are distributed.



Figure 4.0: Testing product with staff

#### 3.4 Data Collection

The method on how the data were collected is by using the questionnaire method which is it involving the respondent from the location that been appointed as Work Based Learning (WBL) which at ECRL Section 5, Gebeng, Kuantan, Pahang.

#### 3.4.1 Respondent

The respondents are active members of the construction team who were also always at sites project everyday as they all involve in testing the Digital Site Diary application. The survey is given to 30 people who must respond to the questions. Those who replied included project managers, project engineer, site engineers, site supervisors, safety environment officer and workers including site clerk. They are workers and advisers on the construction site who can reply to the questionnaire

#### 3.4.2 Research Method

To gather data for this study, two questionnaires has been distributed to the respondent. This technique was utilized to collect data in an open interview or face-to-face interviews. When what the study requires has been understood, the questionnaire is an excellent method to use as data gathering tool. The purpose for this approach is for following reasons:

- i. The collected data will be processed.
- ii. Questionnaires that are sent out on a regular basis make data collecting easier.

#### 3.4.3 Data Analysis (Excel)

After the questionnaire has been answered by the respondents involved, all the data that has been collected will be filled into Microsoft Excel for the analysis of the data that has been collected.

#### a) Data Collection

This data is taken from the result google form and converted all the data including gender, age, position and gender into Microsoft Excel. From the Microsoft Excel we will estimate the value of the data to be analyzed through formula in Microsoft Excel

	Copy of POST DIGITAL SITE DIARY with formula - Excel								MUHAMMAD M	UZAKKIR AIM	AN BIN NAZRI	I 🐠 - I	<b>1</b> – 12					
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Gender	Position in company	Working Experience	Diary on progress al daily site project will enable the staff to get the information on the site quickly	Site Diary allow the staff to follow up the progress work at site project from anywhere	Digital Site Diary is useful in collecting data information of daily progress at site project	Using Digital Site Diary will save the time to collect data information	Digital Site Diary is very easy to use	Data taken by Digita Site Diary is confidential	I									
2 Male	Site Engineer	3-5 year	6		5 5		5 4		4									
3 Female 4 Male	Site Engineer	less than 2 year	6		5		5 5		2									- 1
5 Male	Site Supervisor	3-5 year	6		5		5 6		5									-
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14 Male	Site Supervisor	3-5 year	5		5		5 5		5									- 1
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20 Male	Supervisor Assistant	3-5 year	6		5 5		5 6		5									
21 Male	Supervisor Assistant	less than 2 year		4	4		3 4		5									- 1
22 Male	Supervisor Assistant	3-5 year		-														-
24 Female	Supervisor Assistant	less than 2 year	5	-	5 5		4 5		5									-
25 Male	Project Manager	more than 10 year	6		5 5		5 5		5									
26 Male	Site Supervisor	3-5 year	6		5		5 6		5									_
27 Male	Supervisor Assistant	less than 2 year	5		5			-	2									
20 Male	Site Engineer	6.10 years	1															-
30 Male	Site Supervisor	6-10 years	5		5 5		5 5		5									-1
31 Male	Staff	3-5 year	6		5 5		4 6		5									
32																		
33 N			30	30	30	3	0 30	3										
34 Mean			4.83	4.83	4.83	4.7	7 4.73	4.6	7									
35 Standard Deviation			0.46	0.46	0.38	0.5	0.52	0.6	1									
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Figure 5.0: Data Collected from Respondent's Answer

#### 3.5 Mean and Average Mean

A form of average is the mean (or arithmetic mean). It is calculated by adding the values and dividing the total number of values by the number of values. The term "average" refers to the value derived by dividing the total of a collection of quantities by the number of quantities in the set. The square root of the variance yields the standard deviation. Another measure of variability is the average deviation, often known as the mean absolute deviation.

#### **CHAPTER 4: DISCUSSION AND DATA ANALYSIS**

#### 4.1 Introduction

The anticipated outcomes of the project are outlined in this chapter so that researchers are aware of them. Researchers carefully evaluate the data that will be produced throughout the project's implementation as one of the pre-project planning processes. Researchers want to be certain that the data they compile will enable them to accomplish the objectives they have established. Additionally, a more thorough description of the demographic data for the study participants is provided in this chapter. More than 30 people were surveyed using a quantitative approach. The digital site diary should assist in achieve the following objective:

- i. To study the issue about the method of collecting data information for site diary at this company.
- ii. To evaluate the effectiveness and efficiency of this application toward the project.
- iii. To develop the Digital Site Diary for efficiency analysis.

#### 4.2 Data Collection and Finding

This study presents the findings of a questionnaire issued to respondents, who included project managers, project engineers, site engineer, site supervisors, site assistant and others. This questionnaire is divided into three sections: Section A and Section B and Section C. Section A contains demographic information like gender, ages, experience and position. In Section B, contains about perceive of usefulness of the conventional method or Digital Site Diary. Section C, contains about the satisfaction and ease of use respondent toward the product. This questionnaire has been distributed for 30 respondents at PTT management team at ECRL Section 5, Gebeng Kuantan.

#### 4.2.2 Demographic Data

Section A is a demographic data section that includes five questions on the respondent's backgrounds. The respondents of pre and post questionnaire was same. The items are as follows:

#### a) Gender

This questionnaire included 32 which 59.4% of them are male respondents and 40.6 % of them are female respondents. Male respondents exceed female respondents with a considerable difference. This is because a male, rather than a woman, dominated the responses at the Pembinaan Tetap Teguh (PTT) working on the site, whereas most of the females are related to documentation. The number of respondents by gender is shown in chart 1.0 below.

#### Gender



Chart 1.0: Pie chart of respondent's gender

Chart 1.2 shows the age groupings of the respondents in this questionnaire. The age groups were divided into seven categories. This section was formed to assist with data processing and identifying respondents on the job site and office. In this survey, the age group 31-35 years old has the most responses, with 25%, followed by 36-40 years old, which has 21.9%. While age 46-50 and age 26-30 each got 15.6% and 18.8%. Only 9.4% of the respondent was on their 20-25 years old

#### Age



Chart 1.2: Pie chart of respondent's age

#### c) Position

The respondent's position is Project Manager, Construction Manager, General Manager, Project Engineer, Site Engineer, Supervisor, Site Assistant, Staff. Chart 1.3 shows that Supervisor had the most respondents, with 21%. The other respondents consist of Site Assistant, Site Engineer, Project Engineer came in second with 15.6%. The Construction Manager and General Manager both had 9.4%. Lastly Project Manage and staff both got 6.3%

#### Position



Chart 1.3: Respondent's Position

#### d) Work Experience

Majority respondents in this survey (45.2%) had 2 to 5 years of experience, with 9.7% respondents having fewer than two years of construction experience). There are 25.8% respondents with 6 to 10 years of experience, and 19.4% respondents with more than 105 years of work experience. The number of responses by experience is shown in Chart 1.4 below

#### Working Experience



Chart 1.4: Respondent's Experience in Construction

#### 4.3 **Pre-questionnaire (Conventional Method)**

#### 4.3.1 Conventional Method for Collecting Data Is Easy to Use

For the first question, it shows from chart 2.0 that majority of the respondent are disagreed to say that using the conventional method for site diary on progress at daily site is very easy to use. Which 4 respondents are said neutral. While 12 respondent answer strongly disagree and 16 is answer disagree. This may be due to the way the methods used by the information collectors for this diary site are very troublesome.



Chart 2.0: Bar Chart of Respondent for Question 1

#### 4.3.2 Conventional method is systematic to manage the data

For the second question, it shows from chart 2.1 that majority of the respondent are still answer disagree to say that using the conventional method is systematic to manage the data gathered. Which 17 respondents from 31 respondents are strongly disagree while another 11 respondents' answer is disagreed. But there some minority with 3 respondents still answer neutral about this conventional method. This may be them still thinking that conventional method is still relevant and can manage the data.



Chart 2.1: Bar Chart of Respondent for Question 2

#### 4.3.3 Data Collected was Secure

For the third question, it shows from chart 2.2 that majority of the respondent are answer strongly disagreed to say that using the conventional method for site diary is secure. With 20 respondents are strongly disagreed and 10 from them was answer disagreed from. But there are 2 respondent which still answer neutral about data that been collected was secure.



Chart 2.2: Bar Chart of Respondent for Question 3

#### 4.3.4 Information About the Progress of Work on The Site Fast to Receive

For the fourth question, it shows from chart 2.3 that majority of the respondent are strongly disagreed to say that using the conventional method for site diary on progress at daily site will enable the staff to get the information on the site quickly. Which 18 respondents are said strongly disagree while another respondent, 13 is answer disagree. This may be due to the way the methods used by the information collectors for this diary site are very slow. for example, having to wait for information from other staff to update in the WhatsApp group for each activity carried out.



Chart 2.3: Bar Chart of Respondent for Question 4

#### 4.3.5 Time Taken to Collect and Update Data Is Fast

For the fifth question, it shows from chart 2.4 that majority of the respondent are answer disagreed to say that using the conventional method for site diary will save the time of staff to collecting the data information. With 21 respondents from 32 respondents are strongly disagreed while another 9 respondents are answer disagreed. But there are 2 respondents are answer neutral that using conventional method will save the time for collecting data information



Chart 2.4: Bar Chart of Respondent for Question 5

## **4.3.6** Using Conventional Method for Site Diary Would Improve the Collection the Information Performance

For the sixth question, it shows from chart 2.5 that majority of the respondent are answer disagreed to say that using the conventional method for site diary would improve the collection the information performance. With 21 respondents from 32 respondents are strongly disagreed while another 7 respondents are answer disagreed and 4 still answer neutral. This may due that conventional method is not relevant to say that it will improve the performance of collecting data information.



Chart 2.5: Bar Chart of Respondent for Question 6

#### 4.4 Mean and Standard Deviation of Pre-Questionnaire

Table 2.0 show the result of respondent related to existing method in site diary at ECRL Section 5 Gebeng, Kuantan. There are 6 questions of existing method in site diary at ECRL Section 5 Gebeng, Kuantan. The data was generated by using Microsoft excel 2019

Question	Mean	Standard Deviation
Conventional method for collection data is easy to use	1.75	0.67
Conventional method is systematic to manage the data collected	1.53	0.67
Data collected was secure	1.44	0.62
Information About the Progress of Work on The Site Fast to Receive	1.47	0.57
Time Taken to Collect and Update Data Is Fast	1.41	0.61
Using Conventional Method for Site Diary Would Improve the Collection the Information Performance	1.28	0.58

Table 2.0: Mean and Standard Deviation of pre questionnaire

#### 4.5 post-questionnaire

# 4.5.1 Using Digital Site Diary on progress at daily site project will enable the staff to get the information on the site quickly

For the first question, it shows from chart 3.0 that majority of the respondent are strongly agree to say that using the product of Digital Site Diary for site diary on progress at daily site will enable the staff to get the information on the site quickly. Which 26 respondents are said strongly agreed while another respondent, 3 is answer agreed and 1 respondent answer neutral. This may be due to the way the methods for this Digital Site Diary are update the data information and collecting data information just by using the smartphone only and doesn't need to find every person in charge to get information.



Chart 3.0: Bar Chart of Respondent for Question 1

# **4.5.2** Using the Digital Site Diary allow the staff to follow up the progress work at site project from anywhere

For the second question, it shows from chart 3.1 that majority of the respondent are strongly agreed to say that using the product of Digital Site Diary for site diary allow the staff to follow up the progress work at site project from anywhere. Which 26 respondents are said strongly agreed while another respondent, 3 is answer agreed and 1 respondent answer neutral. This may be due to the way the methods for this Digital Site Diary are update the data information and collecting data information just by using the smartphone only and can follow up every activity progress work at site project just only from this application Digital Site Diary.



Chart 3.1: Bar Chart of Respondent for Question 2

# 4.5.3 Digital Site Diary is useful in collecting data information of daily progress at site project

For the third question, it shows from chart 3.2 that majority of the respondent are strongly agreed to say that using the product of Digital Site Diary is useful in collecting data information of daily progress at site project. Which 25 respondents are said strongly agreed while another respondent, 5 is answer agreed. This may be due to the way the methods for this Digital Site Diary are update the data information and collecting data information just by using the smartphone only and can follow up every activity progress work at site project just only from this application Digital Site Diary.



Chart 3.2: Bar Chart of Respondent for Question 3

#### 4.5.4 Using Digital Site Diary will save the time to collect data information

For the fourth question, it shows from chart 3.3 that majority of the respondent are strongly agree to say that using the product of Digital Site Diary will save time of staff to collect the data information. Which 24 respondents are said strongly agreed while another respondent, 5 is answer agreed and 1 respondent answer neutral. This is because the time taken by the digital site diary application is very short because it only uses the phone compared to the conventional method where it is necessary to find each person in charge



Chart 3.3: Bar Chart of Respondent for Question 4

#### 4.5.5 Digital Site Diary is very easy to use

For the fifth question, it shows from chart 3.4 that majority of the respondent are strongly agreed to say that Digital Site Diary is very easy to use in collection data and daily work progress at site. Which 23 respondents are said strongly agreed while another respondent, 6 is answer agreed and 1 respondent answer neutral. This may be due to the way the methods for this Digital Site Diary are update the data information and collecting data information just by using the smartphone only and can follow up every activity progress work at site project just only from this application. It more relevant more than using the conventional method. It also more sustainable. Also, majority staff nowadays have smartphone so they are used to is with using the application



Chart 3.4: Bar Chart of Respondent for Question 5

#### 4.5.6 Data taken by Digital Site Diary is confidential

For the sixth question, it shows from chart 3.5 that majority of the respondent are strongly agreed to say that the data that been collected is safely be save in the application storage and very confidential. Which 22 respondents are said strongly agreed while another respondent, 6 is answer agreed and 2 respondents keep it neutral. This because all the data that been recorded it will save in this application storage for record use on another day and it also can print the record as the documentation if needed.



Chart 3.5: Bar Chart of Respondent for Question 6

#### 4.6 Mean and Standard Deviation of post questionnaire

Table 2.1 show the result of respondent when using Digital Site Diary at ECRL Section 5 Gebeng, Kuantan. There are 6 questions about usefulness and also effectiveness of Digital Site Diary at ECRL Section 5 Gebeng, Kuantan. The data was generated by using Microsoft excel 2019

Question	Mean	Standard Deviation
Using Digital Site Diary on progress at daily site project will enable the staff to get the information on the site quickly	4.83	0.46
Using the Digital Site Diary allow the staff to follow up the progress work at site project from anywhere	4.83	0.46
Digital Site Diary is useful in collecting data information of daily progress at site project	4.83	0.38
Using Digital Site Diary will save the time to collect data information	4.77	0.50
Digital Site Diary is very easy to use	4.73	0.52
Data taken by Digital Site Diary is confidential	4.67	0.61

Table 2.1: Mean and Standard Deviation of post questionnaire

#### **CHAPTER 5: CONCLUSION AND SUGGESTION**

#### 5.1 Introduction

This chapter's goal is to further develop and wrap up the research. It serves as a summary of the entire research, conclusions, and data analysis. It is necessary to accomplish the research's and study's objectives. To accomplish the study's goals, the final chapter summarized all the findings. The results of the questionnaire survey that was conducted in chapter four are presented in this chapter. The key findings are compiled in a conclusion. In addition, suggestions are made to provide a better working environment for the project team. By assessing the degree to which a certain research objective was accomplished, the Pembinaan Tetap Teguh (PTT) site evaluated the creation of this Digital Site Diary and determined its level of effectiveness. The researcher should propose a system update in this chapter that would make the project at hand considerably better and more functional. Another step is for the researcher to carefully analyze the proposals that will be made during the project once it has been completed. The creation of this project is intended to make it easier for users to track the systematic development of their work. Employees at ECRL Section 5 Gebeng, Kuantan are also trained in the Innovation Revolution 4.0 (IR 4.0) technologies used in the development industry

#### 5.2 Conclusion

In conclusion, the main goal of the research is to collecting data information of progress work for site diary at site is more easily, as well as the challenges that arise in the Issue of collecting data, this issue the researcher find this company still not managed properly for instance lack of information gained from all responsibility party which led to miscommunication can be reduced. According to the results of the analytical questionnaire, the majority of respondents have assuming that the conventional method in collecting data information for site diary is not suitable in this IRR 4.0 era which is the use of concept Internet of Things (IOT) is the main objective. Especially when using conventional methods to collecting the data information and also to follow up the progress work at site by using social media (WhatsApp), and staff dislike it because it is less appropriate and unsystematic. Based on the first objective, to study the details the issue about the method of

this company is using to collecting the data information especially for site diary report, it is clear that it showed the objectives had achieved. After the problem has been clearly described, the study's second objective emerges, which is to develop a Digital Site Diary using mobile apps. In order to assess feedback on the system's efficiency during task tracking, expect validation surveys to be delivered as part of the final aim. The results show that respondents firmly feel that work at site Pembinaan Tetap Teguh in collecting the data information and also follow up progress can be managed very well by using the Digital Site Diary for Construction. Digital Site Diary helps provide on-site progress monitoring for daily updates and can reduce communication breakdowns. Since users are happy with how it clear and understandable to operate the apps, Digital Site Diary has been suggested for use at the ECRL Section 5 Gebeng, Kuantan site.

#### 5.3 Recommendation

The researcher would like to offer some recommendations that can be utilized as a guide or course of action for the future enhancement of using the Digital Site Diary in order to make it more effective over time in light of the aforementioned findings.

#### i. Open up to another platform

This application is currently in the early stages of development and the use of this application is limited to use for users of the android smartphone platform only. In the future, it is proposed to improve the use of this application for iOS users and also developed into a website for more various platforms that can be used to use this application.

#### ii. Publish to developer market

Currently, nearly every worker in the construction sector has a personal or business cell phone, making it convenient for them to connect with one another. It was suggested that the programmed be made available to users of both Android and iOS through developer marketplaces like Google Play or the App Store. The staff at the building site may become more interested in using this programmed as a result, to some extent.

#### iii. Internet Coverage

A person in the field can continue working on any mobile business app using offline mobile applications without worrying about WIFI or a cell signal. This is due to the fact that several project locations, like the MCKIP project, are primarily in forests. Internet line coverage is therefore somewhat erratic. Therefore, it won't be a problem for the project site's staff to utilize in the future if there are ongoing efforts to improve the internet coverage. Users may therefore access documents, gather data, and keep photographs even when there is no network coverage or Internet connection. They can even access manually. This programmed is still capable of functioning even when a signal is lost.

#### iv. Multipurpose application

In the future, we plan to improve this application by making it possible to diversify its use not only for site diary documentation but also for other documentation work such as Request Work Inspection (RWI) and Request for Surveyor (RFS)

#### 5.4 Advantage of using Digital Site Diary

Using a digital site diary had several advantages over the conventional method such as:

a) Improved accessibility and sharing

Digital site diaries can be accessed from anywhere and at any time, as long as there is an internet connection. This accessibility allows project stakeholders, such as managers, clients, contractors, or regulatory authorities, to review and monitor project activities in real-time, promoting better collaboration and communication.

b) Data backup and security

Digital site diaries can be automatically backed up and stored securely in cloud-based servers or databases. This backup feature helps protect against data loss due to unforeseen circumstances such as physical damage, theft, or hardware failures.

c) Increased data storage capacity

Digital site diaries can accommodate large amounts of data, including text, images, videos, and audio recordings. This expanded storage capacity enables comprehensive and detailed documentation of site activities, observations, and incidents.

d) Enhanced accuracy and reliability

Digital site diaries reduce the risk of human errors and inconsistencies that can occur in manual record-keeping. With digital tools, information can be entered accurately and in a standardized format, ensuring reliability and consistency in the documentation.

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