

CHAPTER 1

INTRODUCTION

1.1 INTRODUCTION

This chapter explains about overview of renewable energy focusing on tidal energy at Pahang River specifically, introduction of flow straightener, the problem statement, objectives and the scopes of the project.

1.2 OVERVIEW OF ENERGY EXTRACTION FROM TIDAL ENERGY.

It's a plain fact that world require almost 80 percent of the demanding energy is furnished by sources such as natural gas, coal, or oil, which are quickly being depleted as well as environmentally unfriendly. Tidal energy is one of the renewable energy that contribute to the global warming reduction. Tidal energy is well known for using the water current to rotate the blade turbine and generate electricity. Tidal power is classified as a renewable energy source, because tides are caused by the orbital mechanics of the solar system and are considered inexhaustible within a human timeframe. Energy from tidal power is also a form of pollution free energy, which has a lot of potential. However in Malaysia, there is not much studies and development towards the tidal energy.

1.3 TIDAL ENERGY TESTING FACILITY

Before installing tidal energy power plant, detail research must be done to define the quality and the efficiency of the turbine. That is where the flume is needed. Flume is a tidal energy testing facility. It is required due to the condition of the ocean or river, depends on the research. For this project, a flume that has a Pahang River condition has to be designed so that the efficiency of the turbine can be tested practically. To get an efficient flow along the test section, a flow straightener needs to be installed to produce a laminar flow.

1.4 PROBLEM STATEMENT

Flow along the test section must be constant and uniform along the test section so that the efficiency for turbine blade experiment is high. Without the flow straightener, flow inside the flume will create a swirl flow pattern, and this will contribute to the inaccuracy of the turbine blade experiment. This condition should be avoided. At the same time, the installation of flow straightener will produce a pressure drop. High values of pressure drop will decrease the velocity of the flow inside the flume. High values of pressure drop will affect pump requirements. The effect of the flow straightener design is important for flow inside the test section effectiveness.

1.5 PROJECT OBJECTIVES

The effect of flow water from the flow straightener is an important thing to be studied. Basically, this thesis would be done to fulfill the following objectives:

1. To analyze the flow straightening effect for the three different shapes.
2. To determine the pressure loss during the flow for each type of flow straightener used.

1.6 SCOPES OF PROJECT

In order to achieve the objectives listed, the scopes of this study are defined as below;

- The study was to analyze the honeycomb, rectangular and vane type of water straightener.
- ANSYS CFX (Fluid) was used to analyze the water straightener.
- Velocity of the water inside the flume must be approximate to tidal stream current (Sungai Pahang).
- The placement of the flow straightener was fixed three (3) meter from the flume inlet.