

ABSTRACT

The mining industry heavily relies on vehicles and heavy equipment to support daily operations. However, the large size and significant tank capacity of heavy equipment, such as dump trucks, pose challenges for fuel refueling, especially when done at public fuel stations. To address this, refueling is generally conducted within the mining site. Nevertheless, misuse of authority by employees, such as refueling personal vehicles with fuel intended for heavy equipment, is common and directly impacts company losses. This research aims to develop a system utilizing Internet of Things (IoT) and Radio Frequency Identification (RFID) technology on nozzle pumps to restrict and monitor the refueling process, ensuring that only authorized vehicles can refuel, thereby reducing potential misuse and corruption. The Integrity Assessment Survey (SPI) at the end of 2022 revealed that the misuse of company facilities, including fuel, is one of the highest corruption risks, with percentages reaching 56% in government agencies and 76% in regional companies. By implementing this system, it is expected that companies can reduce material losses due to uncontrolled fuel usage, as well as enhance operational efficiency and security. This IoT- and RFID-based fuel nozzle restriction system is expected to be an effective solution in fuel management within the mining industry and could serve as a model for other industries facing similar challenges. The test results show a deviation based on the existing formula of 0.000960825 and a standard deviation of 0.030997184, indicating a small value, which means the data variance is also small. Therefore, the average obtained can be used as a set point on the ESP, which is used to convert the pulsa value into mL. Based on field tests, this device can operate for 3 hours and 55 minutes. It takes approximately 3 hours to fully charge.

Keywords: Fuel nozzle, IoT , Monitoring, RFID