

UNDERGROUND TANK MONITORING SYSTEM GAS STATIONS FOR OPERATIONAL EFFICIENCY

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STATEMENT BY THE AUTHOR

I hereby declare that this submission is my own work and to the best of my knowledge, it contains no material previously published or written by another person, nor material which to a substantial extent has been accepted for the award of any other degree or diploma at any educational institution, except where due acknowledgement is made in the thesis.



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ABSTRACT

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The increasing demand for fuel due to the growth in motor vehicle usage requires more accurate and efficient fuel stock management at Public Fuel Filling Stations (SPBU). One common issue is the manual measurement of fuel volume in underground storage tanks, which is prone to error and does not provide real-time information. This research aims to design and evaluate a simulation-based underground fuel tank monitoring system using Internet of Things (IoT) technology. The proposed system employs an ultrasonic sensor to measure the distance to the fuel surface, which is processed by a Node-MCU ESP8266 microcontroller to calculate fuel depth and volume. Measurement data are transmitted to a Firebase Realtime Database and displayed in real time through a web-based dashboard, with an automatic email notification triggered when the fuel volume falls below 10% of the tank capacity. System testing was conducted using a simulated tank model with 50 measurement samples. The results indicate that the system produces stable and consistent measurements and displays values that correspond with reference measurements. This research is limited to simulation-based evaluation and does not include direct implementation in an operational SPBU environment.

Keywords: Internet of Things, fuel tank monitoring, ultrasonic sensor, Node-MCU, simulation.



DEDICATION

This work is dedicated to my beloved family for their continuous support and encouragement throughout my academic journey.



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