
Environmental Quality Monitoring of Road Preservation in the Paal X Area

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Abstract: Transportation plays a very important role in economic development in Indonesia. The contribution of construction services to national development is very large, especially in preparing road facilities and infrastructure which have a great influence on economic development in Indonesia. In order to integrate the transportation system in Indonesia, this indicates the increasing number of road maintenance project activities. Jambi Province has a national road where road maintenance activities are carried out every year. The increasing number of road maintenance activities means that based on existing regulations, it is important to carry out environmental testing during the construction period. The purpose of this study is to carry out environmental testing on the Preservation work of the X road section which includes surface water analysis, ambient air testing, n. The method used in this study is descriptive quantitative, the quality standards in this test include Government Regulation No. 22 of 2021. The results of this study at the location obtained all test results with the nationally accredited laboratory KAN are still below the environmental quality standard parameters.

Keywords: Trasportation, Constructions, Preservation, Labotary

1. Introduction

Transportation plays a very important role in developing and improving the economic, socio-cultural, political, defense and national resilience sectors. The contribution of construction

services to national development is very large, especially in preparing road facilities and infrastructure that greatly influence economic development in Indonesia. In order to

improve national road connectivity, and with the great goal of integrating the road transportation system in Indonesia, the central government allocates a budget for national road management [1]. Based on the Decree of the Minister of Public Works and Public Housing No. 248/KPTS/M/2015, there have been many improvements in road status in Indonesia [2]. This indicates the increasing road services and the increasing intensity of road management activities in Indonesia.

Road Preservation Work is one of the important activities in maintaining transportation infrastructure that involves various work items in one long segment package. This work is classified as short-term work that is stationary or moving, with the main focus on repairing hot and cold asphalt mixtures, especially for patching holes in asphalt road pavements. the location of the work is a national road with heavy traffic flow, the impact of this work will affect environmental quality.

The Construction Phase is re-monitored. Based on PUPR Regulation No. 10 of 2021 concerning the Construction Safety Management System [3], explains the procedures for management, monitoring and reporting during the construction stage. at the construction stage itself there is an environmental management and reporting plan, so it is important to carry out environmental monitoring during the construction stage based on existing regulations. environmental monitoring testing at the construction stage of road activities, to carry out environmental testing during the construction period on the national road work package in Jambi Province[4], namely on the Paal X Section Road Preservation work which includes surface water analysis, ambient air testing, noise testing and vibration testing. The scope of this work includes Major Road Rehabilitation, Minor Road Rehabilitation, Landslide Handling and Minor Road Rehabilitation. The study also intends to support existing regulations on the importance of environmental analysis.

2. METHOD

2.1. Method

This research is a quantitative descriptive study that intends to describe the results of testing Surface Water, ambient air, noise and vibration. The quality standards used in this test are as follows:

- Surface Water based on the quality standards of Government Regulation No. 22 of 2021, Appendix VI.I, class II
- Ambien Air based on the quality standards of Government Regulation No. 22 of 2021, Appendix VII [5]

In this test, only 3 locations were taken, each 1 sample, namely as follows:

- Location of the Paal x Jambi intersection, Basecamp of the Implementing Contractor, coordinates LS: 010 40' 12" BT: 1030 36' 1" at this location represents testing at the national road location

3. RESULT AND DISCUSSION

Environmental quality monitoring is done by taking water

and air samples and analyzing them in the laboratory. The results of this test can be used to determine steps for handling water and air quality. [6]

Water and air quality monitoring is an effort to determine the condition of water and air quality in an area [7]. This monitoring is carried out using sensors and other devices to record, store, and analyze data [8]. Monitoring water and air quality is important for maintaining public health and the environment [9]. Water quality monitoring Provides information about current, past, and predicted future water quality conditions [10], Helps detect hazardous substances such as bacteria, viruses, parasites, or chemicals [10],[11], [12]

Uses special methods to assess water quality, such as the Water Quality Index (IKA), Factors examined include temperature, brightness, dissolved oxygen, salinity, ammonia, total phosphate, nitrate, and pH. Air quality monitoring can determine air quality in an area Helps detect sources of emissions that contribute to air pollution. [13], [14].

Analisis data in to table 1 Surface water test result and table 2 ambien air result.

Table 1. Surface Water Test Results

Parameter	Unit	Standard	Test Method	Paal X Street
Physics				
Suhu	°C	Dev 3	SNI 06-689.23-2005	32
TDS	mg/L	1000	IKM.ALKA-14 (TDS)	30,87
TSS	mg/L	50	SNI 6989.3-2019	15,70
Chemical				
pH	-	6 - 9	SNI 6989.11-2019	6,32
(BOD ₅)	mg/L	3	SNI 6989.72-2009	2,82
(COD)	mg/L	25	SNI 6989.2-2019	26,68
(DO)	mg/L	4	SNI 06-6989.14-2004	4,95
Sulfat(SO ₄)	mg/L	300	SNI 6989.20-2019	10,08
Klorida (Cl)	mg/L	300	SNI 6989.19-2009	5,88
Nitrat	mg/L	10	SNI 6989.79-2011	0,1
Nitrit	mg/L	0,06	SNI 6989.9-2004	<0,013
Amonia	mg/L	0,2	SNI 6989.30-2005	0,04
Total Fosfat	mg/L	0,2	SNI 6989-31:2021	0,11
Fluorida	mg/L	1,5	SNI 06-6989.29-2005	0,21
Sianida	mg/L	0,02	SNI 6989.77:2011	< 0,030
Minyak & Lemak	mg/L	1	SNI 6989.10-2011	< 1,56
Deterjen	mg/L	0,2	SNI 06.6989.51-2005	< 0,031
Fenol	mg/L	0,005	SNI 06.6989.21-2004	< 0,070

Source: Analysis

In Table 1. Explains the results of surface water testing on the Paal X road section including 2 Testing sections, namely Physics with 3 parameters and chemistry with 15 parameters,

so that for surface water testing there are 18 test parameters, For physical parameters, consisting of a temperature value of 320C, TDS 30.87 mg/L and TSS 15.70 mg/L still meet environmental quality standards according to government regulation no. 22 of 2021, [15] [16]

For chemical parameters pH 6.32, BOD with a value of 2.82 mg/L, COD 26.68 mg/L, DO 4.95 mg/L, Sulfate. 10.08 mg/L Chloride 5.88 mg/L, Nitrate 0.1 mg/L, Nitrite <0.01 mg/L, Ammonia 0.04 mg/L, Total Phosphate 0.11 mg/L, Fluoride 0.21 mg/L, Cyanide <0.030 mg/L, Oil and Fat <1.56 mg/L, detergent <0.031 mg/L, and phenol <0.070 mg/L are still safe and below the quality standards according to government regulation no. 22 of 2021 attachment VI. [17], [18].

Water quality monitoring is carried out periodically to determine the current condition of water quality, past trends, and predictions of changes in the future, water quality monitoring can also be a solution to maintain available water sources so that it can create a more beautiful and sustainable environment [19], [20].

Table 2. Ambient Air Results

Parameter	Unit	Standard	Test Method	Paal X Street
TSP	µg/Nm ³	-	SNI 7119-3:2017	38,3
SO	µg/Nm ³	150/1 H	SNI 7119-7:2017	75
CO	µg/Nm ³	10000/1 H	IKM.ALKA-42 (CO)	2964
NO	µg/Nm ³	200/1 H	SNI 7119-2:2017	7,5
Ozon	µg/Nm ³	150/1 H	SNI 7119-8:2017	42

Source: Analysis

Ambient air quality monitoring is one of the efforts to evaluate the level of success of air pollution control programs that have been carried out by the central and regional governments [21]. The results of ambient air quality monitoring can be used as an indicator to determine the priority of air pollution control programs that need to be carried out. In table 2, direct air measurements meet the KAN standard, Dust Particulates (TSP) of 38.3 µg/Nm³, this figure is compared to the standard set in SNI 7119-3:2017, Still meets the quality standards. Sulfur Dioxide of 75 µg/Nm³, this value compared to the maximum allowable limit of 150 µg/Nm³ for an average of one hour still meets SNI 7119-7: 2017, Carbon Monoxide of 2964 µg/Nm³, this is below the threshold set at 10,000 µg/Nm³ for an average of one hour, according to the IKM.ALKA-42 (CO Meter) guidelines. Nitrogen Dioxide of 7.5 µg/Nm³, which is below the maximum allowable limit of 200 µg/Nm³ for an average of one hour, in SNI 7119-2: 2017 and ozone of 42 µg/Nm³. This value is compared to the maximum limit of 150 µg/Nm³ for an average of one hour, according to the SNI 7119-8:2017 standard. From these data, all values are still categorized as good, road preservation on national highways is still relatively safe [22], in accordance with government regulation no. 22 of 2021 attachment VII because it is in accordance with SNI and in accordance with the rules, and the national road in the paal x section is still covered with many trees and greenery so that the road still has very good air. [23].

4. Conclusion

The environmental quality monitoring conducted on the Paal X road preservation project in Jambi indicates that all tested parameters for surface water and ambient air remain within the acceptable limits set by Government Regulation No. 22 of 2021. The results suggest that the ongoing road maintenance activities do not pose a significant environmental risk at this stage. Regular monitoring, however, remains essential to ensure compliance throughout the construction process and to promptly detect any potential negative environmental impacts. This study reinforces the importance of integrating environmental assessments into infrastructure projects and supports the implementation of sustainable construction practices in line with national regulations.

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