ABSTRACT

Train is one of the people's favorite public transportation. In recent years, the number of passengers and the frequency of train trips has increased. As a result, the railroad tracks are being crossed more frequently. Rail is one of the most important components in rail travel. If these conditions are not treated, the rail may be damaged. If the rail is damaged in its construction, the train that crosses it can have an accident.

The aim of this research is to study a rail damage detection system using a laser beam. The rail damage studied was in the form of a broken rail causing a gap in the rail. This research was done by designing a prototype that has been fitted with a laser-based proximity sensor named VL53L0X. This sensor will read the rail distance that has been set as far as 50 millimeters. To find out whether the rail has a gap or not, it is necessary to know the measurement threshold.

The results showed that basically all gaps condition with a width of $\times$ 2 mm can be read by the VL53L0X sensor whose position is $\times$ 30 mm from the rail body after the threshold was found. But not all sensor gaps and distances result in ideal measurements. The ideal test results are obtained when the sensor is 50 mm from the rail body.

Keywords: *Rail, gap, sensor, distance, laser, threshold*