



TECHNICAL ADVICE

Traditional Lean Limes

TAN3

Historically, Shillingstone, Totternhoe, Dorking and many other limeworks produced lean limes. These combined the good working properties of non-hydraulic 'fat' lime with some slight hydraulicity. Sadly, no traditional lean-lime plant is currently in operation.

Lean limes were 'grey' or 'chalk' limes - first choice materials produced by calcining lower bed chalk in a traditional flare or draw kiln at a temperature rarely in excess of 950°C.

The superior properties of these materials in relation to modern non-hydraulic lime were:

- Improved durability
- Reduced shrinkage
- Faster stiffening
- Greater resistance to freezing and salts crystallization

The reasons for these superior properties are:

- The raw material was unprocessed and contained a small proportion of mineral 'impurities'. The kiln was coal, charcoal or wood fired and traditional lime putty contained fuel ash. Some 'impurities' become reactive towards lime in the kiln and form stable pozzolanic compounds that provide a weak hydraulic set in addition to carbonation.
- Traditional lime-kilns rarely got hotter than 950°C and it was therefore very rare for lime to contain over-burnt material.
- The putty and mortars produced using it contained "under-burnt" and kiln reconverted calcium carbonate. The presence of this carbonate 'porous particulate' aids carbonation by 'seeding' calcite crystal growth.
- Lean quicklime took up less water during slaking producing denser putty. Shrinkage of mortar due to water loss was therefore reduced.



Maturation of Lime Putty

It was less necessary for lean lime putty to be matured for a prolonged period prior to use as it formed a usable consistency more quickly, nor could it contain over-burnt material that can spoil finished work by late hydration. The presence of this less reactive over-burnt material in modern quicklime is one of the principal reasons for the need to mature modern putty lime.

Hydraulicity

It is thought that lean lime putty should have been used soon after slaking as the hydraulic properties might be lost, and advice for the use of Totternhoe lime was that enough lime should be slaked on a Friday for the following weeks mortar. However, whilst there may be some loss of hydraulicity in stored or matured lean lime putty, maturation did not impair performance, and a matured lean lime putty was still a superior material.