

# **MEASUREMENT OF SPEED OF SOUND IN RIVER USING ULTRASONIC SYSTEM**

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## **Abstract**

Ultrasonic are one of the most popular technique used by industries to test and evaluate their product called non-destructive testing (NDT). This paper present the design of a model water quality measurement using sound signal. The model is preliminary action to measure time travel of sound wave in water. Ultrasonic will transmit and receive the sound signal by with 42 KHz frequency operation. Data receive by ArduinoMega and at the same time send to the smartphone using HC05 bluetooth module. Measurement of water located at Klang River whereas most of factories located near to it. The time of flight (ToF) from the sensor are recorded, analyzed and presented in result.

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# CHAPTER 1

## INTRODUCTION

### 1.1 BACKGROUND STUDY

Water are the most important substance in our evolution and our daily lives. 97 percent of all the water on earth is in the oceans, only 0.0001 percent is in the atmosphere, available for rain [1]. The major point sources of pollution in Malaysia are sewage treatment plants, agro-based industries, manufacturing industries, sullage or grey-water from commercial and residential premises, and pig farms [2]. Non-point source (or diffuse) pollution is largely due to storm runoff after a downpour. These source of pollution effect the underwater ecosystem and also human as a water consumption.

Development in technologies of a devices are increasing over the years. The appearing new ideas may lead development of the product. In order to produce a good productivity, the Non-destructive Test and Evaluation (NDE) are made. (NDE) is aimed at extracting on information on the physical, chemical, mechanical or metallurgical state of materials or structures [3]. The information can be generated using X-rays, gamma rays, neutrons ,ultrasonic method, magnetic and electromagnetic methods or any other establish physical phenomenon. Ultrasonic are the easiest method to conduct non-destructive testing to measure water pollution compared to existing methods.

The history of NDT techniques used for quality control testing in part manufacturing dates back to the beginning of the industrial manufacturing era [4]. Ultrasonic testing method are very popular used for composite material or crack inspection on metal. The ultrasonic NDT sensor works at frequency range from 40 kHz up to 400 kHz. Application of ultrasonic