

Plastic Stone Repair Using Natural Hydraulic Lime

Introduction: This guidance note provides advice to anyone carrying out plastic stone repair using natural hydraulic limes. It assumes that stone replacement has been rejected as a solution although in some instances this latter course of action will be the most appropriate.

Before starting repair work be fully aware of the causes of the damage and deterioration that you are seeking to remedy and make all efforts to reduce the causes of accelerated stone decay. For instance, measures should be taken to reduce damp around the building if rising damp containing salts and subsequent sulphate attack are the cause of the problem.

Background Preparation: Ensure the background is thoroughly clean. If removing vegetable growth using biocides check that these will not react with the mortar causing stains.

Building Out Deep Voids: If there are large deep voids in the existing stone work all the friable stone should be removed and the area built up with low fired clay tiles, using an NHL 3.5 or NHL 5 mortar.

Suction Control: Before each coat of mortar is applied, if necessary, apply sufficient water to reduce excessive suction, especially on old bricks and porous stone. On many occasions this is done the day before, if necessary several times, with the last damping just before application starts. This will prevent water being drawn out of the mortar before it has had chance to begin to cure properly and ensure that the applied mortar remains workable.

A Stipple or Spatterdash Coat: These can be used on weak and variable backgrounds to break up tensile stresses within subsequent coats of mortar and to provide an adequate key. The normal thickness varies between 3 and 5 mm. This coat has to provide sufficient bonding to support the remaining coats of render. On soft or weak background use a 1:2 or 2:5 mix (NHL: Sand). Successive coats must be the same strength or weaker than this coat.

First Coat of Mortar: This coat should be applied 2/3 days (or more, depending on atmospheric conditions) after completion of the stipple coat. Its strength should be marginally less than the first coat. Thickness can vary according to the overall thickness required but it is normally between 10 and 15 mm. It must not be applied over 20 mm thick. The thicker the intermediate coats the longer the waiting time before each application. Provide a criss-cross key, creating 25-35 mm diamonds, with a pointed wooden lath.

Further Coats: Deep areas of mortar should be avoided by building out deeper areas as described above. Any subsequent coat should be applied 3-4 days (or more, depending on atmospheric conditions) after completion of the previous coat. The strength of each coat should be less than the previous coat. The thickness of each coat should be kept to between 10 and 15 mm.

Scour back and key the final undercoat, after initial setting. Check for shrinkage during the first 2 days and, if necessary, lightly dampen the relevant area, scour back and re-key. Do not apply a finishing coat for 3-7 days, until undercoat is adequately firm and any small amounts of shrinkage are complete.

Finishing Coat: Use NHL 3.5 or NHL2, and appropriately coloured and textured sands apply a final 3mm finish coat. This can be applied in two thin coats immediately after each other. Stock up finishing sand in one go, especially if no colouring or paint finish is being used. The mortar should always be weaker than the proceeding coats, consult Womersley's Limited if in doubt. A Sponge and small tools should be used to achieve the desired finish.

Setting Properties of NHL Mortars: The setting properties of NHL mortars require much lesser time for protection against adverse weather conditions than fat lime mortars. Precautions are however necessary and, if in doubt, Womersley Limited will be able to advise. The following are the main recommendations.

Mortars made with	Protect from frost, heavy rain, strong wind or direct sun for a <u>minimum</u> of: -
NHL 5	48 hours
NHL 3.5	72 hours
NHL 2	96 hours

The preferred form of protection is damp hessian cover which, with re-damping, will also contribute to curing the mortar.

Plastic sheeting is effective against rain but should not be touching against fresh work. If too tight they will also provoke trapping of condensation. Plastic sheets, unless they are bubble wrap, will not protect against frost.

Frost protection should be applied even if frost is not occurring at the moment of finishing the day's work but is forecasted during the night or within a short time (see suggested protection periods above) from completion of work. Work should not start in frost conditions or with temperatures below 5°C. In working with NHL 2 this should be 8°C.

Note: In all patch render repairs, coats should be applied firmly to exclude air and any excessive moisture. Suction needs to be carefully controlled at all times.

Choosing the right Natural Hydraulic Lime: The type of hydraulic lime used for plastic stone repair should create a mortar that is not stronger and denser than the surrounding stone. The choice of mortar will also be dependent upon the climatic conditions. If in doubt contact Womersley's Limited.

Sands: Well graded sharp sand 3mm down to 0.075 should be used for undercoats. But the sands for the Finishing coat can be finer (1.18mm down to 0.075 mm) if necessary cure minor shrinkage by spraying a light water mist.

Hair: Hair can be added to all but the finishing coat.

If you have any questions or queries please do not hesitate to contact Womersley's Limited on Tel 01924 400651 or call in at our workshop.