

# Analysis of Carbon Monoxide (Co) Quality Due to the Construction of the Miftahun Najah Islamic Boarding School

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**Abstract:** Air pollution comes from construction activities in the development of educational infrastructure buildings because it has an impact on changes in green open space and an increase in air pollution, especially Carbon Monoxide (CO) emissions in the air. The contribution of increasing CO<sub>2</sub> and CO emissions can be sourced from all activities of workers who use energy such as procurement of building materials, use of transportation fuels, electricity use activities, and LPG use activities. Carbon footprint is a measure of the total amount of carbon dioxide (CO<sub>2</sub>) emissions that come from activities or accumulations from daily activities. This study aims to determine the amount of carbon Monoxide (CO) and CO<sub>2</sub> emissions as indicators of air quality at the Miftahun Najah Islamic Boarding School. Measurement of Carbon Monoxide (CO) parameters was carried out for one week with 7 samplings in the morning and samplings in the afternoon in situ. Measurements using the Lutron GCO-2008 CO meter and carbon footprint calculations using the IPCC 2006 method. The measurement results were obtained in the afternoon with a total of 9,926 mg/Nm<sup>3</sup> and the lowest in the morning was 1,102 mg/Nm<sup>3</sup>. Air temperature in the morning to evening ranged from 29oC – 36oC. The results showed that the concentration of Carbon Monoxide in the development of Islamic boarding school buildings was still below the quality standards set according to Government Regulation No. 22 of 2021, namely 10,000 µg / Nm<sup>3</sup>.

**Keywords:** Air Pollution, Carbon Monoxide (CO), Carbon Dioxide (CO<sub>2</sub>), IPCC method, Lutron GCO-2008

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## 1. Introduction

Air pollution can be sourced from construction activities in the development of educational infrastructure buildings because it has an impact on changes in green open space and an increase in air pollution, especially Carbon Monoxide (CO)

emissions in the air [1]. The change in the amount of green open space has a major impact on increasing the average temperature of the earth as a result of greenhouse gas emissions [2].

Contribution of the improvement of the CO<sub>2</sub> and CO emissions can be sourced from all activities of workers who use energy such as the procurement of building materials, the use of transportation fuels, electricity usage activities, and LPG use activities. accumulations from daily activities [3].

The more activities of construction workers, the more energy is needed so the greater the CO<sub>2</sub> and CO emissions produced [4]. One method that can be done to measure the amount of CO<sub>2</sub> and CO emissions produced from an activity is to calculate the carbon footprint [5]. Carbon footprint is a measure of the total amount of carbon dioxide either directly or indirectly derived from activities or Miftahun Najah Islamic boarding school located in Lrg Kebun Kolim, RT 01, Tangkit Village, Sungai Gelam District, Muaro Jambi Regency, has an area of 14,079 m<sup>2</sup>. The percentage of reduction in green open space as a result of the development of the building is 20% of the total area of the Islamic Boarding School area. Measurement of the quality of Karbon Monoxide (CO) in the boarding school area was carried out to determine the impact of construction activities and the reduction of RTH on air quality in the region. The CO quality standards refer to [6] the Regulation of the Government Number 22 of 2021 concerning the Implementation of Environmental Protection and Management Hidup. The commitment of the Government to regulating greenhouse gas emissions is contained in the Presidential Regulation of the Republic of Indonesia Number 71 of 2011 concerning the Implementation of Home Gas Inventory Glass Nasional. [7]

Based on these problems, the air pollutant parameters studied in this study are CO and CO<sub>2</sub>. Taking CO parameters due to carbon monoxide is one of the most dangerous and toxic pollutants that can result in death. Meanwhile, the selection of CO<sub>2</sub> parameters is because CO<sub>2</sub> is one of the greenhouse gases (GHG) that has the greatest impact on increasing the average air temperature in the world. To reduce emissions in the Islamic Boarding School environment, the calculation of the carbon footprint of the activities of building workers needs to be carried out. Referring to the problems described above, the author is interested in researching to find out how much air quality Karbon Monoxide (CO) and CO<sub>2</sub> emissions are due to the construction building development process and carbon footprint emissions in the construction workers [8] of the Miftahun Najah Islamic boarding school.

## 2 MATERIAL AND METHOD

### 2.1 Material

Tools and Materials Preparation for taking and testing ambient CO air samples in this study requires the tools and materials needed as follows: Tools The tools used in this study are as follows Lutron GCO-2008 CO meter; Stopwatch; Stationery; Glove.

### 2.2 Method

Procedure for Measuring CO In The Air The procedure for measuring CO in the air is as follows: Prepare the Tool Lutron GCO-2008 CO meter; Then press the ON/OFF button and wait for 5 minutes until the "S" sign (Stand By) appears; After that press the arrow keys up so that an "R" sign appears (Record); At the "R" (record) position will show the tool performing the recording to the presence of CO indicators during sampling; Set the time for 1 hour to take measurements of carbon monoxide in ambient air; Once the recording is complete press the arrow keys up to stop the work of the CO analyzer tool so that the "R" sign is missing; Furthermore, the data is transferred to a computer for reading of the measurement results.

### 2.2 Data Analysis

Primary Data Primary data were obtained by taking CO measurements directly at the Miftahun Najah Islamic boarding school, Tangkit Village, and direct interviews with Islamic boarding school administrators. Secondary Data is obtained by researchers through theoretical studies carried out from various sources: journals, and articles that can be from websites that are closely related to the topic of research problems. Research Variables The variables of wastewater treatment of workshop activities with this electrocoagulation method are as follows: Bound Variables The variables bound to the study are the parameters that carbon monoxide (CO) ambient air tested. Free Variables The free variable in this study was the time of co-air sampling carried out for 1 hour with 7 days of sampling in the morning and evening.

## 3. RESULT AND DISCUSSION

### 3.1 Results

Miftahun Najah is developing buildings that have an impact on changes in green open spaces Changes in the number of green open spaces have a major impact on increasing the average temperature of the earth as one of the consequences of greenhouse gas emissions [9]. The contribution of increasing CO<sub>2</sub> and CO emissions can be sourced from all activities of workers who use energy such as

procurement of building materials, use of transportation fuels, electricity use activities, and LPG use activities [10].

Type of research used is descriptive quantitative. The purpose is to describe the distribution of CO levels around the construction of Islamic boarding schools. Sampling was carried out for one week on the day of fishy K to Rash with time intervals of the morning, and evening. On foreign-each time interval is taken measurements for 1 (one) hour. The tool used is a CO Meter brand KMOON Carbon Monoxide Meter GM8805, in addition, a calculation of the carbon footprint resulting from pesantren development activities is carried out. The calculation of the carbon footprint is carried out to find out the number of carbon emissions during the development process that produces energy. The measurement of CO parameters can be seen in table 1.

Table 1 Results of Measurement of CO Parameters in Area

No	Day	Temperature (°C)	CO (ppm)	Result ( $\mu\text{g}/\text{Nm}^3$ )	Quality Standard ( $\mu\text{g}/\text{Nm}^3$ )
1	Thursday				10.000
	Morning	29.5	2	2.254	
	Evening	29.8	4	4.505	
2	Jum'at				10.000
	Morning	30.2	2	2.249	
	Evening	30.1	5	5.625	
3	Saturday				10.000
	Morning	33.1	3	3.342	
	Evening	33.4	7	7.791	
4	Sunday				10.000
	Morning	30.5	2	2.247	
	Evening	29.5	4	4.509	
5	Monday				10.000
	Morning	31.5	3	3.360	
	Evening	30.5	10	6.742	
6	Tuesday				10.000
	Morning	29	2	2.258	
	Evening	34.7	8	8.867	
7	Wednesday				10.000
	Morning	36.2	1	1.102	
	Evening	36.2	9	9.926	

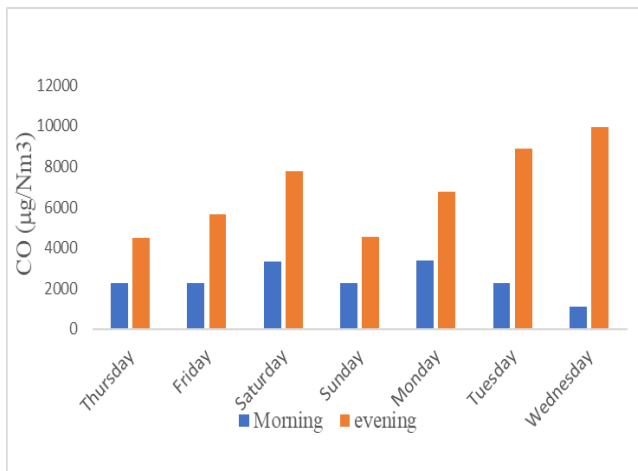
Based on table 1 can be seen that the highest CO level is in the afternoon rate with a total of 9,926  $\mu\text{g}/\text{Nm}^3$  and the lowest in the morning is 1,102  $\mu\text{g}/\text{Nm}^3$ . The air temperature

in the morning to evening ranges from 29°C – 36°C. Measuring CO parameters using a CO meter will show the amount of CO read in ppm units, so it is necessary to convert the unit into  $\text{g}/\text{Nm}^3$  to be compared with the quality standards in Government Regulation Number 21 of 2021

CO levels tend to be higher from the day to evening. This is influenced by the number of truck vehicles that arrive increasingly in the construction area of Islamic Boarding Schools [11] and is also the peak of activity so that the number of vehicles that cross the measurement point in the afternoon is more than in the morning which tends to have a small amount of CO levels [12]. This is due to the lack of vehicles where there is still little activity in development activities. The more the number of vehicles crossing the road, the level of CO that is discharged into the air will also increase. The main source of carbon pollutants comes from the burning of fossil fuels in the air in the form of exhaust gases [13]. The exhaust gas comes from truck vehicles and development activities. Nature research [14] explained Carbon Monoxide Gas (CO) produced by gasoline-engined vehicles (premium) is about 1% at running time and about 7% at not running time, while engines diesel produce carbon monoxide (CO) gas of 0.2% at the time of running and about 4% at the time of stopping. [15] Research also conducted concluded that the number of vehicles is directly proportional to the concentration of CO pollutants produced. This means that the more vehicles that cross the sampling site, the greater the concentration of pollutants.

### 3.2 Analysis

High air temperatures will cause pollutants in the air in the form of particles to become dry and light so that they last longer in the air, especially in the dry season where the air is drier so that air pollutants in dry season conditions tend to be high because there is no dilution of pollutants in the air. the higher the air temperature, the higher the CO concentration will be [16]. This happens because the presence of high temperatures will accelerate the decomposition of CO gas. Where the higher the temperature, the higher the CO level which shows a relationship that is directly proportional between CO levels and temperature in the development area even though the temperature difference is not too far.



Based on figure 1, the measurement of air CO levels in Islamic boarding schools is carried out for seven days, namely Thursday, February 2022 to Wednesday, February 2022. The measurement time is carried out with the time interval of the morning, and evening. This measurement is carried out for 1 hour. Based on the results of the study, the highest CO level in the Pesantren area is  $9,926 \mu\text{g} / \text{Nm}^3$ . When compared to the standard threshold value in the Government Regulation of the Republic of Indonesia, the Number 22 of 2021 concerning the implementation of protection and Environmental management explains the threshold value of carbon monoxide (CO) parameters, which is  $10,000 \mu\text{g} / \text{Nm}^3$ , the CO level in the pesantren area is still qualified. [17] His research also explained that although at not too high levels, the influence of CO on human health is quite evident. The impact of CO can affect the work of the heart (cardiovascular system), the central nervous system, and all organs of the body that are sensitive to lack of oxygen.

## 4. Conclusion

The concentration of CO at the development site of the Islamic boarding school building miftahun najah in the afternoon conditions the highest CO level is in the afternoon measurement with a total of  $9,926 \mu\text{g} / \text{Nm}^3$  and the lowest in the morning is  $1,102 \mu\text{g} / \text{Nm}^3$ . The air temperature at both points in the morning, noon to evening ranges from  $29^\circ\text{C} - 36^\circ\text{C}$ .

## Acknowledgment

Thanks, addressed to Islamic Boarding School Miftahun Najah Jambi

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