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ANALYSIS OF THE APPLICATION OF GREEN CONSTRUCTION THROUGH THE UTILIZATION OF WASTE FROM THE DESTRUCTION OF PILE HEADS IN THE CONSTRUCTION OF THE IRRIGATION MODERNIZATION PROJECT (CASE STUDY PT. XYZ)

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ABSTRACT

Green Construction is a planning and implementation process to minimize the negative impact of the conduction process on the environment. The Problem is how to apply green construction in irrigation according to the regulations of PP 14 of 2021. So the method in the research used is a quantitative method with experimental methods and testing test objects in the laboratory. With the purpose of the study, it produces experts in the implementation of material processing and forming waste concrete material pile heads can be used as watershed aggregates for road construction and strengthening.

KEYWORDS: *Irrigation, Modernization Projects, Green Construction, Application*

1 INTRODUCTION

Green Construction is a planning & implementation of the construction process, the construction process on development is very large environmental impact. So that it can cause major changes in the surrounding environment, preventing this, a development concept that pays attention to the state of the environment is needed. This concept is known as an environmentally friendly building or can be called "Green Building" (Post The President, 2013). Minimizing the negative impact of the construction process on the environment in order to strike a balance between environmental capabilities and the needs of human life for current and future generations. The need for a sustainable movement through green construction or green construction that aspires to create construction from the planning stage, implementation and use of construction products that are environmentally friendly, efficient in the use of energy and resources, and low cost. This green construction movement is also synonymous with sustainability which prioritizes a balance between short-term gains and long-term risks, with the current form of business that does not damage the health, safety and well-being of the future. And the criteria for sustainable construction based on Government Regulation No.14 of 2021 in

the fields of Engineering, social, engineering and the environment. Environmental management includes the use of waste or the use of former pile head unloading debris. The problem is how to analyze the application of green construction through the use of waste from the destruction of pile heads in the construction of irrigation modernization projects at PT. XYZ, with the purpose of research to realize green construction through the use of waste from debris to unload pile heads into new products or as the basic aggregate for road construction and retrofitting. So the method in the research used is a quantitative method with experimental methods and testing test objects in the laboratory.

According to the U.S Enviromental Protection Agency, (2010), green construction is an effort to produce buildings using environmentally friendly processes, efficient use of resources during the life cycle of the building from planning, construction, operation, maintenance, renovation and even to demolition. Meanwhile, according to Budisuanda (2011), green construction can be mentioned into several aspects including: 1. Development processes that seek to reduce materials that damage the environment 2. The construction process that does not disturb the tranquility of the surrounding residents. 3. Implementation methods that do not produce waste above the tolerance threshold limit. 4. Implementation methods that do not disturb the balance of the surrounding nature. 5. Implementation of development that does not pollute the environment over harmful chemicals. 6. A development process that is supposed to make reuse of material remains. The definition of green construction is a project implementation process that refers to the principle of green (Environmentally friendly, energy-saving, natural resource saving and siding with the health factors of all project stakeholders). This green construction is one of the series in the procurement of green bulding. According to Imam Soeharto, realizing the impact of development activities that can have a major effect on the environment, the government issued Law No.32 of 2009 concerning the main provisions of environmental management, while its implementation was stated in PP No.29 of 1986.

1.1 Application of Green Construction

From the green construction criteria set by the government in accordance with PP 14 of 2021, the application carried out in irrigation modernization projects can be applied as follows:

1. Climate change and greenhouse gases in 3 types, namely (a). Management of environmental aspects (Use of non-halon fire extinguishers, use of non-CFC air conditioners and coolers and energy saving and education of employees and the community in maintaining the surrounding environment. (b) Monitoring electricity consumption (Recap Monitoring Electricity Consumption per Month and Recap Monitoring Fuel Usage per Month). (c) energy consumption savings Reduce Lamp Use by Utilizing Sunlight for Room Lighting, Light Intensity Measurement (+/- 250 Lux), Use of LED Lights, Use of Sunscreen to reduce Direct exposure to sunlight, Air Conditioner (AC) Temperature Regulation at (25*/- 1) C and Use of low energy electronic devices).

Figure 1. Implementation of climate change prevention and greenhouse gases

2. Non-emission air pollution of greenhouse gases consists of three types, namely management of environmental aspects (Use of non-halon fire extinguishers, Use of non-CFC air conditioners and refrigeration and energy saving and education of employees and the community in maintaining the surrounding environment). Monitoring electricity consumption. Recap Monitoring electricity consumption per month and recap monitoring fuel consumption per month, energy consumption savings), (3) Reducing Lamp Use by Utilizing Sunlight for Spatial Lighting, Light Intensity Measurement (+/- 250 Lux), Use of LED Lights, Use of Sunscreen to reduce Direct exposure to sunlight, Air Conditioner (AC) Temperature Regulation at (25 */- 1) C Use of low energy electronic devices.

Figure 2. Control of gas emissions, noise, vibration, air and lighting

3. Water management consists of 3 types of flowers. Conducting Infiltration Wells, Efforts to stabilize groundwater levels around the project / recharging well and Making biopore infiltration holes) : Management of Environmental Aspects, Use of Paving Blocks to enlarge water catchment areas (the land is ensured that there is water absorption into the ground and is not covered with asphalt or concrete). Making Sump Pit (Sludge setters & water catchment), Use of low-phosphate soap,

Measurement of dewatering (depending on the work item), Management of dewatering the concept of aeration (when water dewatering contains chemicals and Avoiding the concept of septic tanks and more using Bio-Tanks), Water Use Recycling (Utilization of re-water for field activities or water recycle / water reuse. There is a SIPA permit (when using groundwater). Minimalization Water Use The use of showers and faucets in water-saving bathrooms). And Water Use Monitoring (Measuring water use with a water meter, Sedimentation control / monitoring (depending on work items) Landslide control (depending on work items)

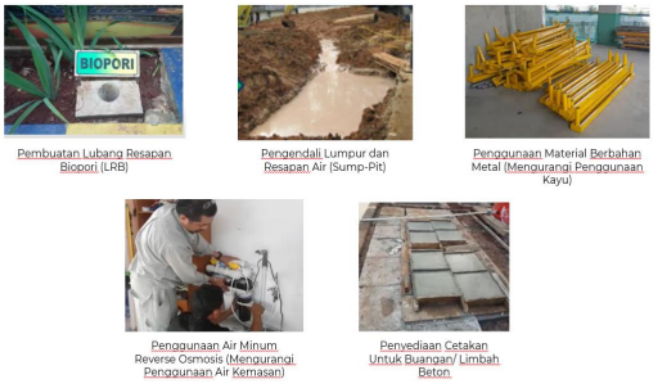

Figure 3. Management of environmental aspects

4. Waste management shall be project waste management, provision and selection of waste bins according to their type (waste segregation), transportation of waste periodically Monitoring the volume of waste based on the type of B3 and non-B3 waste. Promoting hazardous chemical pollution: Not using asbestos material, Procurement of special places for B3 materials, Procurement of special places for waste materials Certified B3 waste officers from the Environment. Provision of freezers for medical B3 waste (according to the risks in the field). Waste Utilization (Utilization of containers as contractor keet, Utilization of former pile head unloading debris (depending on the work item), Provision of molds for concrete discharge / overflow and data collection of B3 and non-B3 waste on a monthly basis).

Figure 4. Waste management

5. Ecosystems & biodiversity

Project Cleanliness Maintenance (Dust control in the project or installation of safety net /clading / greening with vertical garden. Garbage collection program and 5R). Maintenance Of Project Comfort (Care of plants around the contractor's keet And Supporting facilities to improve comfort. Reducing the impact of Cigarette Smoke (Installation of no-smoking signs around the project and Provision of smoking area facilities outside the keet board of directors / work sites. Environmental permits (SIPA permits or when using groundwater, Quarry Permits or when using natural materials), Non-Illegal Logging Timber Permits / when using wood materials and AMDAL/ RPL-RKL Reports are prepared and reported or adjusted to the obligations in the terms of the contract and Control of Rare Flora and Fauna. Data collection of felled trees with classification of rare flora species and socialization of the prohibition of killing rare fauna (depending on the project location).

Figure 5. Ecosystem and biodiversity management

2 MATERIALS AND METHODS

This research uses qualitative research methods. Data needed in the study: Waste management efforts carried out by parties involved in building construction projects at PT. XYZ to realize green construction Primary data is obtained from the results of interviews while secondary data is obtained from documents owned by parties handling the construction of PT. XYZ. related to waste management and green construction. The sampling technique used in this study was purposive sampling. Purposive sampling is a technique for sampling data sources with certain considerations (Sugiyono, 2013). The people who were used as resource persons were practitioners who handled the four projects that were used as research objects, namely the site manager and K3 from the contractor, field supervisors from construction management consultants and project design planners from planning consultants. The data collection techniques used in this study are in-depth interviews and document studies (content analysis) related to waste management and green construction.

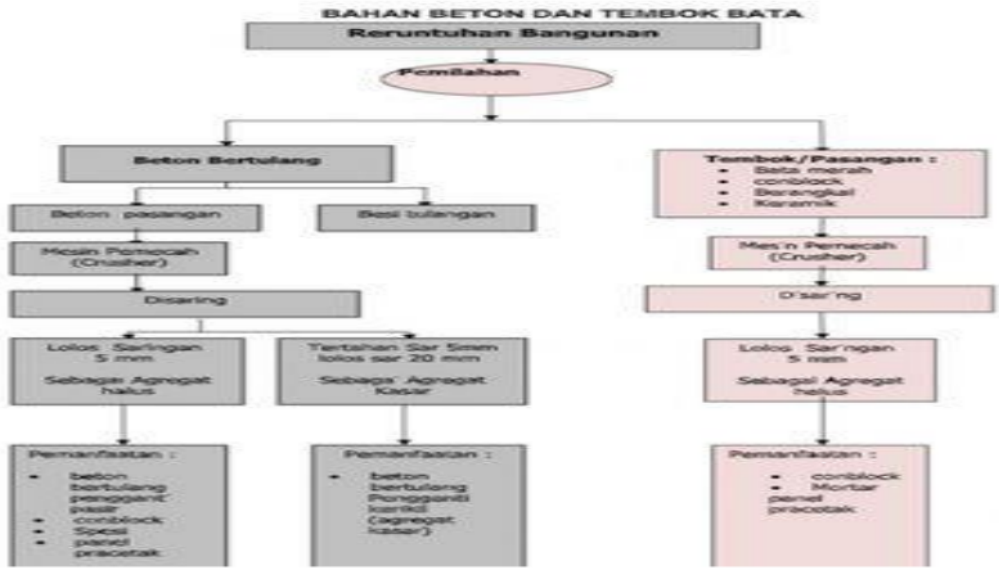

Figure 6. Building Ruins Material Chart (Concrete Materials and Brick Walls)

Causes of the emergence of construction waste Things that are the causes of the emergence of construction waste in pt. XYZ: a. Design / Planning in terms of design / planning which is the cause of the emergence of construction waste is a design that must consider lighting and lighting such as: The shape of the building and the size is not suitable which causes a large number of glass pieces left. Meanwhile, the design change is not the cause of the emergence of construction waste in the four building construction projects. Contractors also do not find it difficult to find product specifications.

Figure 7. Building Reruntuhan Limbah

3 RESULTS AND DISCUSSION

Raw materials for used debris materials and determination of mixed materials when using the pile head concrete waste material mentioned above, in accordance with engineering specifications as a basic reference, namely building ruin materials (concrete materials and brick walls). In the process of crushing the pile head CCSP produces concrete debris from the removal of the pile head which becomes construction waste. Then the raw material from concrete waste is cast waste and waste because bobokan is a type of silicate crystal structure ceramic (SiO2) as in figure 1. According to the 1989 Concrete guidelines, the Consensus Draft (SKBI.1.4.53, 1989) concrete is a mixture of portlad cement or any other hydraulic cement, fine aggregate, coarse aggregate and water with or without the use of additives. The kinds and types of concrete according to the forming material are normal concrete, reinforced, precast, pre-pressed, lightweight concrete, reinforcing concrete, fiber concrete and others.

The working method of processing used debris concrete into aggregates is the processing of the initial process of concrete occurrence is through cement paste, which is the hydration process between water and cement. Where the aggregate formed a set of crushed stone, gravel, sand either in the form of natural products or others. Aggregate is a material used in concrete mortar that forms a hydraulic cement that is adjusted to size. Aggregates there are smooth forms and coarse forms. further if added with fine aggregate to mortar and if supplemented with coarse aggregate to concrete. The addition of other materials will distinguish the type of concrete, for example, what is added is that steel reinforcement will form reinforced concrete. So that the aggregate is basically for the construction and strengthening of roads.

This disposal of construction waste incurs its own costs that can impose on operational costs during the work. To overcome this, the contractor used the debris to fill the gaps produced between the existing soil and the CCSP as a reinforcement before

being stockpiled with selected soil. Besides being able to be used to fill the gap between the selected soil and CCSP, debris is also used as a base (base B) by adding adhesive materials such as lime or cement, and aggregate material used for piles can be used as a deking concrete material. Building ruin materials that can be reused kpala pile concrete waste materials as basic soil strengthening materials for strengthening roads and structures, reducing the use of natural materials and maintaining environmental sustainability, determining the composition of mixed materials at the time of use of pile head concrete waste materials, work method of processing during the work process, technical specifications as the basis of quality reference and there is a bobok process or destruction of the CCSP pile head produces concrete debris that becomes construction waste. This disposal of construction waste incurs its own costs that can impose on operational costs during the work. To overcome this, the contractor used the debris to fill the gaps produced between the existing soil and the CCSP as a reinforcement before being stockpiled with selected soil. Besides being able to be used to fill the gap between the selected soil and ccsp, debris is also used as a base (base B) by adding adhesive materials such as lime or cement and aggregate material used for pile bobokan can be used as a deking concrete material. So it shows that the CTB construction layer is not sensitive to water, this property is very helpful for constructions where the groundwater level is high. The resulting CBR value > 100% higher than the usual aggregate, so as to reduce the thickness of the pavement plan. And can be implemented even in areas with high rainfall conditions, the implementation period is relatively very fast so as to create time efficiency. CTB only needs a curing period of 3 days for the vehicle to pass or continue construction work on it after compaction.

4 CONCLUSION

From the results of the analysis and discussion, it is concluded that it is to produce experts in the implementation of material processing, so that the pile head concrete waste material can be used as a watershed aggregate for road construction and strengthening. CCSP concrete material that uses K-700 or 61 MPa concrete material, is good for reuse because it uses smooth material during the pile making process. The use of pile head waste cannot be used as the main material for concrete work because the concrete waste generated in the project is small and the pile head concrete waste can only be used as decking concrete

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