

ABSTRACT

Air pollution in Indonesia has become a crucial issue in an era of rapid economic growth and urbanization. Establishing Air Quality Monitoring Stations (AQMS) is one solution to assess the level of air pollution in a specific area. However, to obtain representative air pollution data in a region, it is crucial to choose the appropriate locations for these stations. This research aims to design and construct an air quality Monitoring system using microsensors on telecommunication towers. Towers, with a height of approximately $\pm 75\text{m}$ and widespread distribution, present an advantageous platform for Monitoring. Nevertheless, various factors need consideration when placing the system on a telecommunication tower, such as the load-bearing capacity of the tower. Additionally, ensuring electrical self-sufficiency is vital to avoid disrupting the tower's electrical system. Moreover, to facilitate monitoring, a website is developed to provide real-time data access. Based on these considerations, the AQMS is designed with two main systems: hardware and software. The hardware system focuses on measuring representative air quality while complying with telecommunication tower installation regulations. Meanwhile, the software system concentrates on processing and presenting real-time data through a website. The integration between hardware and software is achieved through a wireless network. To evaluate the designed system's performance, a monitoring system dashboard is created. Quality of Service (QoS), availability, and performance analyses are conducted. During testing, the system successfully transmits data, resulting in high QoS values. However, an implementation error is identified in the shelter design, allowing water to enter during rain, and affecting the performance of the PM_{2.5} sensor. Consequently, a lower performance value is obtained for PM_{2.5}. Despite this, data from other sensors measuring CO₂, meteorology, and tower inclination still adequately represent the conditions, with the caveat that maintenance is needed for the shelter design implementation.

Keyword : inclination, air quality, power source, tower, website