

Good building practice

The following guidelines have been produced to help you and your organisation understand the requirements when using Limestone in your construction project.

Also see mortar mixes (below) as this is a critical element to satisfactory building with limestone.

If built correctly limestone will last for a thousand years or more, this is evident by the hundreds of kilometers of dry stone walling which stretches through the Cotswolds, Rutland and Lincolnshire amongst other counties. Also as seen in the many churches and cathedrals which have stood the test of time since medieval times. However if not built correctly most limestone would be lucky to survive one or two extreme winters. Some beds of limestone are more resilient to frost than others and rely on experienced masons to identify the most suitable stone for the application.

Long gone are the days when masons and quarry owners could leave stone out to the elements to 'prove' over several winters, but with today's building technology and a wide range of damp proof materials and membranes in addition to a raft of metal products such as fixings, wall ties etc., incidents of failure can be minimised by good building practice.

As a rule of thumb most limestone is very happy with one or two faces to the weather so long as there aren't other forces at work such as rising damp or water soaking from the rear or above.

A common reason for the failing of some limestone is the tarmacing of the adjacent ground surface which is allowed to abut the stone. This should be avoided. A gap should be provided for rainwater to drain prior to soaking the limestone wall.

Therefore applications such as in the walls of a house where the roof keeps it dry from above and the damp proof course keeps it dry from the ground, no problems should be encountered so long as the stones are allowed to breathe with the adoption of a suitable mortar mix (see mortar mixes).

Other matter that effect natural stone is quarry sap. This is a natural inclusion in most newly quarried stone and usually takes between 12 months and 3 years to dry. When the quarry sap has dried out the limestone is considered at its hardest and most weather resilient. On rare occasions slight spalling from the faces may occur following freezing conditions, this however usually stops after the first one or two years following construction.

Storage of limestone goods during winter periods

During winter periods when freezing conditions are expected, all stored limestone should be protected by a minimum of two layers of dry insulating material, dry straw or any other suitable material over which a polythene outer cover or tarpaulin should be provided in order to prevent water ingress.

The packaging provided upon delivery is not on its own considered suitable for winter protection.

Part built structures

Part built walls and structures are extremely vulnerable to frost damage during winter periods and should be suitably covered with sacking or hessian type material (minimum two layers in extreme frosts), polythene or tarpaulins should be provided in order to prevent water ingress.

Patina

The patina is the act of the newly exposed stone reacting to air and starts to mature the colouration, for example from white to a honey colour.



Membranes

If stone is used in other applications it is important to keep it as dry as possible. This would include the use of a damp proof course at ground level in order to prevent the constant damp rising from the ground also where soil abuts the stone work for example from a planted border at the rear. The stone work must be separated by a polythene membrane or by a concrete block and cavity, although metal wall ties may be used. Where limestone is laid on the ground for example as garden step rises, the stones must be protected from rising damp, also from damp penetration from the rear by the use of a plastic membrane and from rainwater saturating it from above by adopting an adequate overhang of the step along with a drip bar if necessary in order to deflect draining water from the stone. Where a garden wall abuts a house or building, a membrane should be installed in order to separate the two structures and prevent passive damp. Limestone is not considered suitable for some applications which include curb edgings, path edgings, external floor tiles and slabs; external stair treads and rises, pond or lake surrounds or any application where the stone is likely to remain wet over winter periods. Where twin faced garden walls are constructed the centre must be able to breathe and the filling with solid mass such as cement must be resisted. Rain water penetration should be minimised by the adoption of suitable copings with suitable overhang and drip channels.

Dry stone walling

If limestone is to be used for dry stone walling, this should be made clear from the outset so that suitable material can be provided. Under no circumstances should the wall be built on a concrete footing or slab. The wall should be built to traditional designs with adequate through ties. The larger stones should be concentrated to the bottom of the wall with diminishing sizes as the wall rises. The girth of the wall should reduce as the wall rises in accordance with accepted traditional building methods. No cement mortar should be used with the exception of a little mortar to the top copings, if necessary in order to prevent unauthorised removal (see mortar mixes).

Chemical treatments

Chemical treatments are widely available for the protection against weather deterioration, acid rain etc. Manufacturers claim that certain treatments whilst protecting from the elements, breathe and allow any internal moisture to escape. The use of chemicals are not a traditional application to natural stone and are thus outside of our remit. Individuals however may wish to discuss claims directly with the manufacturers. Our company would not accept any responsibility in circumstances where failure occurs due to the use of chemicals applied to our stone products and would suggest taking a cautious approach.

There is no accounting for the weather

The building methods referred to are considered good building practice for the present time. However, English weather never ceases to surprise and over a recent winter, a 200 year old dry stone wall was crumbling due to frost. An inspection of the wall fails to give any indication as to the reasons for this. The choice of material must rest with the experienced builder who should take ultimate responsibility in the choice of stone and the building practices adopted and most importantly the constituents of the mortar used.

Structural Steel

Sometimes it is necessary to incorporate steel work into a design, but as stone masons, steel is not our remit and we recommend discussing this with your building inspector or a suitably qualified structural engineer.

Mixing mortar for natural stone

"The besetting sin of much modern pointing is to mix too much Portland cement into the mortar. All stone absorbs a certain amount of moisture in wet weather, and in order to dry out again it must be able to 'breathe' freely through the mass in every direction. Unless this can happen some kinds of stone will fail, and all can be adversely affected. Very hard non-porous joints impede this aeration and are therefore wrong.

The aesthetic effect of too much cement in the mixture is invariably bad. A good working mixture for most purposes is ten parts of clean sand to two or three of lime, beaten up with water, with the addition of no more than one part of ordinary Portland cement; the object of adding more cement is to help the mortar to harden, and no more should be added than is sufficient to make sure of that, nor should any be added until just before the mixture is going to be used. On exposed sites and with harder stones a slightly harder proportion of cement is sometimes acceptable. For historic buildings on the other hand, Portland cement is never right and is no longer used at all by the Department of the Environment."

Source: 'English Stone Building' (Alec Clifton Taylor & A. S. Ireson)

Hydraulic lime

Many historic buildings were built before the use of cement. When re-pointing, alterations or repair of a historic building is required, it may also be necessary to use hydraulic lime.

One part hydraulic lime should be mixed with 3 parts sand. For exposed areas such as chimney stacks or below D.P.C. etc 1 part hydraulic lime with 2 parts sand may be used.

White cement

The use of white cement can be more aesthetically pleasing than the use of grey cement. White cement however is around 33% stronger than grey which should be allowed for within the mortar mix.

For further information or for a quotation please contact our sales team on 01400 230002.