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Assessment the Level of Environmental Damage On Andesite Mining Based on Governer Decree No.63 of 2003 in Subdistrict Pengasih, District Kulonprogo, Special Region of Yogyakarta

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Abstract. Mining is a part or whole Stages of activities in the context of research, management and operation of minerals or coal which includes general investigation, exploration, feasibility studies, construction, mining, processing and refining, transportation and sales, and post-mining activities. Kulonprogo andesite deposits contain more than 240 million tons. The quality of Kulonprogo andesite is very good as material for recast concrete and the like. Its compressive strength is 1138.47 kg per square centimeter, the wear rate is 13.5 percent and its specific gravity is 2.7. The purpose of this study is to make a research model based on Yogyakarta's governor decree number 63 of 2003 concerning the standard criteria for environmental damage for businesses and / or mining activities of group c minerals in the region of the special province of Yogyakarta. The method used in this study is the survey method. Sampling and determination of measurement points in the field by stratified random sampling. The strata used were the type of excavation and mining location, including Andesite Rock in Pengasih sub-district, Kulon Progo district. Based on the description of calculations and discussion, it can be concluded that the level of physical damage due to andesite mining in the subdistrict of compassion in Kulonprogo district in the moor area is medium damaged, with an average score of 21.75.

1. Introduction

The Mining is part or all of the stages of activities in the context of research, management and exploitation of minerals or coal which includes general investigation, exploration, social studies, construction, mining, processing and refining, transportation and sales, and post-mining activities [2].

Andesite Stone Mine is a mine that uses natural stone to make a product prepared for construction materials. The process of andesite mining undergoes a variety of truly complex processes consisting of raw materials, cutting, and finishing. The sources of natural stone raw materials start from mountains and hills with extraordinary conditions. The strategy for mining natural stone itself in each region will vary in the type of natural stone, some will be done manually, and some will use heavy equipment. However, in the process of andesite mining. it causes river water to become cloudy and reduce DO levels of river water. Whereas for land affected by sediment due to andesite stone cutting waste, the c-organic content is lower than the land that is not affected [4].

The potential of andesite stone in Kulonprogo Regency has not been utilized properly. The natural resources have only been used for local needs of Kulonprogo and has not yet been used by a wider audience. Kulonprogo andesite deposits contain more than 240 million tons. Currently it is only used for building materials and roads for the local needs of Kulonprogo [5].

The quality of Kulonprogo andesite is very good for materials such as precast concrete and the like. Its compressive strength is 1138.47 kg per square centimeter, the wear rate is 13.5 percent and its specific gravity is 2.7 [6].

Basically related to natural damage due to the existence of an andesite mining business carried out in the province of the special region of Yogyakarta, it has been regulated in the Yogyakarta's governor decree number 63 of 2003 concerning the standard criteria for environmental damage to businesses and / or mining activities class c the province of Yogyakarta special region [8].

Based on the rules we will conduct this research entitled analysis of environmental damage due to andesite mining in Pengasih sub-district, kulonprogo district.

2. Literature Review

Natural Resources are all potentials and environments that can meet human needs (Sumaatmaja, 1988, Sutikno & Maryunani, 2006). In accordance with the physical, natural resource classification consists of: (1) limited natural resources; (2) renewable natural resources; (3) Natural resources that cannot be renewed; and (4) potential sources that currently do not become resources [10].

The natural resources of andesite in the district of Pangasih Kulon Progo Regency are utilized in the business of farming as a raw material for construction. Andesite stone originates from magma which usually erupts from stratovolcanoes on thick lava which flows up to the surface and freezes, so that the type of minerals present in this location is arbitrarily non-renewable natural resources [3].

Criteria for environmental damage for businesses or rock mining activities based on Yogyakarta's governor decree Number 63 of 2003 states that mining is the limit of changes in the characteristics of the mining environment, so that it cannot function in accordance with its designation. Environmental damage is a change that occurs due to human actions that directly or indirectly affect the physical and biological environment, which results in the environment not functioning anymore in supporting sustainable development [11].

Human activities that can cause environmental damage or scarcity of natural resources take place in three ways: first, if the resource is exploited with a rate of speed that exceeds its recovering power; second, scarcity of resources is caused by population growth, and third, access to unbalanced natural and natural resources [12].

3. Research method

The method used in this research is the survey method. Sampling and determination of measurement points in the field by stratified random sampling. The strata used are the type of excavation material and the mining location, including andesite rocks in dry fields. Data taken as listed in Table 1.

Tabel 1. primary data

No	Mining in moor	Alphabet
1	Excavation edge	a
2	Initial excavation limit from initial ground level	b
3	Basic excavation relief	c
4	The slope limit of the cliff excavation	d
5	High wall excavation	e

(Governor decree no.63 of 2003)

Then, the data is scored starting from the mild (value 1), medium (value 2) and weight (value 3). Data that has been scored is then given a weight in accordance with the provisions of the DIY Governor Decree No. 63 of 2003 which is weighted 4 (very influential), 3 (influential), 2 (little bit influential) and 1 (less influential) [1].

In this research taken 8 samples to represent all andesite mining areas in Pengasih sub-districts. The weighting and scoring results were then classified into 3 classifications, namely mild, medium, and very damage. Each value is as in Table 2.

Tabel 2. Classification of the level of damage to the environment and its symbols

No	Classification	Total Range Scores	Symbol
		In moor	
1	Mildly damaged	10-17	Δ
2	Medium damaged	18-25	○
3	Very damaged	26-33	□

(Governor decree no.63 of 2003)

The results of the classification using the table above are then analyzed descriptively according to each mining location and then plotted onto the map.

4. Results and Discussion

Observations on physical environmental damage in Pangasih Sub-District, Kulon Progo district included mining carried out in the moor. Retrieval of mining location data carried out in the moor is located at the Pengasih sub-district. The scores and weights of each observation and measurement location can be seen in Table 3

Table 3. Damage level score Caused by mining in Tegalan

No	Location	a	b	c	d	e	Total Score
	Score	2	3	1	2	2	
T-1	Coordinate	3 m	> 8m	0 m	70^0	4 m	
	Score × Weight	2×2=4	3×3=9	1×1=1	2×2=4	2×2=4	22
T-2	Coordinate	3 m	> 8m	0 m	70^0	2 m	
	Score × Weight	2×2=4	3×3=9	1×1=1	2×2=4	1×2=2	20
T-3	Coordinate	3 m	> 8m	0 m	80^0	4 m	
	Score × Weight	2×2=4	3×3=9	1×1=1	2×2=4	2×2=4	22
T-4	Coordinate	3 m	> 8m	0 m	85^0	5 m	
	Score × Weight	2×2=4	3×3=9	1×1=1	2×2=4	3×2=6	24
T-5	Coordinate	4 m	> 8m	0 m	75^0	4,5 m	
	Score × Weight	2×2=4	3×3=9	1×1=1	2×2=4	3×2=6	24
T-6	Coordinate	3 m	> 8m	0 m	80^0	4 m	
	Score × Weight	2×2=4	3×3=9	1×1=1	2×2=4	2×2=4	22
T-7	Coordinate	3 m	> 8m	0 m	80^0	2 m	
	Score × Weight	2×2=4	3×3=9	1×1=1	2×2=4	1×2=2	20
T-8	Coordinate	3 m	> 8m	0 m	75^0	1,7 m	
	Score × Weight	2×2=4	3×3=9	1×1=1	2×2=4	1×2=2	20

Based on Table 3, it can be seen that the level of damage for sirtu mining in the moor is a medium damaged (values between 20-24). The location of damage can be seen in Figure 1.

Figure. 1 location of environmental damage

Based on the assessment of the results of the field data analysis above, it can be seen how the general description of the state of mining activities in Pengasih District, Sleman Regency. The spatial distribution and assessment of the level of damage to the physical environment due to mining of andesite in each location are presented in Figure 1. Associated with factors that causes environmental damage can be seen from the results of a survey of respondents consisting of 4 respondents. The four respondents were asked about 2 things. The first is related to knowledge about the criteria for damage to the existing physical environment (Governor's Decree). The four respondents stated they did not know. While related to the question of whether there has been prior socialization, 100% of respondents also answered that there had never been socialization. The practical solution that can be done is by changing the excavation altitude of less than or equal to 3 meters, as required in the Governor's Decree No. 63 of 2003. By policy, the government can re-socialize to the sirtu mining entrepreneurs, to then provide obligations the entrepreneur must also socialize it to operators / miners. In addition, it also needs to be strictly controlled by the local government as well as sanctions for violator.

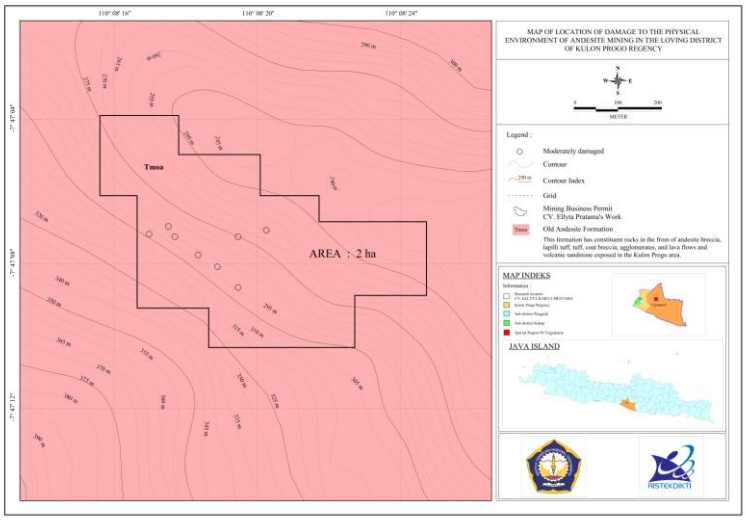

Figure 2. Map of the damage level to the physical environment

5. Conclusion

Based on the discussions the level of environmental damage due to Andesite mining in Kulon Progo is a medium damaged with an average score of 21.75. The damage of environment is caused by absence of socialization from local government that aimed to operator or miners about environmental level damage criteria and its prevention

In order to decrease the damage by andesit mining operations, miners or operators should reduce the excavation height around the mine slope. The local government should give resocialization, developing implementation of regulation to prevent environment damage and sanctioned for those who against the regulations.

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