

MARSHALL STABILITY TESTING ON AGGREGATES  
OF DIFFERENT ROCK TYPE AND GRADATION

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## SYNOPSIS

Aggregate type and grading play an important part in the performance of asphalt mixtures having an effect on stability, impermeability, surface degradation, skid resistance, fatigue life and segregation. Aggregates may be broadly characterised by rock type, as natural uncrushed rocks and sands or crushed materials.

This experimental project attempts to study the effect of different aggregate type and gradation on the properties of the bituminous mix of road pavements and to determine the optimum bitumen content based on the Marshall Stability test method. Two types of aggregates; namely granite and limestone were used with different gradation i.e. gap graded, well graded and uniformly graded.

The Marshall properties of the samples prepared such as density, air voids, voids filled with bitumen, stability and flow, were determined and plotted against the bitumen content. The samples were prepared and tested, with the bitumen contents varying from 4% to 6.5% at 0.5% bitumen content intervals. The results were analysed to determine the range of bitumen contents that is best suited for the preparation of the asphaltic mix using both granite and limestone.

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## CHAPTER 1 : INTRODUCTION

### 1.1 General

The purpose of this project was to study the effect of aggregate type and gradation on the performance of pavement bituminous/asphaltic mixtures. The study was carried out based on two major features of the Marshall Method of designing mixes namely, (i) density-voids analysis and (ii) stability-flow tests. The project was intended to determine the best composition of asphalt with both granite and limestone for producing asphaltic concrete mixture.

### 1.2 Bituminous Pavement

Bituminous pavement consist of a combination of mineral aggregates with bituminous binder. There are many ways to combine these components that will produce good and strong pavement.

Generally, a pavement can fulfill its function throughout its design life if it has the following qualities:

- a) Freedom from surface ravelling or cracking due to shrinkage or fatigue failure;