UNIVERSITI TEKNOLOGI MARA

COMPARISON OF SOUND VELOCITY VALUE USING FOUR DIFFERENT EMPIRICAL EQUATION IN ESTUARIAL AREA AT KUALA KURAU, PERAK

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Thesis submitted in fulfilment of
requirements for the degree of
Bachelor of Surveying Science and Geomatics (Hons)

Faculty of Architecture, Planning and Surveying

January 2020

ABSTRACT

SONAR refer to sound, navigation and ranging and it is commonly used for underwater measurement applications. In hydrographic surveying, bathymetry survey is the most famous underwater applications using the sonar, which echo sounder is used to a measured depth. Next, depths in sonar are computed based on sonar formulae. In sonar equation, elapsed time of an acoustic pulse which travels to the bottom and return back is measured. In the depth measurement a large source of error in sonar hydrographic surveys is an incorrect speed of sound. The depth can be accurately determined, if speed of sound is accurately known. However, speed of sound values is subjected to conductivity, temperature, and pressure. To determine speed of sound accurately, there are equipment and equation that can be used. The aim of this research is to estimate the suitable value speed of sound of in water as well with different empirical equations to compare the value between computed speed of sound using empirical equations and observed speed of sound. For this purpose, observation was performed in estuarial area Kuala Kurau, Perak. The methodologies of these procedures are explained in detail in the paper. Finally, the result will be the estimation of suitable value of speed of sound during operations in estuarial area.

ACKNOWLEDGEMENT

Firstly, I wish to thank Allah for giving me the opportunity to embark on my Degree and for completing this long and challenging journey successfully. My gratitude and thanks go to my supervisor Encik Mohd Zainee Zainal. Thank you for support, patience and ideas in assisting me with this research

My appreciation goes to the En Husin who provided the facilities and assistance during data collection. Special thanks to my colleagues and friends for helping and supporting me with this research.

Finally, this thesis is dedicated to the loving my very dear father and mother for the vision and determination to educate me. This piece of victory is dedicated to both of you. Alhamdulilah.

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CHAPTER 1

INTRODUCTION

1.1 Introduction

This chapter one (1) describes detail about this study, background of study, problem statements, aim, objectives, scope and limitation of study and thesis outline.

1.2 Background of study

In Hydrographic surveying, the most famous method used which gives accurate and high resolution sea depth is bathymetry (Alkan et al, 2006; Roy, 2016; Talib et al, 2011). So, the investigation of sound velocity in sea water and freshwater is one of the major interests to hydrographer. The application of sound velocity has become vital in hydrographic surveying as the acoustical method has been commonly applied for remote observations of seas and hydrography purpose (Yusop et al, 2010, 2011). The sound velocity is an important information required to retrieve good depth measurement. In water, the sound velocity in sea water is approximately 1500ms^{-1} and for freshwater is around 1400ms^{-1} (Alkan et al., 2006; Talib et al., 2011; Yusop et al., 2010, 2011) .

In the context of shallow water environment, the sound velocity in seawater is inconstant and depends on its temperature and salinity meanwhile fresh water is temperature. Since that there several method in determining sound velocity which is using sound velocity profiler and empirical equation (Alkan et al., 2006; Jamshidi et al, 2010; Talib et al., 2011). In this study, the sound velocity of certain location in Sungai Kurau, Perak was investigated. The sound velocity computation was based on field observation of depth, salinity and temperature of Sungai Kurau, Perak. The collected data showed a variation of sound velocity. The sound velocity variations followed more the differences in salinity compared to differences in temperature data collection at the transverse direction of the estuarial site.