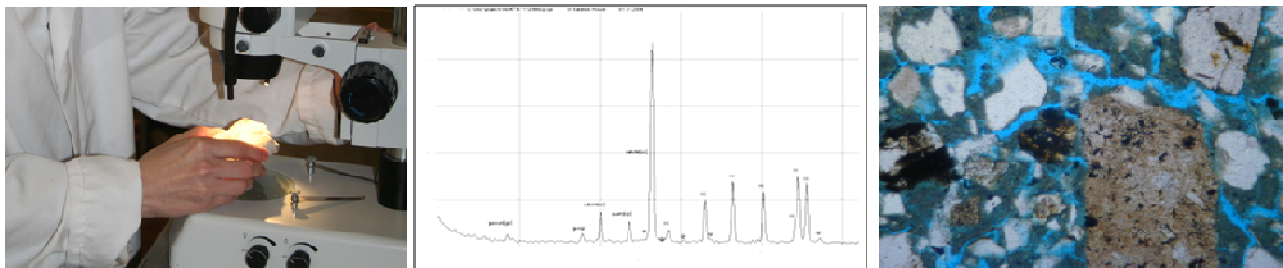




Technical Advice Guide: Materials Analysis & Matching

Analysis of historic mortars can provide essential information to assist in the specification of compatible materials for conservation and repair work. This will be particularly relevant where patching and consolidation of historic mortars, plasters and other lime finishes are involved. Textures, colours and performance characteristics can be derived from analysis of historic materials, and used as the basis for developing appropriate specifications for conservation and repair works. Analysis is also helpful in determining causes of materials failure, and may be used for research and archaeological purposes. It is imperative that the reasons for undertaking analysis of historic mortars are understood at the outset, to ensure the most appropriate procedures are undertaken to achieve successful results. This will maximise the amount of useable information derived from any analysis procedures.

There are numerous techniques for determining and characterising historic mortars, some of which are outlined below. Each technique should not necessarily be seen in isolation as, commonly, two or more techniques can be used to build a clearer, more accurate 'characterisation' of the mortar. It must be recognised that different historic mortars and constituents of mortars may require different types of analysis.



Microscopy is the most basic and useful technique for characterising mortars. A wide range of information can be derived, with the help of an experienced eye (we have analysed thousands of historic mortars using this method).

Wet chemistry can derive basic information on the approximate proportions of a lime: sand mortar sample. As part of this process the aggregate is isolated from the binder, and can be subsequently evaluated and graded for matching.

X-ray diffraction analysis can identify and differentiate crystalline binders and aggregates within a mortar. Particular types of binder; non-hydraulic lime, hydraulic lime or cement can be positively identified.

BS4551 analysis is a quantitative method used for samples which are cement based, from which the relative proportions of cement: lime: sand can be determined. If required, the isolated aggregate can be subsequently evaluated and graded for matching.

Petrographic (thin section) analysis can provide information on the structure of the mortar, and assist in identifying the composition of aggregate, binder, additives, and any salts present.

Aggregate evaluation and matching for repair mortars: SLCT hold, and are continuously developing and updating, an aggregates database. The database can be inspected by visiting us at Charlestown Workshops, and we can advise of suitable, local sources for use in most types of mortars. As part of our standard mortar analysis service, we match original aggregates to currently available sources from the database.

Stone analysis, evaluation & matching: in conjunction with Construction Materials Consultants (CMC) Ltd, we are pleased to offer this additional service. Petrographic examination and/or porosity and absorption testing are commonly used, depending on the nature and scale of stone replacement or indenting.

Analysis and evaluation of other historic building materials: in conjunction with other building conservation specialists and laboratories we can also provide analysis and evaluation services for other traditional building materials.