

1162

1162

Ancient Monuments Laboratory
Report 11/88

ANALYSIS OF MORTAR SAMPLES FROM
THREE SITES IN WINCHESTER, HANTS.

J Evans

AML reports are interim reports which make available the results of specialist investigations in advance of full publication. They are not subject to external refereeing and their conclusions may sometimes have to be modified in the light of archaeological information that was not available at the time of the investigation. Readers are therefore asked to consult the author before citing the report in any publication and to consult the final excavation report when available.

Opinions expressed in AML reports are those of the author and are not necessarily those of the Historic Buildings and Monuments Commission for England.

Ancient Monuments Laboratory Report 11/88

ANALYSIS OF MORTAR SAMPLES FROM
THREE SITES IN WINCHESTER, HANTS.

J Evans

Summary

A total of 39 mortar samples were analysed. Those from the Western Suburbs were medieval in date while those from the Northern Suburbs and High Street area were Roman. Several different building phases were identified among the Roman samples.

Author's address :-

Department of Physical Sciences
North East London Polytechnic
Romford Road
STRATFORD
E15 4LZ

ANALYSIS OF MORTAR SAMPLES FROM THREE SITES IN WINCHESTER, HANTS.

Analysis of mortars, concretes and plasters does not give absolute dating evidence. No period apart possibly from Roman military material used a unique recipe. The gravel:sand:lime ratios employed for various building tasks in the past were much the same as those used today. At best, analysis can give only relative dating evidence, ie which walls are likely to be contemporary with each other. Even here interpretation usually depends on the use of sand, gravel etc having quite distinct characteristics.

Chemical analysis will provide two basic pieces of information. First it will provide the weight of acid insoluble aggregate and secondly the amount of lime probably used in the original mixture. Additional information may be obtained by sieving the insoluble aggregate. The particle-size distribution can be diagnostic and may also provide help in recognising geological sources of aggregate. Examination of the samples before and after analysis may provide information about the preparative practices of the builders ie whether the sand was sieved, washed etc prior to use.

Microscopic examination of the sieved material may give useful data as it is sometimes possible to assess the shape of the quartz grains and the quantity (and nature) of non-quartz inclusions.

Certain problems must be borne in mind when carrying out analyses. For instance, the use of shell or chalk/limestone aggregates can give rise to misleading data as these will disappear in the acid treatment phase. Unfortunately the samples from all three sites contained a high proportion of chalk/limestone and consequently it was not possible to estimate the relative proportions of ingredients in the original mix.

ANALYSIS

Thirty-nine samples were submitted for analysis; 8 from the Western Suburb (AM Lab No 876102), 25 from the High Street Sites (AM Lab No 876103) and 6 from the Northern Suburb (AM Lab No 876101). All samples were in good condition and showed little sign of leaching out of calcium salts. The samples showed the usual buff-brown colouration. All samples contained quantities of up to 4 mm white, angular fragments of limestone. In most cases, this accounted for about 50% of the visible area. Such levels argue for deliberate inclusion as aggregates as opposed to accidental inclusion from the lime phase.

The samples were initially dried at 110°C to a constant weight. Approximately 50 g of dried material were treated with dilute hydrochloric acid to remove the acid soluble material, mainly calcium carbonate, and thus reduce the sample to its insoluble aggregate. This aggregate was filtered off, thoroughly washed and dried to a constant weight. It was then passed through a series of standard sieves and the various quantities retained noted. In order to facilitate inter-sample comparison, the raw data were converted into percentages of the total soluble aggregate. All analyses were carried out in duplicate wherever possible. Where duplicate analyses were carried out the mean values were used for the comparisons.

Examination of the coarse aggregates (ie particle size 2.00 mm and above) showed them to consist of angular flints and brick/tile fragments in varying proportions. There was no correlation between the coarse aggregate make up and site or building phase. This suggests that crushed brick/tile was routinely added. The finer fractions were composed of sub-angular quartz sands. No sample contained any practical quantities of brick/tile dust. The absence of such dust suggests some form of preparation of the crushed brick/tile phase either sieving or washing.

Aggregate-size analysis suggested a series of building phases as summarised in the Table.

SITE	GROUP	SAMPLE NUMBER	AM LAB NUMBER
Western Suburb	A	164, 170, 175, 177, 178, 182, 196, 202, 203	876102

It seems reasonable to assume that all these samples were associated with a common building phase.

High Street	A	1, 5, 6, 7, 10, 11, 12, 13, 18, 20, 27, 30, 33, 34, 35, 52, 55, 58	876103
	B	3, 14, 17, 24, 29	876103
	C	45	876103
	D	2	876103

Assuming that the samples are representative of the original buildings then it would appear that Group A represents the prime building phase.

Northern Suburb	A	478, 739, 970	876101
	B	654, 684, 1167	876101

Although the analysis has separated the mausoleum fabric from the other structures, this is on the particle size-distribution of the sand (ie different building phases) as opposed to the use of special mortar types.

John Evans
Department of Physical Sciences
North East London Polytechnic