CHAPTER 3

METHODOLOGY

3.1 INTRODUCTION

In this chapter will be described the process on handling laboratory experiment and computational work. The procedure and method in handling the process are described details below.

3.2 RESEARCH DESIGN

The methodology that used to run the research is the HEC-RAS software. It is the simulation experiment that is very economical and effective to analyze the water surface profile of a stream or channel. The research is divided into four phase, which are laboratory work, Manning Value specification, computational work and analyze result.

3.3 FLOW CHART OF PROJECT METHODOLOGY

Figure 3.1 shows a project methodology which involved the steps that have been taken to complete this study.
Figure 3.1: Project Methodology
3.4 LABORATORY WORK

Erosion occurs at the depth of 0.47m as shown in figure 4.22. It occurs at 11m from the upstream as the distance is longer than actual flume dimension. In order to calibrate HEC-RAS, it needs laboratory experiment and HEC-RAS. The preparation needs a laboratory where the dimension of open channel is measured. The dimension is referred to the height, width and length of the structure as shown on figure 3.2. Different value of discharge and manning value is determined and applied on the flume. The water flow will show the water surface profile.

![Image 1](image1.png)

**Figure 3.2**: Open channel that is located at the Hydraulic and Hydrology Laboratory

![Image 2](image2.png)

**Figure 3.3**: Water started to flow along the flume