ABSTRACT

The case of a train accidents that occurred in Indonesia were caused by several factors, one of them was poor rail conditions. The condition of the railway problem is an issue that needs special attention from PT. KAI (KERETA API INDONESIA) as the train transport company in Indonesia. One effort to overcome these problems by monitoring the vibrations that occurs on the rail needs is done continuously to determine the quality of rail based on standard used by PT KAI to minimize train accidents. ZigBee is technology focused on the data communication which has characteristics such as low data rate, low cost, and small power consumption. One of function of ZigBee technology is the monitoring system. This monitoring system can be applied to monitor rail vibration.

In this final project, design and implementation of hardware vibration monitoring system are using the railroad ADXL345 accelerometer sensor and Zigbee modules that have the ability to transmit data over a wireless network sensor network, Results of the data transfer is expected to find out the quality of the railway. The parameters studied are the vibration acceleration, Bit Error Rate (BER), and Receive Signal Level (RSL).

The result of railway vibration monitoring system testing railway that had been done, showed the quality of the train tracks are in good condition. Maximum distance Zigbee module can transmit data at 100 meter spaced at 50 meter Zigbee module with a maximum BER value of $2{,}8\times10^{-4}$ and the measured values of RSL -96.59 dBm.

Keywords: wireless sensor networks, zigbee, monitoring, ADXL345, BER, RSL