PREDICTING LOS ANGELES ABRASION OF ROCKS IN SRI LANKA FROM SOME PHYSICAL AND MECHANICAL PROPERTIES OF ROCK

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Abstract

As urbanization and development rapidly increase, the demand for high quality aggregates becomes progressively higher. Thus quality controlling of rock aggregates is a major concern in construction industry.

The engineering properties of different rock types in Sri Lanka are not the same and therefore the suitability of rock aggregates should be investigated prior to use for construction works. The cost and time implication of the quality control process is becoming a concern from the entrepreneurial point of concern. Cost and time of quality controlling can be minimized via finding correlations between different tests on aggregates and rocks.

Laboratory studies were carried out to investigate the existence of relationship between LAAV and AIV, ACV, TFV, UCS, Point Load Index (PL), Specific Gravity (SG), Water Absorption (WA), Methylene Blue Absorption (MBA) and soundness parameters of the rocks in Sri Lanka. Fresh rock samples of different rock types were collected from quarries operating in various locations and exposed rocks in different localities within Sri Lanka to correlate each parameters.

Results from different rock types were analyzed separately using EXCEL by the means of least square regression methods. A linear relationship between LAAV and AIV was found with R^2 value of 0.7728 for Biotite Gneiss rock and exponential relationship between LAAV and AIV was found with R^2 value of 0.6609 for Charnokite/Charnokitic Gneiss rock. Relationships between LAAV and ACV for Biotite Gneiss and impure marble as well as relationships between LAAV and PL and LAAV and TFV for Biotite Gneiss were obtained with significant R^2values. Strong relationship could not be obtained between LAAV and Soundness, MBA, SG and WA.

Key words:

Quality controlling, LAAV, Correlations, EXCEL, regression methods

TABLE OF CONTENTS

LIST OF TABLES

Contents **Page No**

LIST OF FIGURES

Contents **Page No**

LIST OF ABBREVIATIONS

Abbreviation		Description
ACV	-	Aggregate Crushing Value
AIV	-	Aggregate Impact Value
ASTM	-	American Society for Testing and Materials
BS	-	British Standards
CI	-	Crushability Index
LA	-	Los Angeles
LAAV	-	Los Angeles Abrasion Value
MBA	-	Methylene Blue Absorption
PL	-	Point Load Strength Index
R^2	-	Correlation Coefficient
SG_{App}	-	Apparent Specific Gravity
SG_{Dry}	-	Bulk Dry Specific Gravity
SG_{SSD}	-	Bulk Saturated and Surface Dried Specific Gravity
SSD	-	Saturated Surface Dry
TFV	-	Ten Percent Fines Value
UCS	-	Uniaxial Compressive Strength
VFA	-	Voids Filled by Aggregate
VMA	-	Voids in Mineral Aggregate
WA	-	Water Absorption

LIST OF APPENDICES

Appendix	Description
Appendix I:	Data gathered to develop Correlations
Appendix II:	Sampling Locations