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Heritage Stones from the Archaeological Site of Fuwairit (NW Qatar)

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The archaeological site of Fuwairit is a historical coastal town that flourished from the 18th to the 20th century. It is located in the north-western part of Qatar. Its architectural remains cover an area approximately 750 m long by 160 m wide.

Fieldwork was carried out to determine the type of building stones used at the site. Three main types of stones have been identified and sampled for an in-depth analytical study. Two thin sections were prepared for each stone type and characterised under a Leica DM 4500 P polarisation microscope equipped with a Leica DFC290 HD digital camera and LAS 4.9 software.

For each type of building stone, six cubic samples with dimensions of $5\times5\times5\pm0.5$ cm were tested for effective porosity and bulk density using the Natural Stone Test Method described in European standard UNE-EN, 1936, 2007. Ultrasonic pulse velocity (Vp) of the samples was taken with a CNS Electronics PUNDIT equipment following European standard UNE-EN, 14579, 2005.

The most-used building stone found in the masonry of the Fuwairit archaeological site is a Holocene little-consolidated limestone with shells. The fossils are mostly gastropods and bivalves from coastal-spit deposits of marine carbonate-sand bars, which form the Chenier's plain on which the archaeological site was built. This stone was extracted from the same area where it was used or in its vicinity.

Another building stone identified is a calcarenite from Jebel Fuwairit. It is a cross-bedded well-cemented and well-sorted oolitic grainstone with ophimorpha burrows and with oomoldic porosity. Ooliths have carbonate nuclei and well-developed cortices. It is from the Holocene and was formed from wind-blown dune deposits showing alternating periods of flooding and stability. Desiccation cracks filled with mud have facilitated the extraction of blocks. The source of this calcarenite are the hillocks located 1 km to the NW of the archaeological site, where some small historical quarries have been identified.

Dolomite of the Dammam formation (Middle Eocene) also constitutes part of the rubble masonry. It is a wackestone with nummulites, alveolines, molluscs and echinoderms. This stone has the highest bulk density and Vp, and lowest effective porosity of the three stone types analysed.

The little-consolidated limestone has the lowest Vp and density of the three stone types, and the greatest porosity. This stone is the one most frequently used to build the walls of the buildings that make up the ancient city. This stone is not very resistant. In fact, its quality is the lowest among the three stones available in the area. These low-quality petrographic and petrophysical properties have led to a poor conservation of the buildings. Its availability and proximity seem to have prevailed over durability in choosing this building stone.

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