

**MEASUREMENT OF SPEED OF SOUND IN NATURAL
RESOURCES WATER USING ULTRASONIC SYSTEM AS
A TOOL FOR NON-DESTRUCTIVE TESTING**

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ABSTRACT

The research is conducted to measure the speed of sound based on ultrasonic system. Ultrasonic non-destructive testing methods can be utilized to a wide scope of materials and it used high frequency sound energy to conduct examination and measurement. In this paper, this studied was carried out on the speed of sound from the natural resources of the river and lake water. The ultrasonic system used will include the equipment of an ultrasonic transducer, a microcontroller and a computer. The ultrasonic transducer measured the time of flight (ToF) from the transducer to the targeted object and its reflected time or echo detection. From the ToF, the value of the speed of sound will be obtained by the calculation. The result will show the comparison between the speed of sound in the clean water and the polluted water.

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CHAPTER 1

INTRODUCTION

1.1 BACKGROUND STUDY

The interest in non-destructive testing (NDT) has considerably increased in these recent years. NDT is one of analysis techniques used in science and industry to evaluate the properties of a material, component or system without causing damage [1]. NDT is used in a variety of settings that covers a wide range of industrial activity, with new NDT methods and applications being continuously developed. By using NDT, it could be done without distracting system or mechanism of a substance and the method is faster when compared with existing methods.

There are several types of NDT that recently used in the industry such as visual, ultrasonic, x-ray thermographic, acoustic emission, and eddy current. Recent advances include focused ultrasonic systems promise to further improve underwater NDT capability. In order to conduct underwater NDT, the samples of water are assigned as the material to be tested. The sound wave is emitted into the water from the transducer and the returning wave are analyzed. With NDT, defects or pollution in water may be found before they become dangerous.