JSE Journal of Science and Engineering, Vol. 2, No. 2 (page: 60-65)
e-ISSN: 2723-3944 January 2024
DOI: https://doi.org/10.30650/jse.v1i2.3842

Review of The Existing Drainage Channel Development Method (Case Study: Semani Road Environment (Sentosa-Remaja-Ahmad Yani)

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Abstract – The purpose of this review study is to see the effectiveness of the method of implementing primary canals in the Semani environment (Sentosa-Remaja-Ahmad Yani) Management and Development of Drainage Systems that are Directly Connected to Rivers across Regency/City Areas and Provincial Strategic Areas. This condition shows the importance of handling drainage problems. Measurements use mechanical and manual, data collection is carried out in natural settings (natural conditions), primary data sources and data collection techniques involve more participant observation, in-depth interviews, and documentation. From the results of reviews and observations during practical work, I concluded that we can really learn the techniques and conditions for making good drainage. so that the desired results can be maximized. The benefit of this study review is that we know how effective the work of the Semani environmental drainage project (Sentosa-Remaja-Ahmad Yani) is. It is hoped that this will eliminate the problem of flooding in the area.

Keywords: Job Review, Method, Precast Baton, and Location

Submitted: 23 November 2023 - Revised: 24 January 2024 - Accepted: 27 January 2024

1. Introduction

Along with the development of the population, especially the city of Samarinda, water problems are increasing. In general, the primary drainage channel is a channel that uses gravity to drain water towards a translucent exit in the Karangmumus river. Samarinda is one of the most populous cities in East Kalimantan, considering the many problems that arise due to the dense population resulting in environmental damage and one of the problems that occurs as a result of this environmental damage is the problem of flooding which often occurs in the city of Samarinda.

In the city of Samarinda, especially Jalan Pemuda 1, which is one of the densest residential areas and is included in an industrial area, this has an impact on environmental conditions which causes frequent flooding which greatly disrupts community activities[1,2]. The flooding that occurred was the result of waste and poor drainage. Management and development of drainage systems that are directly connected to rivers across districts/cities and provincial strategic areas [3,4]. The problem of flooding and inundation that occurs on Jalan Semani (Sentosa-Remaja-Ahmad Yani) can be overcome by redesigning the drainage channels according to the flood capacity of each segment of the existing channels.

Overview of the implementation of the existing drainage canal construction implementation method (case study:Semani road environment (Sentosa-Remaja-Ahmad Yani) includes 3 fabrication sites in different locations, Permata in the second grouse in Panjaitan and the third in Pemuda 1, from all of these locations one casting produces up to 50 precast per location so there are a total of 150 precast concrete [5]. The u-ditch drainage method uses mechanical and manual methods.

2. Objective

The goal to be achieved in this writing is to determine the effectiveness of the implementation method for the construction of Semani environmental drainage (Sentosa-Remaja-A.Yani) Jl. Youth 1.

3. Research methodology

In this field work practice the method I use is:

1. Practical Work Methodology
   In an activity, data collection is carried out in natural settings (natural conditions), primary data sources and data collection techniques involve more participant

observation, in-depth interviews, and documentation [6,7]. In providing a clear picture in this report, the author tries to collect data as needed [8,9,10]. This report is essentially a report on field observations during the construction of the Semani Scope Drainage project (Sentosa-Remaja-A.Yani). I used several data collection methods as follows:

a. Field Observation Method (Observation)
   In this method, you make direct observations in the field regarding the techniques and methods of the ongoing work. This is done by looking directly at the work you want to observe and then taking the data, in addition to making observations about problems that arise when project work is underway.

b. Interview Method (Direct Interview)
   In this case we conducted interviews or direct questions and answers with all parties involved in the project, interviews with project supervisors, contractors, foremen, and builders regarding matters in the implementation of the Semani scope drainage project (Sentosa-Remaja-A.Yani) .

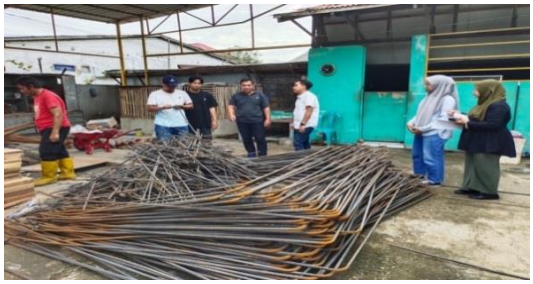

Figure 1. Interview

c. Descriptive or reading method (Literature)
   This method is carried out to fulfill the data obtained in the field by using various references related to things observed in the field, so that a more accurate and in-depth understanding will be obtained.
   The approach methods offered for problem solving include:
   Engineering Approach: planning, implementing and supervising the installation of drainage channels.
   Social Approach: Formation and socialization of development committees from community members for the installation of drainage channels.
   The activity plan includes the process of planning, organizing and controlling the activities of various resources within the organization through systematic, coordinated and cooperative efforts to achieve the goal of installing drainage channels.

2. Research sites
   Research sites carried out in the Semani Environmental Drainage Project (Sentosa-Teenager-Ahmad Yani) Jl. Youth 1 city of Samarinda. The time for doing work practice starts May 22, 2023 - August 11, 2023.

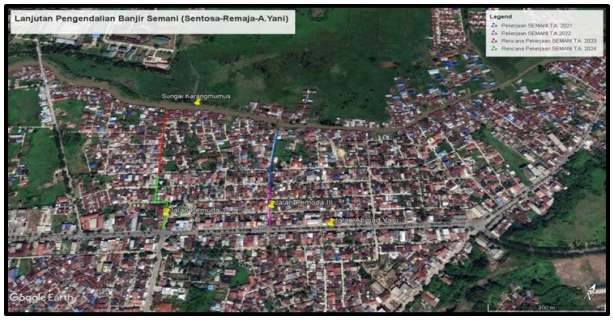

Figure 2. Project Location

4. Results And Discussion

The project can be defined as a series of work activities consisting of a series of work parts that are interrelated with one another and involve many people and human resources to do everything in it, with a certain cost and time, regarding preparation, surveys, drafting, to the implementation of the concept, which in the end jointly achieve a predetermined goal [11]. In accordance with the scope of the observation on the Implementation of Environmental Drainage Channel Development for Jalan Semani (Sentosa-Remaja-A.Yani) which uses a combination of mechanical and manual methods.

The work that I have observed for the past 2 months is that there are three places for u-ditch fabrication, namely Jl. Belibis, Jl.Pemuda, Jl. Panjaitan. The following is a description of the work on the implementation project for the Construction of Environmental Drainage Channels Jalan Semani (Sentosa-Remaja-A.Yani) Jl.Pemuda 1. Location of grouse fabrication work to the project site in Pemuda 1 as far as 2.5 km, u-ditch fabrication in grouse as much as 50 precast. The Panjaitan fabrication location to the youth 1 project site is 3.9 km away, at the Panjaitan location there are 50 precast concrete. As for the fabrication work in Youth 1 as far as 50 m. in Youth 1 there were 50 u-ditch preprints during the observation of this practicum review taking place.

Implementation is the realization of the planning and design stages. With different conditions between the time of planning and implementation. This practical work focuses on observing the work review of drainage project development methods. In this case the author observes some of the work which includes measurement work (drainage channel length 300 meters) Measurement, Soil excavation, Landfill, Steelwork, Formwork, Slump Flow Testing, Casting, U-ditch precast concrete installation. In

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the Semani Environment Drainage Development Project (Sentosa-Remaja-A.Yani) Samarinda City.

4.1. Measurement

The method of using this measurement is to get the size/dimension and elevation of the construction, before starting work it is necessary to measure it first, namely by placing stakes per STA for installation with these stakes to be carried out on each main work and measurements will use manual measuring devices (Measuring Wheels). And the results of measuring the length to be carried out are 300 m long.

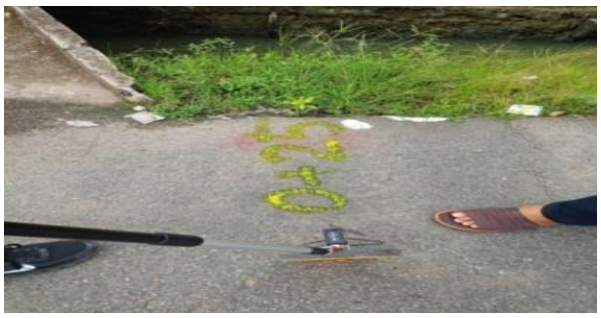

Figure 3. Measurements

4.2. Soil excavation

The work method is mechanical, excavation is carried out after measurements and a bowplank is made according to the shop drop drawing [12,13]. The final process of the u-ditch channel uses heavy excavators with a trimming slope system, so the fill area uses soil from the excavation. The work must be completed with the finish that is made so that the slope of the land is in accordance with the requirements. Enlarging that does not adjust to the increase in land will cause air retention in the channel because air cannot flow properly [8]. The initial excavation should consider the backfilling of sand under the canal first, where the sand is used as a stabilizer for the soil under the canal. After the process of limiting.

4.3. Soil excavation Work

After measurements, excavation work can begin. The excavation elevation is controlled based on the elevation that has been stored in the stakes [14,15,16]. Excavation of the soil using an excavator. Within 1 day the minimum excavation length target is 8 m to meet the ability of heavy equipment to install precast concrete, namely 8 units.

Figure 4. Soil Excavation

4.4. Heap of Excavated Land

The landfill method uses a mechanical method, as long as the excavator is excavating, 1 unit of dump truck is ready at the side of the excavation to accommodate the excavated soil [17]. The excavated land is immediately dumped into the field that has been provided by the contractor and after that there will be landfill again. Thus the area on the side of the excavation is relatively clean and ready to be occupied at any time by stocks of u-dtich precast concrete.

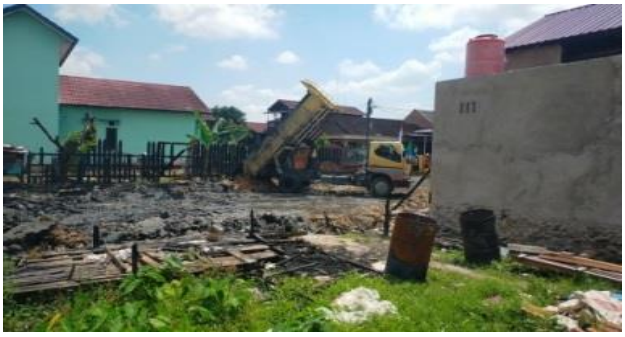

Figure 5. Heap of Excavated Land

4.5. Reinforcing

The method for carrying out reinforcement work, the general requirements that must be known regarding the supply of steel work materials are always familiar with the manufacture of structural elements [18]. This ironing work will affect the strength and durability of the u-ditch to be made. Here's the repair work:

1. Iron treatment should not be exposed to the floor or ground directly.
2. D13 iron cutting with a size of 2 m according to the initial calculation for making a U-ditch Drain.
3. Main iron or D16 iron bending using a machine.
4. D13 iron bending using the manual method.
5. Installation of stirrups, each meeting between the main reinforcement and stirrups is tied with a cross wire system.
6. Then install PVC pipe 3 to the reinforcement.

e-ISSN: 2723-3944

7. After the reinforcement has been assembled, the precast steel reinforcement is ready to be installed in the formwork.

4.6. Formwork

`The method of carrying out formwork work as follows:

1. Determine Formwork Size.
2. Cutting Plywood and wood as formwork.
3. Formwork assembly.

4.7. Floor and Wall Casting

Methods The work observed during these 2 months there were 3 u-ditch precast manufacturing sites located on Jl. Belibis, Jl. Youth 1, Jl. Panjaitan from the three places has 2 different casting methods, on Jalan Belibis casting using a mixer car connected using a 10 inch pipe, the casting work takes 3 days as much as 50 u-ditch. While casting on Jl. Panjaitan uses a mixer car with a pump car. Then, the casting work takes 1 day as much as 50 u-ditch. The floor and wall casting method was carried out immediately after the mixer truck arrived because we used ready mix concrete.

Figure 6. Casting

4.8. Casting and Compaction

The compaction method is carried out while the casting is running using a vibrator machine [11]. The concrete mixture is poured into the formwork then the vibrator machine is turned on. Compaction is done by vibrating so that air or wind that is still in the mixture can come out and not cause cavities or holes which reduce the quality of the concrete.

Figure 7. Vibrator Machine Vibration

4.9. TestingSlump Flow

Testing the slump flow value using K-250 concrete was then carried out after the concrete was finished. The slump value test is useful for determining the feasibility of the mixture. Overall the slump flow test takes about 4 minutes. The test steps are as follows:

1. Place the mold on a flat, non-absorbent, and rigid surface. The mold shall be held firmly in place during filling by the operator standing on the tread. The filling of the concrete mix is divided into three layers. Each layer is approximately one third of the volume of the mold.

Figure 8. *Slump test*

2. Compact each layer with 28 joists using compactor rods. Spread reference evenly over the surface of each layer.

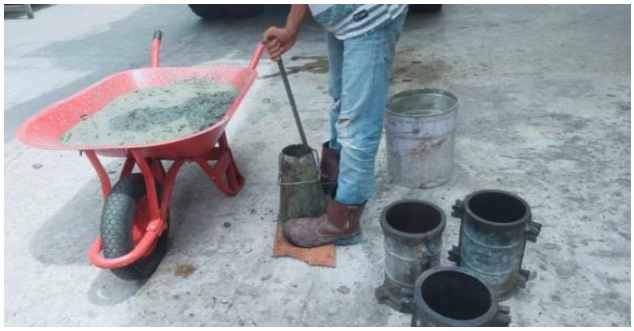

Figure 5.1Rojokan

3. When filling the top layer, overfill the concrete over the top of the mold before compaction begins. If compaction causes the concrete to sink below the top of the mould, add additional concrete to keep excess concrete at the top of the mould. After that, level the surface of the concrete at the top of the mold by rolling the awl over it.
4. Immediately remove the mold from the concrete by carefully lifting the mold vertically. Mold aggregates with a distance of 300 mm in 5 seconds.

e-ISSN: 2723-3944

5. Measure the slump by determining the difference in height between the top of the form and the center of the top surface of the concrete. In this study, the slump value was 10 mm

4.10. Installation of U-ditch precast concrete

[19,20] Precast concrete installation method that will be installed on site:

a. Installing 7 meter long stakes into the excavation using the help of an excavator to push the wooden stakes into the ground.
b. U-ditch precast concrete that is more than 28 days old from fabrication is delivered to the site and stocked at the location near installation.
c. Transfer of u-ditch precast concrete from the stock yard to the installation site using a crane and then loading it into a truck to be brought to the project site.
d. Installation of u-ditch precast concrete using a crane to move it to the drainage area. Installation of u-ditch every day an average of 6 units.

5. Problem Factors that Occur at the Project Site

In carrying out activities on the project, there are bound to be problems that interfere with the work. Many factors cause problems. These factors can come from natural, technical, licensing, operational, and human factors. Problems that occur in the implementation of the Semani environmental drainage canal (Sentosa-Remaja-A.Yani). Jl. Youth 1 as follows:

5.1. Natural Factors (Rain)

Rain is one of the natural factors that can hinder the implementation of work, especially channel control work and channel wall work, because when it rains heavy equipment activities are disrupted, and workers have difficulty carrying out casting. The solution chosen by the implementation of this project is to stop the work to avoid accidents, damage to heavy equipment, and make workers physically weak when working when it rains.

5.2. Damage Factor

The factor of damaged tools also has an effect on a project, if the tool is damaged it will disrupt ongoing work and cause worker delays.

5.3. Material Delivery Delays

Delays in material delivery due to distance and unfavorable weather. These problems will disrupt the canal construction process schedule that has been prepared by the previous contractor. Because the work on this drainage channel is included in the critical cross, resulting in no work (empty) for several days in the project. So the solution chosen by the executor of this project is to coordinate with the provider so that they can ensure the supply of materials so that there are no delays in delivery.

6. Analysis and Feedback

The contractor can prepare various backup implementation methods, in case implementation does not go according to the initial plan. For the problem of the rain factor that results in stagnant water with a high volume of water in the canal excavation, planning to construct a temporary canal at the edge of the drainage canal excavation, in order to facilitate work and reduce the occurrence of excessive sedimentation into the drainage canal due to rainwater. As well as using a water pump machine to drain stagnant water in the canal and throw it into the canal and throw it into the temporary canal, in order to facilitate the digging process and the drainage canal work process.

7. Conclusions and recommendations

7.1. Conclusion

[9]From the results of observations during practical work in the Review of Existing Drainage Canal Construction Implementation Methods (Case Study) for the Semani Road Environment (Sentosa-Remaja-Ahmad Yani) I draw the following conclusions:

1) The method of implementing the construction of the Semani scope drainage (Sentosa-Remaja-A.Yani) did not go according to the initial plan. Due to the erratic weather resulting in delays in work.
2) The method for implementing the Semani road environmental drainage development (Sentosa-Remaja-A.Yani) uses a combination of mechanical and manual methods.
3) Obstacles in the field that disrupt the course of the work come from natural, technical, licensing, operational, and human factors.

7.2. Suggestion

1) The need for a technical review regarding channel elevation measurements and a review related to Excavator operators during excavation so that the drainage canal digging process is in accordance with the plan and the canal can run optimally.
2) The contractor can prepare various backup implementation methods, in case implementation does not go according to the initial plan. For the problem of the rain factor which results in stagnant water with a high volume of water in the canal excavation, by planning the construction of a temporary channel on the edge of the drainage canal excavation.
3) There is a technical review related to the selection of heavy equipment, so that the drainage canal work runs optimally. .

e-ISSN: 2723-3944

References

[1] Aditama, Rw (Vol. 21 No. 2 July 2017). The Effect Of Resource Leveling On Labor Allocation In Construction Projects. Scientific Journal Of Civil Engineering.

[2] Arifin, Z. (2022). In Z. Arifin, Pengantar Manajemen Proyek (P. 31). Bandung : Pustaka.Ut.Ac.Id (*Text In Indonesia*)

[3] King, D. C. (1987). System Analysis And Project Management. New York: Mcgraw-Hill. (Book)

[4] Abdullah, M. (2014). Manajemen Dan Evaluasi Kinerja Karyawan. Yogyakarta : Aswaja Pressindo. (Book, *Text In Indonesia*)

[5] *U-Ditch Print And Manufacturing Process*. (N.D.). Retrieved From Https://Praprinter.Com/Material/Printing-U-Ditch-Dan-Hasil-Pembuatannya

[6] *How To Use The Vibrator Tool*. (2021). Retrieved Fromhttps://Www.Teknikmart.Com/Blog/How-To-Use-Beton-Vibrator/

[7] Roshindra, D. (2019). In D. Roshindra, Analisis Kombinasi Alat Berat Excavator Dan Dump Truck Pekerjaan Tanah (P. 50). Daerah Istimewa Yogyakarta: Dspace.Uii.Ac.Id. (*Text In Indonesia*)

[8] Herry, H. (2018, 7). Pancang Kayu Galam 10. Retrieved From Https://Www.Scribd.Com/Document/395842704/Patangan-Kayu-Galam-%C3%98-10-Doc#

[9] Insurance, T. (29 August 2022). Get To Know Hse And K3, Safety Aspects In A Company. Retrieved From Https://Tugu.Com/Artikel/Kenali-Hse-Dan-K3-Aspect-Keselamatan-Dalam-A-Corporation

[10] Nikhmatul Huda1*, Am (Volume 9, Number 5, September 2021). Factors Related To Work Accidents In Building Project Workers At Pt. X Year 2020. Journal Of Public Health (E-Journal), Http://Ejournal3.Undip.Ac.Id/Index.Php/Jkm.

[11] Sni Dt 91-0006-2007. (2007). Tata Cara Perhitungan Harga Satuan Pekerjaan Tanah Untuk Konstruksi Bangunan Gedung Dan Perumahan. (*Text In Indonesia*)

[12] Putri, Rm (2015). Review Of The Implementation Of The U-Ditch Drainage Development In The Betung-Sei Lilin-Regarding Road Preservation Project. Development Implementation Review .

[13] Prihatiningsih2, Rd (August 2021). Analysis Of Pile Foundation Section At The Edge Of Reclaimed Soil. Mitra Civil Engineering Journal, 10.

[14] Ratno, D. (2013). Influence Of Factors Incommunication.Http://Eprints.Itn.Ac.Id/Id/Eprint/2377.

[15] Jiang, Feng, Et Al. (2022). Building Demolition Estimation In Urban Road Widening Projects Using As-Is Bim Models. Automation In Construction Vol. 144. Https://Doi.Org/10.1016/J.Autcon.2022.104601.

[16] Amadi,A.A, Sadiku, S., Abdullahi, M., & Danyaya, H.A. (2018). Case Study Of Construction Quality Control Monitoring And Strength Evaluation Of A Lateritic Pavement Using The Dynamic Cone Penetrometer. International Journal Of Pavement Research And Technology Vol. 11, Issue 5, September 2018, Pages 530-539. Https://Doi.Org/10.1016/J.Ijprt.2018.07.001

[17] Seng Hansen, S. (Nd). Construction Contract Management. Jakarta 2015: Www.Gramediapustakautama.Com.

[18] T2, Et (Vol. 1, No. 2, Nov. 2018: 111-121). Journal Of Civil Engineering Partners. Analysis Of Factors Affecting The Main Contractor In The Selection Of Subcontractors In The Implementation Of Construction Projects, 12.

[19] Widhiawati1, Af (Vol. 5, No.1, January 2017, Pp. 1-87). Productivity Analysis Of Ready Mix Concrete Casting Method On Beam And Floor Site. Spectran Journal, Http://Ojs.Unud.Ac.Id/Index.Php/Jsn/Index.

[20] `Pupr. (2016). Spesifikasi Pekerjaan Tanah 2016 (P. 41). Bandung: Simantu.Pu.Go.Id. (*Text In Indonesia*)

e-ISSN: 2723-3944