

## Historic Lime Based Materials

From “Ancient times” to date, the history of building has seen the development of a variety of fundamental construction materials including lime, cement, aggregates and “additives”. As a materials test-house laboratory, Kiwa CMT Testing has devoted a significant amount of time to understanding the nature, characteristics and significance of such materials and the associated methods of mixing and placing. It became clear, as a consequence, that, in the context of restoration, repair and/or refurbishment of existing buildings and structures, the need to identify specific material types and the nature of their *in situ* performance, including external environmental influences, is of paramount importance if we are to achieve successful outcomes and avoid inadvertent damage to our building heritage. Many structures in the UK are now over 100 years old and a significant number of these are protected under the current system of “listing”. Requirements to this end are increasing and the subject is very much here to stay.

The growing interest in this type of expertise is demonstrated by the level of enquiries received that result in Kiwa CMT Testing, who are rapidly becoming a leading laboratory in the field of matching and replicating historic materials for restoration and repair, being contracted to carry out the required analysis.

The following case study is an excellent example.

**Project/location:** Ormiston Ilkeston Enterprise Academy  
King George Avenue, Ilkeston, Derbyshire

**Client:** HB Jones Midlands Limited

**Background:** The project in question concerns the on-going development of the Ormiston Academy, involving refurbishments to existing buildings together with a 40% newbuild element to provide a new lecture theatre, classrooms and science laboratories. The existing buildings are those of the former Ilkeston Grammar School, opened originally in June 1914 by King George the Fifth, including the now Grade 2 listed central domed hall.

Kiwa CMT Testing were approached by the client who, in turn, had been engaged to carry out remedial repair works to the existing buildings being retained as part of the development. The particular issue was the need to identify the precise nature, characteristics and composition of existing external render to the 100 year old buildings to facilitate sympathetic repair in

accordance with the requirements of the Local Authority Conservation Officer assigned to the project.

**Approach:**

KCMT provided a testing proposal commencing with sampling considerations/ availability of suitable test specimens. Having established that the client was already in possession of such specimens, KCMT proceeded with a combination of appropriate chemical analysis in conjunction with x-ray diffraction (XRD) examination and testing of the supplied samples, with due attention to material nature, type, composition and aesthetics, including assessment of overall colour. The analyses addressed individual material layers within the specimens, all findings were incorporated in a fully interpretative report.

**Benefits:**

The examination, testing and analyses carried out established that, although nominally similar in appearance, the render samples submitted by the client actually represented two distinctly different material types; on the one hand an hydraulic lime based render applied in two coats, the hydraulic (setting) characteristics possibly enhanced by addition of brick fragments, and on the other hand a single coat Portland cement based render finished to match the lime based material. Likely mix proportions were also established for each material.

Using the reported information, the client was able to carry out sympathetic patch repairs to various sub- areas meeting conservation criteria in terms of material types, mix design and aesthetics and avoiding potential future problems arising from use of incompatible materials.

The outcome of the testing work undertaken is thus commensurate with the general objectives and philosophy of conservation and/or historic building inspection, namely provision of advice and guidance to promote conservation of our historic environment thereby protecting and enhancing notable buildings and the corresponding character imparted to a particular area or location.



Mike Barham  
Kiwa CMT Testing

