

PETROGRAPHY, GEOCHEMISTRY AND PHYSICO-MECHANICAL PROPERTIES OF DOLERITE FROM OGHY (MANSEHRA) KHYBER PAKHTUNKHWA, PAKISTAN

Muhammad Ismaeel¹, Naveed Anjum¹, Waqas Ahmed², Amjad Hussain² and M. Sajid¹

¹Department of Geology, University of Peshawar,

²National Center of Excellence in Geology, University of Peshawar, KP, Pakistan

Abstract

Dolerite dykes having excellent exposures around Maira Chanser and Jodan Khatta of District Mansehra along Oghi-Tanawal road are studied in terms of their suitability for aggregates and dimension stone using a combination of petrographic, geotechnical and geochemical characteristics. Petrographically, these rocks, known as black granites in commercial market, are fine to medium-grained having ophitic to sub-ophitic texture with plagioclase and clinopyroxene as the major mineral phases, while opaques, quartz, biotite, amphibole, olivine, apatite, chlorite, orthopyroxene and epidote occur as minor to accessory phases. Geochemically, these dolerites exhibit sub-alkalic, metaluminous, tholeiitic to alkalic basalt character and fall in gabbroic category. These rocks have relatively high TiO₂ contents and are ferroan in nature. The geotechnical properties such as unconfined compressive strength (32702psi-34965psi), unconfined tensile strength (485psi - 535psi), specific gravity (3.109 and 3.169), water absorption (0.14% - 0.61%), loss Angeles abrasion (17.34% - 17.36%), soundness (13.86 - 14.31), and flexural test values (30.065 N/mm² - 30.066 N/mm²) show their suitability for construction work as aggregate for concrete and light foundation loads as well as indoor and outdoor dimension stones. The strength properties of all samples studied have inverse ratio with the plagioclase content. The samples of Jodan Khatta samples have a relatively small grain size and fractured nature showing slightly weak mechanical properties as compared to Maira Chanser dolerite. Similarly, Jodan Khatta samples show more alteration along their grain boundaries which also have affected their grain to grain relationship and thus have influenced their strength values. Moreover, their relatively fine-grained nature has also contributed to higher extent of alteration. The study confirms that mineralogical and textural variations do affect the mechanical properties of the studied rocks.

Key words: Dolerite, Petrography, District Mansehra, Mechanical properties, Aggregate, dimension stone.