

Lime Mortar

STORY: Sue Rawle



Anything guaranteed to make my blood boil is when I hear another builder, not one steeped in traditional methods I hasten to add, stating that using lime mortar is old fashioned. “Better to use a more modern approach,” one said to me, as he slapped yet another coat of cement render on the interior of a cob wall that had already seen off two previous coats, the remains of which now lay in crumbled disarray on the hall floor.

You see what is missing here in this conversation is the understanding of science- lime mortar versus cement render. Of course, when you extol the virtues of lime mortar, and why it should be used on older properties, funnily enough they suddenly remember that they have got another appointment and must dash. I bet if you are a traditional builder, you’ve had a similar conversation and are smiling and nodding your head in agreement!

Anyway, back to science and understanding the properties of lime mortar. The Greeks and Romans knew a

thing or two about building, and produced mortar by burning limestone and slaking i.e. mixing with water, then mixing the resultant product of lime with sand. Their understanding of architecture and the use of lime mortars is still apparent today, a true testament to the efficiency and durability of traditional lime mortars in early buildings.

So what is lime mortar and why should you use it as opposed to its modern counterpart? Well, it’s derived from quarried limestone or chalk, (calcium carbonate) which is then crushed and fed into a kiln, where it is heated to a



temperature in excess of 850 degrees Celsius, changing the limestone into calcium oxide, (quicklime) and carbon dioxide. This is then slaked for several months, producing lime putty, which should have the appearance of cream cheese. Mix with good quality sand, and you have lime mortar. Depending on the task in hand, hair can be added at the time of applying the mortar to give it strength and stop it cracking.

There are various grades of lime mortar, again depending on what you want to use it for. A general rule of thumb is a mix of 3:1 (three parts of sand to one of lime putty) is suitable for interior use, whilst a mix of 3.5:1 is preferred for exterior use.

The benefits of lime mortar are many, one of which is it can accommodate considerable movement hence this is why it has always been used for tall factory chimneys! By comparison, cement mortars are harder and have less flexibility of movement.

When lime mortars crack, they tend to do so in tiny micro cracks, but thanks to the properties of lime when it's used as an exterior render, the movement of rainwater through the surface of the mortar joints dissolves the free lime, which gets



LEFT: Applying a scratch coat to this 1930's property. **ABOVE:** Newly applied lime mortar, that's still drying out. **BELOW LEFT:** Before starting work on this barn conversion, circa 1700. **BELOW:** A top coat of lime render has been used on the exterior of this barn conversion.

deposited in the micro cracks as the water evaporates. A chemical reaction sees the lime subsequently react with the carbon dioxide in the atmosphere and is converted

to calcium carbonate, so in a very short period of time, the cracks are healed. It's all very clever stuff and a process which takes place without any interference from man.



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Talking of the effects of rain water, I'm sure everyone has seen instances on cement render where soluble salts have been transported to the external surface by the migration of water through the structure. Once the water evaporates, the salts leave an unsightly stain, something that doesn't happen with lime based mortars. Instead, the soluble salts precipitate in the insoluble calcium form before they reach the surface.

So just how durable is lime mortar and is it weather tight? Anyone who has worked with traditional building materials will tell you it is extremely tough. Firstly, it's very flexible and makes for more effective filling of vertical joints. As lime mortar acts like a sponge, it absorbs rainfall and then allows it to evaporate, rather than soak into a wall. This means reduced water penetration, which also minimises the risk of freeze thaw damage that can be extremely damaging to masonry structures.

Cement mortar on the other hand is brittle and inflexible, and can trap moisture in behind it, giving rise to a variety of problems such as poor insulation, and decay, especially if it's rendered on top of cob. Cement also encourages ground water to rise up a wall by capillary action, leading to internal damp, (a whole subject of its own)!

Lime render can be applied to a variety of backgrounds, including cob, brick and stone. When used internally, lime mortar can also be applied to wooden laths for ceilings and internal partitions.

When restoring a wall, all the old plaster is removed and any repairs done before giving the first coat of a 3:1 mix of sand and lime putty. The lime mortar needs to be



ABOVE: Lime render now ready for limewashing on this listed property in Bideford, North Devon. **BELOW:** Final coat, limewashed in Marigold, property circa 1930

kept damp in the initial stages of application, if it dries out too quick, or is put on too thick, it will crack. The more porous the background, the more water required and for this purpose we use a sprayer to dampen down the wall. A haired dub coat is then added and scratched ready for the third coat,

which is floated to a smooth finish. The final top coat of a 3:2 mix of sand and lime putty gives a fine finish, ready for decorating with lime wash.

Limewash is made from lime putty, diluted down with water. It can be used internally or externally and because it's a breathable paint, works with the lime mortar to protect it. Whereas years ago, the only colour available was white, there are now a host of colours available, giving a soft warm finish that has a certain depth which is unobtainable with modern paints.

Although the process I have described here sounds quite straight forward, there are many factors involved in achieving a finish to be proud of. However, the end result is well worth the effort and can add value to your home, both aesthetically and in ensuring that our heritage will be preserved for future generations to enjoy.

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