



DEVELOPMENT OF WEBSITE-BASED MANAGEMENT INFORMATION SYSTEMS FOR BUILDING CONSTRUCTION

Muhammad Ramadhan Abdurrahim

Fakultas Teknik Sipil dan Perencanaan Universitas Gunadarma

Email: muhammadrama.mail@gmail.com

Abstract: *Project managers are generally constrained by limited time and location to monitor the implementation of daily construction tasks. This problem makes monitoring and coordination run slowly. By utilizing internet technology, the author aims to develop an online management information system that computers or smartphones can access for stakeholders. This research aims to ease tasks such as progress reports and field monitoring with a database that can store soft copies of project data on one server. The analysis follows the waterfall method, requirements, design, coding, and testing in the local server, then uploads the .php index to the database server. This website application helps managers, owners, and other employees by facilitating the process of monitoring, reporting, and discussing even remotely. Using programs such as HTML, PHP, and MySQL, the author developed a website that speeds up the managerial process and creates a database server for storing digital documents. Users of this application were assessed a scale of 1 to 5: Interface design: 4.25, User-friendliness: 4.5, Facilities: 4, Access speed: 3.25, so it has an overall score of 4.25 out of 5.*

Keywords: *Application, Building Construction, Management system, Monitoring, Website.*

INTRODUCTION

The construction world should keep pace with the current information era by utilizing the development of information technology, especially the internet. Internet-networked computers make it easier to work concerning access distance and time. For example, in the research conducted by Mudjahidin (2012) supervision activities at the Surabaya Bina Marga Office, which usually take 6 hours, with the help of a website application, can be shortened to 1 hour 40 minutes. This incident can happen because a limited number of supervisors have to travel to visit various road works in several locations, assisted by the existence of a management information system that can monitor various projects simultaneously. Similar research was proposed by Devianto & Widiyanto (2021) to produce a web-based assignment management communication system that can display a *to-do list* of daily jobs for employees who the project manager has scheduled.

Furthermore, the manager can see a report on the results of the tasks that have been completed. However, this research has yet to apply a *timeline* or s-curve to each *task*, so the *deadline* work is difficult to monitor; this is already covered in the system developed by the author. Furthermore, Rizky Widagdo et al. (2015) research produced a website-based management information system using a *relationship diagram* system design. In the *site office manager* of this system, the files that can be accessed include a *dashboard*, work, progress reports, schedules, and documentation, but this website is only a *local host server*. In contrast, the system designed by the author is online and can be accessed via the internet.



Furthermore, Magdalena et al. (2022) research produced a (2022)*object-oriented analysis and design* methods. The design of this system focuses on project financial management that is made *online* and includes a table of job data such as employer *entry*, contract *entry*, work *entry*, transaction detail *entry*, billing account *entry*, receipt *entry*, expense *entry*, contract *history*, *billing history*, receipt reports, and external reports. This system is made only for one user party, namely, the contractor service provider, while the author creates a system that can be used by service providers, service users, and even third parties. Furthermore, Setiawan et al. (2010) research produced web-based project management applications for small-scale construction services. This system starts with service providers getting development project *orders*(2010)*client* data into the system.

Furthermore, the estimator will make a budget plan and work schedule. Then, in its implementation, the *user* will enter the realization of the activity report into the application, but this system is only for internal companies. Furthermore, Nitithamyong & Skibniewski's (2004) research explains the success and failure factors in the web-based construction project management system implemented at Purdue University - USA. The advantage of this system is that it has features including *document management, project workflow, project directory, central logs, revision control, advanced searching, conferencing and white-boarding, online threaded discussion, schedule, and calendar*. However, the implementation of this system is still constrained by non-technical things(2004)the non-collaborativeness of potential users.

Furthermore, Chan & Leung (2004) research produced a prototype of a web-based project management system using *a unified modeling language modeling* and (2004). This system includes *document management, workflow management, team communication, and project place and administration of projects*. Nevertheless, this study only focuses on analyzing user needs. Furthermore, Anne-Mai Adamsoo (2010) research resulted in a web-based project management system that can add new user accounts, change the assessment rights of each account, *and upload*(2010)*download files*. However, *the interface/web design* is still straightforward. From the advantages and disadvantages of the management system above, the author designed a *website* application that can more fully accommodate the needs of information for project construction.

According to Shen et al.(2006), one of the indicators of contractor competitiveness is the information technology and operational effectiveness. This indicator shows that a construction project must also consider factor technology. Project administrators conventionally carry out documentation of project progress data using a *hardcopy* file system; project progress reporting data is daily placed in a container/warehouse containing files, which result in finding it challenging to search for data reporting the progress of each activity.

Table.1 Futures System Analysis

Futures System Analysis		
Types of Analysis	Offline System	Online System
Performance	Data collection process using <i>print-out copy</i>	Data collection process faster because <i>it is uploaded</i> directly to the <i>server</i>
Information	Work data is stored in the respective Personal Computer	Project progress data information stored in a shared server and can be downloaded by stakeholders
Economics	Warehouses, paper, ink, and other stationery for document storage.	Place, time, and ATK or equipment savings document storage.
Control	Manual development data reporting system and prone to <i>human error</i>	Humane error minimization
Efficiency	Recording the use of paper and the storage of files in the warehouse	Filing of structured documents in <i>server</i> folders
Service	Manually search for document data one by one	Data search can done with <i>search engine</i> features

According to Dimiyati & Kadar(2014), there are three essential elements in project management, namely:

- a. Project Manager: The essential element in project management is the project manager because he is responsible for planning, directing, and rationalizing the working efforts of the members to achieve the goals.
- b. Project Team: A project team is a collection of people from different functional areas who work together to complete the job.
- c. Project Management System: Project managers and project teams should be tools in project management systems. The project management system is created based on organizational structure, information, processes, and training, as well as vertical and horizontal. The vertical system includes solving tasks, while the horizontal includes functional units and departments involved in the project.

Efficient management of all these elements is essential in implementing a good project. Therefore, the purpose of this study is to develop an *online* management information system in the form of a *website* that can be accessed with a computer or *smartphone* for relevant officials regarding progress reports and *monitoring* work in the field, with a *database* that can store *soft copies of* data and project information in one place.

METHOD

To create a management information system that facilitates evaluation and *monitoring*, the framework of the method is prepared as follows: (1) Data collection; (2a) Website SIM Design (2b) PC tools, *Webserver*, PHP, MySQL, jquery; (3a) Needs analysis (3b) Page Design Stage (3c) *Coding* (3d) Tests on *Local Server*; (4) Upload *the Index .php* to the *Database Server*.

This website is only intended for officials related to the Metro Penthouse building project by PT. Margahayuland Development, such as contractors, consultants, supervisors, and *owners* located in Bandung. Regarding the access rights of each party will be explained as follows:

Table.2 Website User Authorities

Website User Authority		
User Type	Position	Right of Access
General visitors	Potential buyers	View photo documentation
<i>Project</i> stakeholders	Commitment-making officials and employees of service providers	Upload, download, and comment
Administrator	<i>Website manager</i>	Upload, download, comment, and delete

Research variables needed in this project management information system include: (a) Contractor data with attributes of company name, logo, project address, organizational structure, employee name, and position; (b) Report data with attributes of activities, physical progress, workers, equipment, and documentation; (c) Plan data such as *schedule*, *mapping zone*, presentation, s-curves, working methods.

The primary data search method is sourced from interviews and contractors' discussions. The results of this discussion will be used to increase the output produced. Meanwhile, secondary data includes project information, photos and logo image reports from consultants and contractors, implementation schedules and physical progress, and information on personnel interested in the project.

The research instrument uses hardware in the form of a laptop with specifications: (a) Manufacturing / Model: Sony / VPCEB4AFX, (b) Processor: Intel® Core™ i3 CPU, (c) Memory: 4096MB RAM, (d) Operating System: Windows 7 Home Premium 64-bit While the software used in the development of this website consists of (a) Word processing applications: used to record reports in the form of documents and worksheets in the form of Microsoft Office Word 2010. To programmatically use the Notepad++ application. (b) System builder applications/programming languages: The programming languages used are PHP and MySQL as database processors. (c) *Web server* application: The application used is XAMPP; it is *open source*, supports web dynamics, and has been included in the HTTP server and MySQL *database*. (d) *Web browser* application: Google Chrome. (e) Web accessibility can use both Android and Windows OS

The analytical method used in this research is a qualitative writing analysis following *the waterfall method*, with a systematic approach to building software. The waterfall scheme has the following *software* development cycle (Tantra, 2019):

Requirements determine what needs to be prepared so the project can be carried out correctly. Second, *the design* includes a description of what component structures will be used in *software* development. Furthermore, coding of the result *software* design is translated into a language understandable to the computer. *Finally, testing, namely*, the system review, will be demoed to potential *website* users and carried out on the existing *web server hosting*—the final result is in interviews to collect responses from application users.

DISCUSSION

Access rights on the *website* page will be divided into three *displays* according to the rights and interests of the user, as follows:

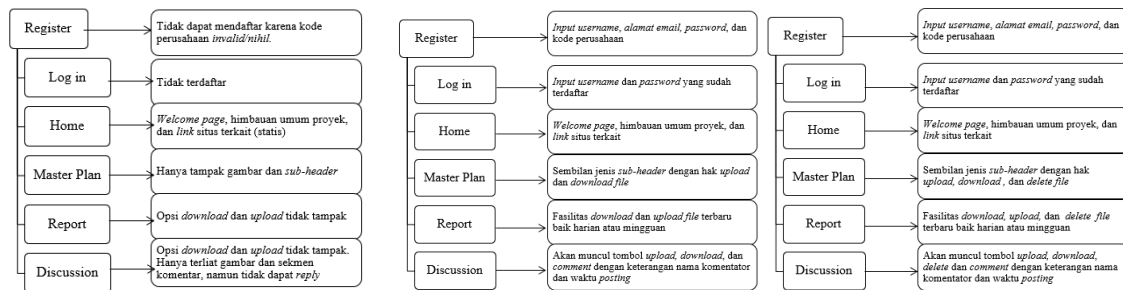


Figure 1. Page Structure of Visitors (Static), Users, and Administrators

The design model starts from need analysis, design sketches, and coding to the program's implementation stage.

1. Registration and Login Page

Function: A page to register as an active user

Description: Users who have yet to be registered must fill out the form first, and then they will be confirmed their activeness via *email*. Meanwhile, those who have been registered can immediately fill in their *username* and password and then click *submit*.

Properties: Has a custom *input* field with an administrator-defined password, so only company employees or interested officials can be active users.

Logo

Home Master Plan Report Discussion Login Register

Image

Form Register Member

Username

Alamat Email

Password

Code

Register

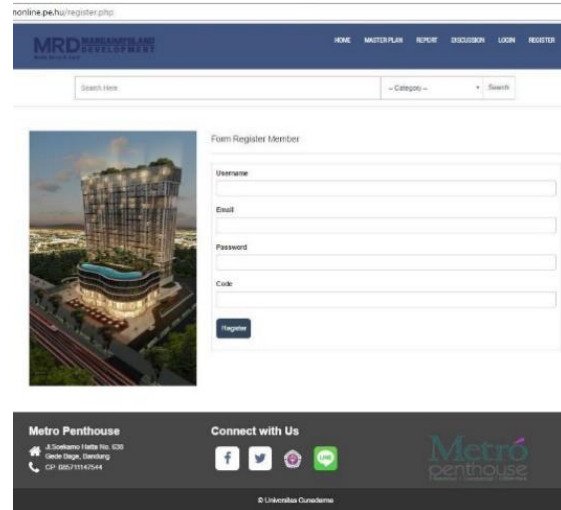
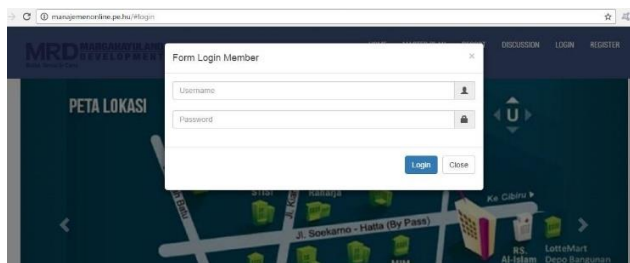


Figure 2. Layout Register Page



Form Login Member

Username

Password

Login Close

Figure 3. Form Login Member

2. Home Page

Function: The user's morning welcome page that contains general project information.

Description: This page contains *links* to the website of the Margahayuland Development Center, group social networks, office addresses, *contact persons*, and general appeals regarding daily activities in the project.

Properties: *Image slider* of project photo

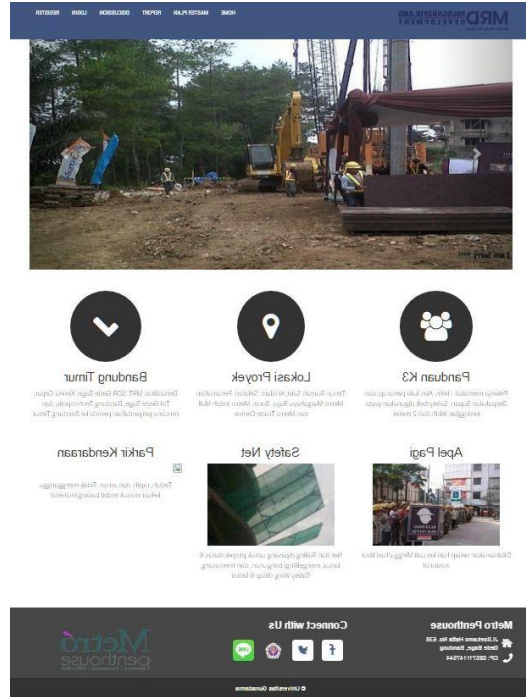
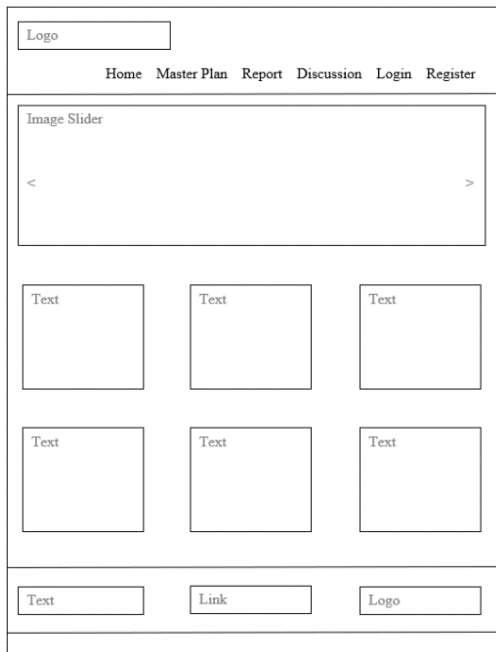


Figure 4. Layout Home Page

3. Master Plan Page

Function: *Back-up memory from softcopy* archives and as a general guide for implementing this work.

Description: Contains archives regarding the organization of projects, *drawing* and *mapping zones*, human resources, materials, work methods, and other archives in the form of xls, Docx, pdf, or ppt. Properties: Has the facility of uploading and downloading files in the form of images (.jpg,.png), Ms. Word (.doc), Ms. Exel (.xls), Ms. Power Point (.ppt), Drawing (.drw), PDF (.pdf), and Video (.mp4,.mkv).

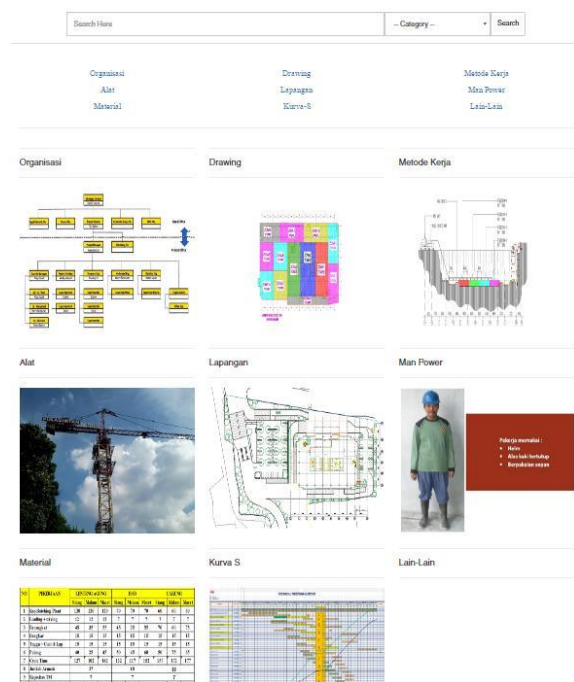
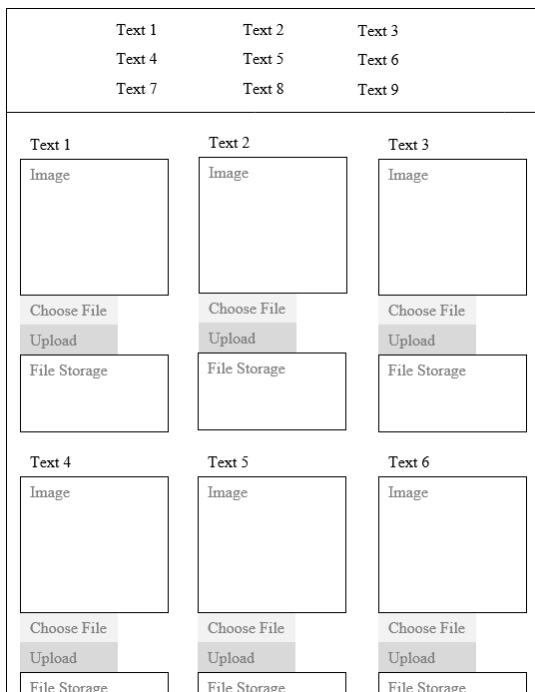


Figure 5. Layout Master Plan Page

4. Report Page

Function: To convey *the schedule* and physical progress of the project.

Description: Related staff make daily / weekly reports *online* with the *choose file* button (select the archive to be uploaded from the computer), then click *upload* until the relevant officials can download the results of the report

Properties: Has the facility of uploading and downloading archives along with notes

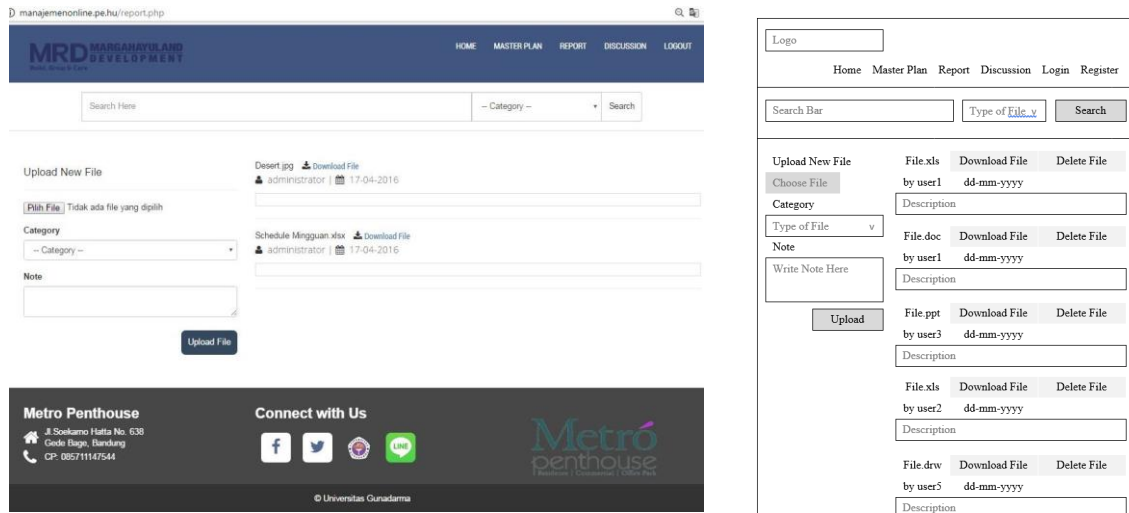


Figure 6. Layout Report Page

5. Discussion Page

Function: Discusses the obstacles that arise in the field when the manager (decision maker) is not in the office.

Description: Staff upload *files* to the *chosen file* button and then click *the upload* so that relevant officials can make suggestions and discuss them with each other in the comment's column.

Properties: Has the facility of uploading, downloading *files*, and replying to each other's comments

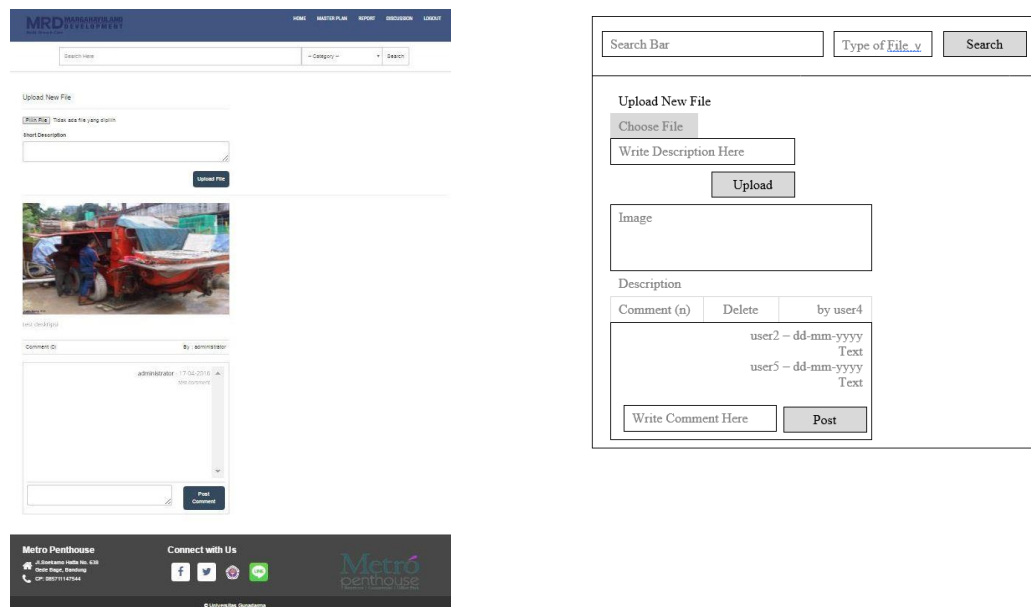


Figure 7. Layout Discussion Page

Users can access *the website* with computers/laptops (1350 pixels) and *smartphones* up to 275 pixels. After the *web development* process is completed at *localhost*, the next step is uploading *the web code* to an *online server* so everyone can access it. *The Author's* hosting is provided by *hostinger.co.id* with the *pe. hu subdomain*. The *MySQL* database must be developed on the homepage by creating a database name, *username*, and *password*. Once a unique code is generated, the *connection.php* needs to be developed by changing the *host* code to *mysql.idhostinger.com*, the *user* to *u373742888_us*, the *password* to *••••••••*, and the *database* to *u373742888_db*. The final step is to manage *the file manager* options, press the *upload* button, and select the *website data* to be published.

The website application has been completed and is ready to be accessed from anywhere and anytime, with the address *manajemenonline.pe.hu*. After *the test and run*, potential users are asked for feedback and input, including:

- a. 2000 MB storage capacity is considered less significant for *video uploading* purposes
- b. The absence of ads on the website is appreciated
- c. There needs to be a manual or guide for using a short and clear website because only some employees (HR) follow technological developments.
- d. Website securities have not been tested.
- e. Applications that can be accessed via smartphones are beneficial in the field.
- f. The provisions of the tool (computer) specification are considered easy and familiar to use, so there is no need to install special programs.
- g. The creation of a free-of-charge networking site is also appreciated
- h. The application is rated good because it is not only for one project but can also be changed for later projects
- i. The existence of a photo gallery of project progress makes it easier for potential apartment buyers
- j. Social media button is considered unnecessary
- k. Clean and easy-to-understand website design

To measure the satisfaction of potential users, a simple questionnaire was distributed on a scale of one to five and consisted of five questions. Below are the results of the questionnaire:

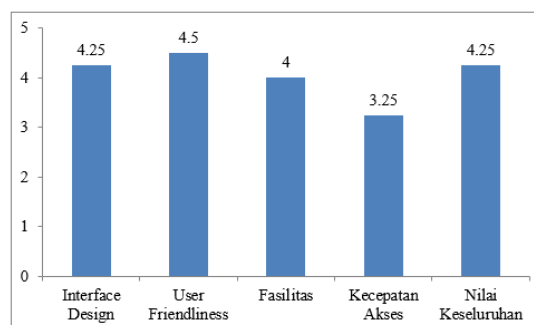


Figure 8. Potential User Satisfaction Graph

The graph above shows that potential users are satisfied with the performance of the network site application in terms of design, appearance, and completeness of the facilities,

especially in terms of ease of use. Although the speed of access (loading) from the server is considered fast.

CONCLUSION

The development of a management information system in the form of an *online website* application has been successfully formed. It can be accessed from a computer or *smartphone*, accelerating and facilitating reports and supervision in the field. *The database server* was successfully created, making storing data (*back-up*) *soft copies* of project information easier. *The user* of this management information system application, PT Margahayuland Development, assesses the good application by providing an average satisfaction score of 4.25 on a scale of 1 to 5. Application compatibility has proven successful so that it can be accessed via the internet with computer or *smartphone* operating systems anywhere and anytime. The advice that the author can give is in the future to increase the *server's bandwidth* and *disk space*, provide tutorials on using applications, and update security systems

BIBLIOGRAPHY

- Anne-Mai Adamssoo. (2010). *Web Based Project Management System Technology and Communication*. https://www.theseus.fi/handle/10024/16996%0Ahttps://www.theseus.fi/bitstream/handle/10024/16996/Aadamssoo_Anne-ai.pdf?sequence=1
- Chan, S.-L., & Leung, N.-N. (2004). Prototype Web-Based Construction Project Management System. *Journal of Construction Engineering and Management*, 130(6), 935–943. [https://doi.org/10.1061/\(asce\)0733-9364\(2004\)130:6\(935\)](https://doi.org/10.1061/(asce)0733-9364(2004)130:6(935))
- Devianto, D., & Widiyanto, E. D. (2021). Aplikasi Manajemen Proyek Berbasis Web Dan Mobile. *Jurnal Sistem Komputer*. <https://garuda.kemdikbud.go.id/documents/detail/2236098>
- Dimiyati, H., & Kadar, N. (2014). *Manajemen proyek*. CV Pustaka Setia.
- Magdalena, H., Santoso, H., & Leonita, L. (2022). Sistem Informasi Pendanaan Proyek Berbasis Web Pada Perusahaan Jasa Konstruksi. *Jurnal Transformatika*, 19(2), 162. <https://doi.org/10.26623/transformatika.v19i2.3670>
- Mudjahidin, M., & Dita Pahang Putra, N. (2012). Rancang Bangun Sistem Informasi Monitoring Perkembangan Proyek Berbasis Web. *Jurnal Teknik Industri*, 11(1), 75–83. <https://doi.org/10.22219/jtiumm.vol11.no1.75-83>
- Nitithamyong, P., & Skibniewski, M. J. (2004). Web-based construction project management systems: How to make them successful? *Automation in Construction*, 13(4), 491–506. <https://doi.org/10.1016/j.autcon.2004.02.003>
- Setiawan, A., Gunawan, I., & Hanjaya, S. (2010). Virtual Aplikasi Manajemen Proyek Berbasis Web Pada Perusahaan Jasa Konstruksi. In *Virtual Aplikasi Manajemen Proyek Berbasis Web Pada Perusahaan Jasa Konstruksi* (Vol. 1). Petra Christian University. http://repository.petra.ac.id/16941/1/Publikasi1_04021_1888.pdf
- Shen, L.-Y., Lu, W.-S., & Yam, M. C. (2006). Contractor Key Competitiveness Indicators: A China Study. *Journal of Construction Engineering and Management*, 132(4), 416–424.



Received: 2022-08-24 Revised: 2022-09-22 Approved: 2021-09-24

[https://doi.org/10.1061/\(asce\)0733-9364\(2006\)132:4\(416\)](https://doi.org/10.1061/(asce)0733-9364(2006)132:4(416))

Tantra, R. (2019). *Manajemen Proyek Sistem Informasi: bagaimana mengelola proyek sistem informasi secara efektif dan efisien*.

Widagdo, R. R., Dundu, A. K. T., Sibi, M., & . (2015). Perancangan Sistem Informasi Manajemen Berbasis Website Dalam Proyek Konstruksi (Studi Kasus : Pembangunan Kantor Makodam 13 Merdeka Di Manado). *Sipil Statik*, 3(11), 767–774.

Copyright (c) 2022 Muhammad Ramadhan Abdurrahim



This work is licensed under a [Creative Commons Attribution-NonCommercial 4.0 International License](https://creativecommons.org/licenses/by-nc/4.0/).