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Sandstone building materials, their geoprocessing and thermal properties

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Sandstone is a medium to hard sedimentary rock largely consisting of quartz grains. This paper discusses the geochemical properties of sandstone found in the Drakensberg mountainous rural area of Qwaqwa (Free State province, South Africa). Their thermal properties will be discussed in terms of their convenience as temperature siphon bricks for housing in extreme weather varying Qwaqwa mountains. Mined artisanal and processed in small scale, sandstone in Qwaqwa is found in different colours varying from reddish to whitish through greyish, yellowish, greenish and blackish. geomorphological patterns on the material seems to instruct their decorative applications. Thick house bricks typically of 20 cmx15 cm x 30 cm were used for church buildings in Qwaqwa and surrounding villages. Local builders and construction workers brought and applied the acquired skills home to their own houses. For house building, it was observed that yellowish sandstone with ultra-fine grains was preferred.

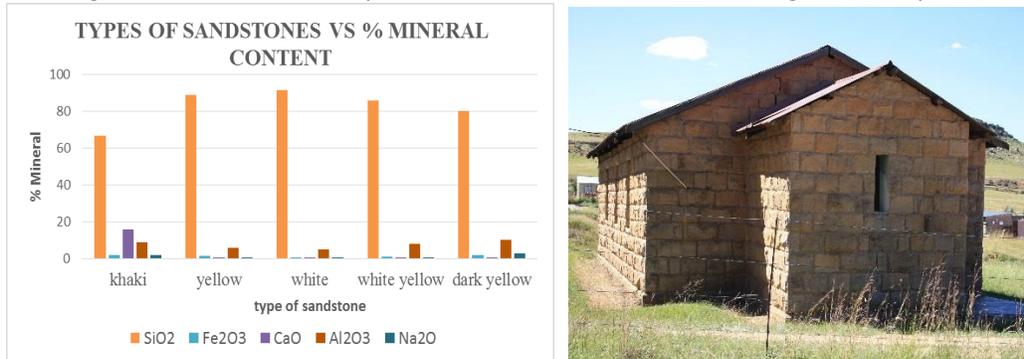


Figure 1: Mineral composition of the reddish, yellowish, whitish, cream (white yellow) and dark yellow (kaki) sandstone studied. The results show that a predominance of siliceous sandstone is encountered in the Drakensberg mountains. The dark yellowish sandstone is preferred as brick materials in Qwaqwa.

X rays fluorescence (XRF) analysis of all the sandstone materials collected show, Figure 1, that sandstone from the Drakensberg mountains is mainly siliceous. It has been found that houses constructed with sandstone bricks are warmer during winter and cooler during summer. This heat retention behaviour will be discussed

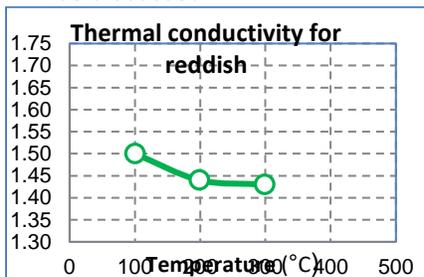


Figure 2: Thermal conductivity of whitish and reddish sandstone. It is lower (1.6 W/mk) than that of steel (52 W/mk) [1] but higher that of cement bricks (0.6-0.7 W/mk) [1].

Reference

[1] Clauser C, Huenges E (1995), Hand book union, reference shelf3, pp 105-126.

