

Construction stone resources of Muzaffarabad area, Azad Kashmir, Pakistan: special emphasis on bed rock resources

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Abstract

Due to increasing population, the demands of construction stones are increasing. The construction materials of Muzaffarabad area are found in the Muzaffarabad thrust anticline. This anticline generally trends northwest to southeast with doubly plunging nature. The northeastern limb is normal while southwestern limb is overturned. This anticline is located in the north western, northern and north eastern vicinity of Muzaffarabad city. The geological Formations exposed in this anticline are Cambrian Abbotabad (dolomite and dolomitic limestone) and Hazira (glauconitic, chamositic, pyritic and hematitic iron), Triassic Kingriali (dolomitic limestone), Jurassic Samanasuk (limestone and dolomitic limestone) and Cretaceous Kawagarh (limestone and dolomitic limestone), Latest Cretaceous Indus (laterite and pisolitic bauxite), Early Paleocene Hangu (synonym Patala; shale, quartzose sandstone, coal, carbonaceous shale), Late Paleocene-Early Eocene Sakesar (synonym Lockhart and Margala Hill; nodular and rubbly limestone), Early Eocene Chorgali (alternating shale and limestone beds), Early Eocene to Early Middle Eocene Kuldana (alternating sandstone, limestone, red shale and green shale), and Miocene-Pliocene Murree (alternating units of sandstone and red shales). Due to thrusting of this anticline the southwestern limb of Muzaffarabad anticline is mostly crushed showing fault breccia, mylonite, gouge and slickenside of bed rocks. So far sheared material of dolomite and dolomitic limestone of Abbotabad Formation is being used as building material and for other construction purposes which cause heavy damages to the civil structures in the area. The physical and petrographical results show that aggregate derived from this Formation may not be suitable as cement concrete aggregate due to presence of chert that may trigger potentially deleterious alkali silica reaction. The engineering properties (soundness, water absorption, bulk density and compressive strength) of the Sakesar/Margala Hill Limestone indicate that this lithostratigraphic limestone is hard, tough, and durable with suitable strength properties especially in the eastern plunge and northeastern part of anticline. Therefore this limestone is suitable for road sub base, base course, and ordinary Portland cement concrete. The Muzaffarabad area has good potential for open pit mining and installation of crushers in the area. The operation cost of crushing activity will be less if plant is installed close to or on the deposits. The potential quarry sites are easily accessible through existing road network. Moreover, it is strongly suggested that environment friendly quarrying and crushing procedures may be applied.