



# Historic Buildings, and Mortars.

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Over the years many of our historic buildings and ancient monuments have had some kind of modern repair/replacement or intervention that has involved the use of mortars. Cement is the one material that seems to crop up in conversation with regards to its hard impervious nature and it being detrimental to historic masonry fabric.

Not all cement is to be thought of in this way though, cement is not new, the Romans prepared and used natural cements successfully in their concrete to create Roman Harbour walls and other significant structures.

Modern cements however are detrimental to historic masonry fabric and should not be used to consolidate or repair where in the past lime or earth was used to construct historic structures.

Hot lime mortars, and slaked lime putty were widely used pre 1920s and also for some time after this date, however, by this time the use of modern cements were on the rise due to its easy application and quick curing times. Suddenly lime was out of favour and the knowledge and skills of making lime mortars declined over the years.

Although modern cement was popular it was beginning to become apparent that cement was detrimental to our historic structures. It wasn't until the late 70s and early 80s in the lime revival days that lime was welcomed back. Lime slaking was once again being explored, normally slaked to a putty and then later mixed with sands and aggregates to form a mortar.

This method of mixing lime for the purpose of producing mortar can be a bit problematic when in unskilled hands and often leads to failure. This is due to the high water content of lime putty, and the lack of knowledge required to perfect the technique and aftercare that is required to cure the mortar. The answer to this was to use Natural Hydraulic Lime (NHL).

The readily availability of bagged, Natural Hydraulic Lime, (NHL binders) and pre mixed mortars have become the easy time saving option for many in the conservation industry. Unlike lime putty mortars Hydraulic lime mortars are relatively easy to cure due to their chemical set. Hydraulic limes have the ability to set with the presence of water as they have the benefits of silica and alumina in their geology that gives them this chemical set and do not totally rely on re-absorbing Carbon Dioxide from the atmosphere. However, many of the hydraulic lime binders produced and currently used in this country today are foreign and may not represent the original binder material of our historic buildings on a like for like basis. Additionally, some of these Hydraulic mortars can set very hard.

Hydraulic mortars can continue to gain in strength for years after they have been placed and this leaves me to wonder if we are actually seeing a repeat of the cement era. Having said that, hydraulic lime binders are not all bad either, in certain locations and building elevations hydraulic lime can work very well. Understanding what you have in a building and what type of lime binders you require is key to successful conservation.





## Hot Lime Mortars.

We are now beginning to see a renewed interest in hot limes, but further testing and curing of these mortars is necessary in order that we can fully understand their complexity. Hopefully this will lead to an improvement in the skill of using and preparing such mortars.

It is hard to imagine that since the revival of lime in the late 70s we have been slow to follow up in the use of hot limes for conservation work. There are very few old texts still available but hot lime we believe, was used originally in historic building construction. These limes were prepared by slaking quicklime (Calcium Oxide) with sand or earth. When slaked Quicklime doubles in volume and tests carried out on original historic lime mortars indicate that the lime to sand ratio is very high in the binder. For example, a **1:3 mix** (Quick Lime & Sand) when slaked together will produce a **2:3 mix** ratio due to this doubling in volume.



Not all is fully understood as to why these mortars work so well. At Team Force Restoration we are currently developing Hot Lime mortars at Marsden Lime Kilns, (one of our current projects) near Whitburn on the North East coast. Test panels are currently underway and a variety of hot lime samples are being carried out with a hope to understand more about this material.

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