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Small scale processing economic potential of Malawian carbonate resources for cement production

Senzani F.E.D. and Mulaba-Bafubiandi A.F.

Mineral Processing and Technology Research Centre, Department of Metallurgy, School of Mining, Metallurgy and Chemical Engineering, Faculty of Engineering and the Built Environment, University of Johannesburg PO BOX 17011,Doernfontein,2028, amulaba@uj.ac.za

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Geographic Information System (GIS) software was used to capture sites and characteristics of natural carbonate deposits in Malawi. Factors plotted included geological setting, chemical composition, nearness to transport and electric power infrastructure, surface water sources, as well as human population density. Precambrian marble, Karoo and younger sedimentary limestone, vein carbonate, carbonatite, calcrete as well as riverbed limestones are present. The study reveals that the deposits vary in size of exposures from 23m^2 to 3238515m^2. The southern region of the country hosts the largest number of occurrences, while the central region hosts the fewest. In both of these regions, Precambrian basement marble occurrences dominate. Significant occurrences of the northern region form part of the sedimentary Karoo and Chiwondo Beds. Pure carbonates as well as other rock types in which carbonate forms a minor component are also present. CaO, MgO, SiO_2, Fe_2O_3 and Al_2O_3 percentages vary, respectively, from 6.9 to 58, with an average of 40.3, 0.1 to 44 with an average of 7.1, 0.8 to 37 with an average of 11.5, 0.1 to 37 with an average of 4.4 and 0.1 and 14.4, with an average of 1.5. Using the highest scores of the foregoing parameters reveals that deposits with the highest exploitation potential are Southwest-Pirilongwe, Kampheko and Makanula-Chilonga. Due to the limited size of the Malawi deposits, the methods to be employed for processing need to be small in scale and mobile. A study of such operations on a global basis will help determine viability and way forward with regard to development of the country's carbonates.