



HARRIS ASSOCIATES (B) LIMEY THAT'S INTERESTING

Attention All Property Managers

If as a property manager your building portfolio includes period properties dating between say the 1800's to the early 20th century then you should be aware of some of the principles of how best to maintain your clients' most expensive asset. This article deals with the brick exteriors that are most commonly found on period mansion blocks and specifically in the context of the most common façade repair "repointing" and how lime is used in that process.

Lime Aid

Lime has been used extensively in the construction of buildings for thousands of years. It has been used as an aggregate mixed into internal and external renders as well as in mortars between bricks. Lime used within brick mortar joints provides flexibility and moisture permeability. This helps the buildings to "move" and "breathe". Without the flexibility of lime within the mortar the facades of period properties will be more prone to cracking which is both unsightly and leads to an acceleration of decay. The use of lime as a building and construction aid is therefore well known and has been proven over a very long time indeed.

OK, Here's The Science Bit

When it comes to using lime in the renovation of historic and period properties there are two choices; Hydraulic Lime and Non-Hydraulic Lime.

Hydraulic lime sets by a process called hydrolysis. Basically it has a reaction with water. It is provided in a dry powdered form and once it becomes wet (usually through mixing on site), the reaction starts the process of setting. Hydraulic lime sets faster and much harder than non-hydraulic lime and is therefore well suited for external use and in damp conditions.

Non Hydraulic lime (also referred to as Lime Putty) sets by carbonation. This is where the lime reacts with carbon dioxide which as we all know occurs in the air that we breathe. Non-Hydraulic Lime is therefore provided 'wet' in the form of putty. The putty is contained within buckets with a thin layer of water on top to prevent reaction with air until it is in place. The use of non-hydraulic lime results in the mortar setting at a much slower pace. It takes longer to set but provides a greater degree of flexibility, greater workability and breathability than its counterpart hydraulic lime.

The use of non-hydraulic lime / lime putty can be ideal for use on historic buildings particularly when carrying out exterior repairs, maintenance and renovation work.

Which Lime To Use When Repointing Period Mansion Blocks?

There is often no right or wrong answer. More likely, the specifier (your friendly neighbourhood surveyor) or builder is faced with a series of conflicting pressures: Time, Material Performance, Existing Conditions, Age (of the building not the surveyor), Flexibility etc. The secret is in achieving the best compromise and to assist with reaching a decision there are a few questions that ought to be asked:

Q1. How hard is the brickwork and structure?

The mortar must always be softer and more porous than the main building material.

Q2. How exposed is the area that is being repointed?

A more exposed area will need to cope with extremes of temperature and freeze/thaw cycles. In these circumstances the mortar will need to boast greater durability and will probably need to set quickly.

Q3. How much movement will the mortar have to cope with?

The less hydraulic a lime is, the more it will be able to flex and "move" with the building and thus less likely to suffer from thermal and seasonal movements. For buildings with timber frames which tend to be susceptible to more seasonal movements a more flexible and breathable lime based mortar would be recommended



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Lime Facts

1. Lime putty (the non-hydraulic lime) or hemp lime mixes should be used with caution in properties where damp saturation is a recurring problem. If for example an exterior wall is permanently very damp, a lime putty mix may never set due to the inability of it to react with carbon dioxide.
2. Lime putty is typically the first choice for internal plastering due to its plasticity and better vapour exchange. In thin layers it is easy for it to absorb Carbon Dioxide and to consequently set.
3. Limewash and lime paints are also typically made from non-hydraulic lime.
4. Using a lime that is too strong can be very damaging for some historic structures. Contractors and specifiers should be cautious with using strong mixes and these are best kept for use in harsh conditions and where high strength applications are required.
5. Using a strong lime mix should be avoided on inherently friable and soft masonry and timber structures. Many period properties, particularly to the front facades, will comprise softer more aesthetically pleasing bricks such as red rubbers. It is to these facades where a softer and more flexible lime mix is required.
6. When carrying out maintenance or repair work to period and historic buildings, it is always best to replace like with like particularly in conserving the originality of the building.
7. When carrying out internal damp-proofing works to historic buildings always check if a lime based render should be used. The application of an impermeable chemical by a "damp specialist" may not be the answer and in fact may compound a problem that only exists because lime had not been used in the first place.
8. Non-hydraulic lime (lime putty) is considerably cheaper to purchase than hydraulic lime and could provide substantial material savings on larger major renovation projects. However, It is also generally accepted that working with non-hydraulic limes can require up to 40% more labour than would be required for hydraulic lime and is not as easy to work with as hydraulic lime.
9. Hydraulic lime can be provided in three strength grades; Feebly Hydraulic, Moderately Hydraulic and Eminently Hydraulic. You don't have to be a genius to work out what each grade actually means.
10. Lime acts sacrificially in that it is weaker and breaks down more readily than masonry. Thus, saving weaker stone such as sandstone and limestone from the harmful effects of temperature expansion and mortar freeze.

For more information and guidance on lime mortars, the use of lime in property renovation or indeed any other property related matter please contact Mazhar Farid or Shaun Harris.

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Harris Associates Case Study

The photographs below illustrate the dramatic effect of carrying out renovation work correctly. This project was carried out in 2015 where Harris Associates specified the works and subsequently project managed the works to completion.

The existing building had been repointed previously using a high strength sand/cement mortar with no lime additive. It was clear that whoever had carried out the works previously had not considered the age of the building, its relative exposure to the weather elements nor had any thought been given to the fact that the flank elevation would naturally experience movement / flexing.

Large swathes of the existing mortar had failed and the entire elevation needed the old pointing removed and the façade completely repointed.

Harris Associates specified a medium grade hydraulic lime to be mixed into a mortar that would provide the flexibility and endurance required.



BEFORE



AFTER