

## BULBOROUGH HALL - Materials Analysis

### Challenge

Restoration work on this Grade 1 Listed building, dating back to the 15th century, required original external mortar to be made good.

### Solution

Samples of old mortar were submitted for analysis so that the original aggregate and binder could be established and the criteria for some initial trial mixes could be determined. Measurements of the proportions of soluble silica, calcium oxide, sulphur trioxide and insolubles were made based on BS4551: Part2: 1998. Also the Munsell colour and particle size distribution of the insolubles were determined.

### Results

The results of these measurements were then translated into mix proportions. This involved using a specially developed in-house computer program SeleX©, which bends some 20 different ingredients of binders and aggregates in 330 different ways, to establish the ingredients and their proportions consistent with the results of the chemical analysis. It also identifies the nearest quarry and sand type given in the English Heritage Directory of Building Sands and Aggregates, which closely matches the measured colour size distribution of the insoluble.



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