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The Heritage Stone of Nossa Senhora de Guadalupe Church, Mouçós, North of Portugal: Characterisation and Glyptography

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Granite is the most important building stone in the north of Portugal. The importance of the stones in this region is evidenced by the pre-Roman roots Mor (r), Mur (r) and Mour of place names such as Montemuro, Moreiras, Mouçós, and Mourelhe. These roots indicate the existence of building stones used since ancient times in these places.

The quarries of the main building stones of historical buildings were generally in the vicinity of the buildings. Formerly, stonemasons carved mason's marks on ashlars. The mason's marks are lapidary signs to indicate the work carried out by each one. The mason's marks are generally symbolised by the initial of the stonemason's name. They are often found on dressed stones in buildings and in other public structures.

Nossa Senhora de Guadalupe church of Mouçós (possibly 16th century) has typical characteristics from the late Romanesque. It is located in Vila Real (North of Portugal). It is made up of three volumes: a single nave, a lower rectangular apse, and a sacristy attached to the apse. The exterior of this church is preserved almost unaltered in its original state. Each of the granite ashlars that make up this church has a mason's mark in the center of its face.

The mason's marks of the church have been identified; all the ashlars with visible mason's marks have been mapped, and a glyptographic study has been carried out. This has made it possible to calculate the number of stonemasons that worked in the construction of the church and the number of ashlars that were transported in each carriage, and to determine the construction phases of the church.

Eight cubic samples have been cut to calculate the granite's hydric properties (effective porosity, water absorption and bulk density) according to UNE-EN:1936. Ultrasound wave velocity was measured according to UNE-EN:14579. Furthermore, three thin sections have been made to characterise the granite petrographically under a polarisation microscope Leica DM-4500-P. A mosaic of photomicrographs has been made to evaluate the petrographic properties.

There are six main types of mason's marks in Nossa Senhora de Guadalupe Church. All quarrymen extracted the stones from the same quarry, or from nearby quarries. The mean effective porosity

of the building granite is 3.2%±0.3, and the mean water absorption is 1.2%±0.1. Its mean bulk density is 2566 kg/m^3±61.0 and its ultrasound P wave velocity is 2920 m/s±98.3.

The mason's marks are preserved because of the excellent petrographic and petrophysical properties of Mouçós granite. Further, Nossa Senhora de Guadalupe church was protected with lime plaster during the past centuries, and the plaster was not removed with the projection of abrasive particles.

The use of analytical techniques such as petrography, ultrasonic P wave velocity and the determination of hydric properties will guarantee the quality and durability of a sustainable restoration.

The historical quarries, forms of traditional stone extraction and uses of Mouçós granite constitute a heritage that must be safeguarded.

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