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Preservation of adobe buildings. Study of materials

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Adobe buildings are common in the central region of Portugal due to the lack of natural stone in the surrounding area. This type of construction technique lasted until the 20th Century, at which time cementitious materials, with faster hardening and greater structural capacity substituted traditional materials and techniques. Currently, a significant percentage of these buildings is vacant and many are degraded and in need of conservation actions. Adobes from central Portugal are distinctive as they are lightly coloured and made from air lime and quarry sand. Although some adobes were manufactured locally, most were produced almost 'industrially' and sold to nearby regions.

In order to preserve this heritage, conservation actions must be undertaken. So as to ensure the adequacy of these actions and compatibility between original materials and new ones, a thorough study of adobe compostion is mandatory. The current study is an initial step in the characterization of earth based construction materials from central Portugal.

Adobe samples were collected from residential buildings in two different locations. The determination of the composition of adobe blocks encompassed the determination of the binder fraction and of their chemical composition and also the particle size analysis of the aggregate. For this purpose FRX analysis, acid dissolution and dry sieving were performed. Methylene blue test was also executed in order to determine the clay fraction. Additionally, the mineral composition of powder samples and oriented samples was performed using XRD analysis in order to determine the clay minerals present in the blocks. As adobe blocks are extremely prone to the action of water the Geelong test was undertaken in order to provide information in terms of durability.

It was concluded that air lime was generally used in adobe compositions. However, the clay content varies in adobes from different regions, providing distinct durability characteristics to these materials.