CHAPTER I

INTRODUCTION

1.1 Background

Deterioration of asphalt pavement are presently more commonly recycled, instead of overlaying them with new asphaltic concrete material or reconstructing them because of the following reasons: reduced cost of construction, conservation of aggregate, preservation of existing pavement geometrics, prservation of environment. In addition also have environmental benefits, that are, recycling old asphalt reduce the amount of new oil needed and recycling saves on construction material waste since the recycled material is not sent to landfill, recycling the material particle that are produced during the process of asphalt pavement helps conserve natural resources. [1].

Recycling is the process of converting waste materials into new materials and objects. It is an alternative to "conventional" waste disposal that can save material and help lower greenhouse gas emissions (compared to plastic production, for example) [2,3]. Recycling can prevent the waste of potentially useful materials and reduce the consumption of fresh raw materials, thereby reducing: energy usage, air pollution (from incineration), and water pollution (from landfilling).

Recycling is a key component of modern waste reduction and is the third component of the "Reduce, Reuse, and Recycle" waste hierarchy [2,3] Thus, recycling aims at environmental sustainability by substituting raw material inputs into and redirecting waste outputs out of the economic system.[4].

Recyclable materials include many kinds of glass, paper, and cardboard, metal, plastic, tires, textiles, and electronics. The composting or other reuse of biodegradable waste such as food or garden waste is also considered recycling.[5]. Materials to be recycled are either brought to a collection center or

picked up from the curbside, then sorted, cleaned, and reprocessed into new materials destined for manufacturing.

Asphalt Pavement Recycling with Reclaimed Asphalt Pavement (RAP)

Environmental stewardship is designated as a major focus area of the United States Department of Transportation (DOT) strategic plan. According to the Environmental Protection Agency (EPA), environmental stewardship is the responsibility for environmental quality shared by all those whose actions affect the environment. The Federal Highway Administration (FHWA) supports and promotes the use of recycled highway materials in pavement construction in an effort to preserve the natural environment, reduce waste, and provide a cost effective material for constructing highways. In fact, the primary objective is to encourage the use of recycled materials in the construction of highways to the maximum economical and practical extent possible with equal or improved performance. As part of the FHWA recycled materials policy, the FHWA actively promotes asphalt pavement recycling and technology.

There are three key requirements that must be satisfied for asphalt pavement recycling to be successful. Recycled asphalt pavements must:

1. be cost effective,
2. be environmentally responsible, and
3. perform well.

In order to satisfy these requirements, the FHWA has identified the following specific objectives to encourage asphalt pavement recycling:

- Encourage the use of recycled material in the construction of highways to the maximum economical and practical extent possible with equal or improved performance;
- Promote the use of Reclaimed Asphalt Pavement (RAP) because the utilization of RAP can have the greatest economical, environmental, and engineering impact in pavement recycling.

Specific goals include increasing the amount of highway construction and rehabilitation projects that use RAP and to increase the amount of RAP used in specific projects.

In this final assignment for Graduated Student of Civil Engineering in Engineering Faculty of UNISULA, surface pavement reycycled material will be used to make new hotmix asphalt mixtures.

1.2 Problem Limitations

From the above background limitation are made, among others as follows :

1. RAP are used for material of Hot Mix asphalt mixtures (HMA)
2. The type of HMA is Stone Mastic Asphalt (SMA-14) and Danse Graded-Wearing Course (DG-WC)
3. Only Marshall stability and flow are used to examine the quality of SMA-14

1.3 The Objectives of the Research

Objectives of the research are :

1. Made H.M.A Mixtures using old Pavement Recycling Material
2. To know the strength of HMA using Recycling Material

1.4 Scope of the Study

To accomplish those objectives, this study started with a literature review of the information pertaining to the relationship of bitumen characteristics on some different temperatures conditions, and characteristics of the present asphalt recycling , and also tests which have to be conducted to the recycling. Based on the results of the literature review, a research design was developed involving preliminary research to find the appropriate modifier, in this study Asphalt Pavement Recycling with Reclaimed Asphalt Pavement (RAP), as well as an extensive laboratory testing and experiments. BNRA was then used as a binder of SMA. Various mix samples of SMA-14, the type of HMA used in this research, using BNRA binder were prepared. Some tests on SMA-14 mixture to evaluate its

performance were conducted by using Marshall Stability test. Data obtained from the test were analyzed and conclusions and recommendations were made.