

ABSTRACT

The difference in the thickness of soil layers in every region certainly affects the classification of land use. To classify the land, technology is needed which is able to identify the thickness of the soil layer without having to break the soil on the land. Ultrasonic testing is one of non-destructive testing that utilizes the principle of wave reflection. This study uses an ultrasonic transducer AT200 as a sensor, T1 developer's board as a signal generator and processor, an oscilloscope as a display, and a DC power supply as a voltage source. Ultrasonic waves transmitted by the transducer will propagate into the object particles. When ultrasonic waves hit the boundaries between soil layers with different densities, the ultrasonic waves will be reflected and the reflected waves will be received by the transducer. The waves received by the ultrasonic transducer will be forwarded to the T1 developer's board for processing. The processing carried out is a superposition between the transmitted wave and the reflected wave. The processing results in the form of stationary waves, will be forwarded to an oscilloscope, so that the waveform and the time of flight can be seen. The measured value of time of flight will be processed mathematically to get the value of the thickness of soil layer. The results obtained from this study shows that the value of measuring the thickness of each soil layer using the ultrasonic testing is close to the actual value of each soil layer, with the highest error percentage being 8.62%.

Keyword: Ultrasonic Waves, Ultrasonic Transducer, Time of Flight, Thickness of Soil Layer.