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## Noise Analysis Around Jababeka – Cikarang Industrial Area

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### Abstract

Noise is an unwanted sound from a business or activity at a certain level and at a particular time that can cause disturbances to human health and environmental comfort. Noise can cause psychological and physiological impacts. The Ind is one of the largest industrial areas in Bekasi Regency, West Java. This study aims to analyse the noise levels around the industrial area of Jababeka-Cikarang. This type of research is survey research with a quantitative approach. This study measures the sound intensity level in the Jababeka–Cikarang area, up to a distance of 20 km from the Jababeka – Cikarang area. Data analysis used descriptive analysis in the form of graphs. The study results show that the noise level in the Jababeka-Cikarang area exceeds the threshold set by the Threshold, which is 70 dB to 85 dB.

## INTRODUCTION

Sound can be said to pollute an environment if it causes disturbances for the inhabitants (Sasongko *et al.*, 2000; Liam & Van Willigen, 2005; Nasution, 2019). Psychological and physiological disturbances are the result of human exposure to sound. Irritation and noise are caused by psychological disturbances manifested as unwanted sound. Noise is an unwelcome sound emitted by a business or activity at a specific level and at a specific time, which can disrupt human health and environmental comfort (Ministry of Environment No. 48, 1996). Noise levels that exceed the intensity of the sound threshold value can cause hearing loss and damage to the ears. Therefore, there is a need for countermeasures and handling related to this noise problem.

Research on environmental health issues resulting from the existence of industrial areas or public space is becoming a concern in all parts of the world, including Indonesia. Several studies that have been carried out include general hospital area in Surabaya (Arifianto, 2017), manufacturing industry in Malang (Sholihah *et al.*, 2019), small muffler industry in Purbalingga (Risvianni *et al.*, 2019), and industrial forest plantation in North Sumatera (Muhamdi, 2022). The research of Minggarsari & Sahuri (2019) concluded that there is a relationship between noise intensity and auditory complaints among workers in the production division of PT X Bogor 2019. According to Wahyudi (2018), the noise level in the industrial area of PT. Semen Indonesia is between 72.54 dB and 96.7 dB, which shows that the noise level in the region has exceeded the noise limit set by government regulations.

All of these studies produced data that noise exposure was above the WHO permitted threshold. Everyone agrees that this noise is very disturbing, especially if it affects local people who are not directly involved in the industry. There have been studies to reduce this noise, for example case study that determine noise reduction of tree belt in an industrial environment at an urban forest in cement factory Cilacap (Uletika *et al.*, 2016). Industrial noise mapping has also been carried out through literature review, designed for new plant operation (Putro *et al.*, 2023). They focus on industrial mapping published by researchers in different industrial sectors from different countries published in past 10-year time aimed at mapping software usage and mitigation plans implemented.

The Jababeka - Cikarang industrial area is one of the largest industrial areas in Bekasi Regency, West Java. In the Jababeka-Cikarang industrial area, there are many factories. According to the Directorate General of Disease Control and Environmental Health (2000), noise sources in industrial areas can be divided into three categories: machines, vibrations, air, gas, and fluid movements. There are not only factories; this area has several other facilities, including housing, shopping centers, educational centers, and hospitals. This condition prompted the emergence of this research; residential areas and public facilities around the factory area are feared to disturb the surrounding community. This research aims to measure the noise level around the Jababeka - Cikarang industrial area.

## METHODS

The type of research used is survey research with a quantitative approach. The study was conducted around the Jababeka industrial area in Bekasi Regency, West Java. The survey was conducted for two days in October 2022. To measure noise, a sound metre level was used with measurement specifications of 30 dB–130 dB, an accuracy of 1.5 dB, and a frequency range of 31.5 Hz – 8 kHz. It has the brand "Benetech." The research stage starts with a review of the noise-related literature; the second stage identifies the conditions around Jababeka-Cikarang; the third stage is data collection. At the data collection stage, the research steps are as follows:

1. Retrieval of noise data at 07.00 using a sound metre level to measure good intensity in the residential area of Bekasi City, which is 20 km from the Jababeka-Cikarang industrial area.
2. Using maps, data is taken every 2-3 KM from the Bekasi city area to the Jababeka-Cikarang industrial area.
3. Repeat the same thing at 9.00, 14.00, and 17.00.

The data collected in the third stage are used in the fourth stage, data analysis.

## RESULTS AND DISCUSSION

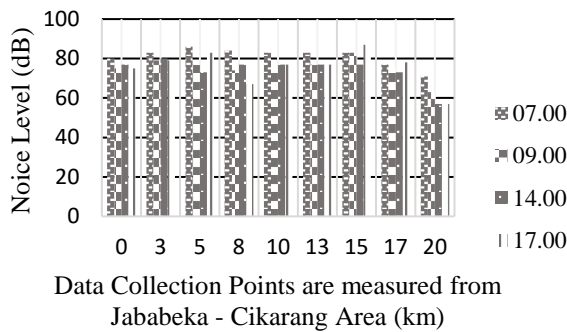
### A. Identification of Conditions Around Jababeka - Cikarang Industrial Area

The Jababeka Industrial Estate is located in Jababeka and has a land area of 5,600 hectares. It is a development of PT Jababeka Tbk. The Jababeka area consists of industrial, residential, and commercial spaces. This area has many public facilities, including schools, hospitals, markets, and

supermarkets. The Jababeka industrial area (Cikarang) is 35 kilometres east of Jakarta's business district. The Jababeka-Cikarang industrial area is easily accessible from the Bekasi-Cikampek toll road (highway). It is served by the Cikarang Barat and Lemahabang toll gate at kilometre 31 (exit toll road at kilometre 28).

The condition of the Jababeka industrial area at 7:00 a.m. was very busy with vehicles. This occurs because the employee's work hours begin at that time. While it appears quiet at 9:00 a.m and 2:00 p.m, you can only see the condition of vehicles passing by, at 5:00 p.m, it is already busy with passing cars and workers returning home from work. Around the Jababeka industrial area are several main markets, including the Tambun and Cibitung markets. Not only the primary market, but there are also several factories on the road to Cikarang, including the Suzuki, Fajar Paper, and Hitachi factories.

**B. Noice Level Around Jababeka Industrial Area – Cikarang**



**Figure 1.** Noice Level Data

In Figure 1, it can be seen that the noise level in the Jababeka-Cikarang area is between 70 dB and 80 dB. The noise quality standard in the Decree of the Minister of Environment No. 48 of 1996 indicates that for an industrial environment, the maximum allowed is 70 dB. It can be seen that the noise level in the Jababeka area exceeds the noise threshold value set by the government. Noise values that exceed the quality standard impact humans, namely causing headaches and ringing in the ears. The high noise level in the Jababeka - Cikarang industrial area is due to the large number of vehicles passing through the site. Motorized cars and trucks are coming in and out of the industrial area.

For the conditions around the Jababeka - Cikarang environment, in Figure 1, it can be seen that the highest noise level is at a distance of 15 km at 5:00 p.m. One of the reasons is that, at that time, it is time for employees to go home, so the density

of the highway affects the noise level. The lowest noise level is at a distance of 20 km from the Jababeka - Cikarang area. At a distance of 20 km from the industrial area is a residential neighbourhood, so it can be seen that the noise level is much lower than in other spaces.

At a distance of 3 km from the Jababeka–Cikarang industrial area, the noise level is between 75 and 80 dB. At a distance of 5 km from the Jababeka–Cikarang area, the noise level looks higher, around 75 – 90 dB. The most elevated noise is at this distance. At a distance of 8 km and 10 km from the industrial area, Jababeka, the noise level is between 75 and 80 dB. At a distance of 5 km from the Jababeka – Cikarang area, the noise level looks higher, around 75 – 90 dB. The most elevated noise is at this distance. At a distance of 8 km and 10 km from the industrial area Jababeka - Cikarang, the noise level reaches 75 – 85 dB. At this distance, the noise level is higher than at a distance of 3 km from the Jababeka – Cikarang industrial area. At a distance of 13 km from the industrial area Jababeka-Cikarang, the noise level reaches 75 – 80 dB. At this distance, the noise level is the same at a distance of 3 km from the Jababeka – Cikarang industrial area. At a distance of 17 km from the Jababeka - Cikarang industrial area, the noise level has decreased compared to before.

**CONCLUSION**

The conclusion that can be drawn is that the noise level in the Jababeka - Cikarang area ranges from 70 to 85 dB, which shows that the noise level in the area exceeds the noise level limit of Regulation No. 48 MENLH/11/1996. The distribution of noise level values around the Jababeka – Cikarang area ranges between 50 dB and 90 dB. One of the causes is congestion and the many conditions of passing vehicles. The highest noise level is at a distance of 15 km from the Jababeka – Cikarang area at 5:00 p.m.

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