CHAPTER 3

METHODODLOGY

3.1 Introduction

As a continual of this chapter, the phases of work of study are determined. This is very important to be using it as a guideline to achieve the objective of the study. After the literature review completely did, the CRM as a useful additive is discussed. The methodology is consisted of several phases. Preliminary study is conducted to gain more information regarding to the proper method and analysis. After that, continue with the standard laboratory test conducted with Crumb Rubber Modified (CRM) and sieved aggregates (Crusher run). The following test like density analysis, void analysis, resilient modulus test, Marshall Stability and flow test were conducted. All the proper tools and equipment must be prepared earlier in order to avoid any problems when conducting the tests. Furthermore, the entire testing machine also needs to be checked to conduct the test smoothly.

3.1.1 Preliminary Studies

The purposes of preliminary studies are to gain information and early understanding about the project title and all the progress of the project. The data was collected from variety of resources such as journals, books, internet and information from the supervisor.
3.1.2 Research Flow Chart

PHASE 1

START

IDENTIFY THE PROBLEM OF THE ASPHALT PAVEMENT MODIFIER

INVESTIGATE THE ALTERNATIVE TO PAVEMENT

IDENTIFY AND DETERMINE SUITABLE SIZE FOR THE CRUMB

OBJECTIVE
1. TO DETERMINE THE SIZE OF CRUMB RUBBER INFLUENCED THE STRENGTH OF ROAD PAVEMENT
   - Make a testing sample with different size of crumb rubber and constant of the percent of bitumen.
   - Percent of bitumen is use only 4% and size of crumb rubber is 2.0 mm, 0.425mm and 0.15mm

PREPARE CONSTANT SAMPLE & CRUMB RUBBER SAMPLE.
- Find the waste rubber in workshop
- Find method to make from waste rubber to be a crumb rubber
- Make a five sample constant.

LIST OF TEST FOR CRM
- Compaction test
- Density and void analysis
- Resilient modulus test
- Marshall Stability and flow test
- California Bearing Ratio Test

Record the data

OUTCOMES:
1. TO DETERMINE THE STRENGTH CRUMB RUBBER AS A BASE FOR A NEW AND UPGRADE PAVEMENT
3.2 Outline Methodology

A flowchart illustrating the experimental design for this study is including in Figure 3.1. A total of 36 binders (15 CRM and 15 controls samples while 6 samples with 3 different sizes of crumb rubber) were tested to measure the specific effects of crumb rubber modification. Six base samples, each being with a three different size of crumb rubber (2.0mm, 0.425mm and 0.15mm) were used to produce the CRM binders in the laboratory. Individual sizes were selected to minimize the effects of particle size gradation on the rheological properties of the CRM binders. Additionally, the best of size Of CRM were selected to represent the range of crumb rubber used to modify asphalt binders. CRM binders were produced with one rubber contents: 10% by weight of asphalt. Each CRM binder was produced in the laboratory using a mechanical mixer to blend the crumb rubber with the binder. Total weight of the each sample is 1200gram. After mixing, weighting, and compacting each of sample was tested. Then from the result, it will analysis, discussion and conclusion if the crumb rubber the best additives in road pavement.