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# MORTAR ANALYSIS REPORT

140 West George  
Street, Glasgow

Sample 1

Ashlar bedding/pointing mortar



SITE	140 West George Street, Glasgow
CLIENT	EBS Construction
DATE SAMPLE RECEIVED	16 May 2019
ANALYSIS DATES	16 May 2019
ANALYSIS, INTERPRETATION & REPORT BY	Dr Katie Strang and Roz Artis
CLIENT REQUIREMENTS	Standard Mortar Analysis
STRUCTURE DATE	19 <sup>th</sup> Century
STRUCTURE TYPE	Offices
SAMPLE DATING	Unknown – presumed to be original?
LOCATION/ FUNCTION IN BUILDING	Bedding/pointing mortar from the front elevation
CONDITION OF SAMPLE RECEIVED	Remnants of ashlar mortar adhered to sandstone

### GENERAL COMMENTS

The sample appears to consist of a carbonated lime, probably a non-hydraulic to feebly hydraulic lime putty with a very small proportion of predominantly fine grained aggregate, most likely crushed chalk (whiting). On the addition of acid to the sample a reaction occurred, indicating a possible content of an organic compound (possibly linseed oil). Further analysis can be arranged to positively identify the organic compound if required.

Organically bound lime mortars do not readily disaggregate using the standard method of acid (10% hydrochloric acid) dissolution, and as such it was not possible to determine the proportions of binder: aggregate. Microscopic analysis revealed a very small proportion of fine quartz aggregate in the mortar and a few small fragments of burnt fuel (likely to be a contaminant from the burning process).

It is likely that a 50:50 mix of lime putty : whiting (crushed chalk), with a few drops of boiled linseed oil and a small proportion (say 10%-20% by volume) of fine silica sand, will provide a mortar similar in nature to the sample provided. If the colour is too stark for replacement work, then a colour matched mortar based on Otterbein NHL 2 may be more appropriate.



### ANALYTICAL PROCEDURES

The selected sample of material was dried to a constant weight and examined under a binocular microscope at x40 magnification. Degree of carbonation of the sample was determined using phenolphthalein indicator, which will react with any uncarbonated lime.

An assessment of the binder type was made by evaluating the physical characteristics of the mortar based on our knowledge, experience and understanding of materials.

Application of 10% Hydrochloric acid to the sample resulted in dissolution of the binder, however the presence of linseed oil keeps the grains clumped and therefore it is not possible to calculate the relative proportions of lime (and gypsum) to aggregate.

The analysis results and interpretations made from it provide information on the composition and characteristics of the mortar sample(s) received by the SLCT laboratory. **Provided the sample was representative of the mortar generally**, the analysis will give a reasonable indication of the original materials and provide a **basis for specification** of repair mortars. If more detailed information is required (for example, for purposes of historic research) more sophisticated analytical procedures can be undertaken.





MORTAR EXAMINATION AND ANALYSIS



Plate 1. The sample as received. Dish is c160mm diameter.

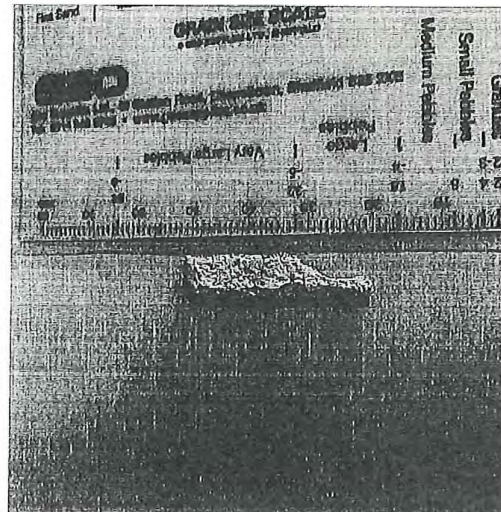


Plate 2. A freshly broken face of the sample. The sample was fragmented upon receipt in the laboratory, common with ashlar joints. Scale is in mm.

PROCEDURE	OBSERVATIONS
PRELIMINARY VISUAL ANALYSIS OF SAMPLE	The sample was received as fully carbonated intact pieces of mortar plus fines. Fines consisted of aggregate grains and silt. The sample is weak, friable and easily disrupted. The total sample weighed 9.42g and the largest intact piece measured = 64.35mm x 9.89mm x 4.28mm
EXAMINATION OF PREPARED SAMPLE BY BINOCULAR MICROSCOPE (X40 MAGNIFICATION)	Once dried the mortar was found to be 10YR 8/1 'white' when assessed against the Munsell Soil Colour Charts. The sample was very disaggregated upon receipt but some aggregate was visible in the small intact pieces. The aggregate appears to consist of fine to medium grained, angular to sub-angular buff/clear/cloudy quartz.

If a repair specification is required please contact us, and we can arrange for one of our surveyors/consultants to visit and inspect the building/structure, evaluate the relevant requirements, and subsequently provide recommendations and/or specifications for construction and repair work.