ABSTRACT

Ultrasonic Testing is one of the Non-Destructive Testing methods that utilizes ultrasonic waves so that the speed of wave propagation can be known to perform soil classification. The composition of the soil ratio is used to determine the density parameter of the sample from the soil ratio and is used as an indicator of the relationship between ultrasonic wave propagation speed and the composition of the soil ratio mixture. This study uses the T1 developer's board as a pulse generator and signal processor, an oscilloscope as a display, an ultrasonic transducer AT200 as a sensor 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 boundary 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 results in the form of stationary waves, will be forwarded to an oscilloscope so that the shape and travel time of the waves can be seen. The value of the measured wave travel time will be processed mathematically to obtain the relationship between wave propagation speed and composition. The results obtained from this study indicate that the measurement value of the relationship between the composition of the gradation layer and the speed of ultrasonic wave propagation using the ultrasonic method is close to the actual value of the composition of the gradation layer, with the highest error of 3.40%.

Keywords: Ultrasonic Transducers, Ultrasonic Waves, Ultrasonic Wave Velocity, Time Of Flight.