ABSTRACT

DESIGN OF UNDERGROUND WATER PIPELINE LEAK DETECTION NETWORK USING WSN TECHNNOLOGY

Leakage of water pipeline is a main problem that often occurs in every water company. It takes the right solution (time saving, cost-effective), to locate the point of leakage. One solution that can be used to determine the location of the leak point is to monitor the infrastructure. However, this solution still needs to be tested for its feasibility to be used as a water leak detection device in the pipeline, taking into account the cost and reliability of the leak detector.

In this research, the tool used to test the feasibility of the network consists of three *nodes* of the *sensor* and one *node* coordinator. Each *sensor node* consists of one water flow *sensor*, one microcontroller, one transceiver NRF24L01+, and one power supply (power bank) except for *node* coordinator not using *sensor*. The design system is a prototype, and still in the experimental stage to be developed. The topology used in this research is star topology. All result of the detection of pipe conditions will be displayed on the user's laptop through the Arduino IDE software.

Based on the results of WSN network testing in the field obtained information the maximum range between the sender and receiver is as far as 78 meters. Normal pipe conditions if the difference between the node water discharge less than 0.6 liters per minute, and the condition of the pipe leak if the difference in water discharge between nodes 1.78 liters per minute. Delay average of at least 1.24 seconds at a distance of 6 meters. The minimum average jitter obtained by 1.25 seconds at a distance of 6 meters. The average of maximum throughput is 369.94 bps at a distance of 18 meters. Packet loss obtained by 0% for the entire test. And the maximum data accuracy level obtained is 79.55 % at a distance of 6 meters.

Keywords: monitoring, delay, jitter, throughput, packet loss