

Abstract

A GEOTECHNICAL STUDY OF THE GUARACARA LIMESTONE
AND ITS PERFORMANCE IN CONCRETE

Kathleen Dyer-Williams

During the 'Construction Boom' the demand for aggregate far outstripped the supply. Consequently shortages, inferior quality and exorbitant rise in prices were the order of the day. Arising out of this situation was the need to systematically survey and assess the aggregate resources with the ultimate goal of forestalling any such situation that might arise in the future.

This thesis examines one aggregate resource, the Guaracara Limestone of the Central Range, in an attempt to place the aggregate in perspective alongside the other known deposits in Trinidad. It also examines the suitability of the aggregate for use in portland cement concrete.

The study is divided into two parts, the first deals with the geological, mechanical and engineering properties of the aggregate. Based on findings of the first part, the aggregate has been placed in the sub-optimal grouping, and this places it in a lower strength category than that of the

Northern Range Limestone, the Melajo and Guanapo quartzites. In the second part a series of mix design studies were undertaken. From the completed analysis it was concluded that the aggregate can be used to produce 'good' concrete where normal strength is required.

The study also focusses on two special aspects.

The first consists of investigating the effect of prolonged soaking of concrete cube samples and comparing this with limited soaked samples. The second aspect focusses on the effect of elevated temperature on the development of early strength in concrete.

The thesis therefore, while being specific in its focus on the Central Range, suggests that a similar exercise should be repeated for other sub-optimal aggregate deposits to establish whether in fact the findings generated here relate specifically to this aggregate type or whether they reflect inherent properties of concrete.

1.0	INTRODUCTION	1
1.1	JUSTIFICATION FOR THE PROJECT	3
1.2	SCOPE OF WORK	8
1.3	DEFINITIONS	9
1.4	THE QUARRY INDUSTRY	10
	1.4.1 INTRODUCTION	10
	1.4.2 Availability and Location of Construction	10
	1.4.3	10
1.5	DEMAND AND SUPPLY PROFILE FOR AGGREGATES	14
1.6	SUPPLY OF AGGREGATES	17
	1.6.1 Private Quarries	17
1.7	SUMMARY AND RECOMMENDATIONS	19