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Laboratory studies of Miocene limestone for the use of construction industry in Sri Lanka

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Geologically ten percent of Sri Lanka is made up of Miocene limestone which covers northern and north-western coastal belt of the Island. It is used as a raw material for various industries but only cement and lime are being used for the construction industry. Except its chemical composition there is no available literature to study about other properties. Therefore the author carried out a series of laboratory tests to find out the mechanical properties of limestone in Sri Lanka. The objective of this paper is to make a note on the various properties of Miocene limestone and describe its suitability to use as an aggregate for the construction industry in Sri Lanka.

Borehole samples (NX size) of limestone were obtained from various drilling sites in Northern Province of Sri Lanka and selected samples were prepared for different laboratory tests after visual observations. The tests were carried out according to ASTM Standards at the geotechnical and materials testing laboratories. The number of samples per each test was different.

The range (and average result) for each property can be mentioned here as bulk density 2213-2643 (2452) kg/m3, water absorption 2.2-4.5 (1.91)%, porosity 1-15 (6.5)%, specific gravity 2.58-2.68(2.62), ultrasonic pulse velocity P wave 4480-6338 (5668) m/s and S wave 2688-3802 (3400) m/s, uniaxial compressive strength 11-92 (35)MPa, point load strength 1.2-7.1 (3.7)MPa, aggregate impact value, AIV 25-30 (28)%, LAAV 35-38 (36)%, and Brazilian tensile strength 2.1-4.4 (3.2)MPa. Poisson's ratio 0.12-0.68 (0.22) and modulus of elasticity 42-85 (62) GPa were obtained by using P and S ultrasonic wave velocity values.

According to LAAV and AIV this limestone may be suitable as the base course material for road construction but may not be suitable for surface material of highways and rail road ballasts. Ultrasonic velocity waves indicate that limestone is highly compacted and solid. According to the compressive strength of solid limestone rock a few story buildings can be constructed on it after a detail investigation.