FILLERS FOR REPAIR AND REINSTATING STONE AND TIMBER
GOOD INDUSTRY PRACTICES

BCA’s quality standards encourage “Do it right the first time” so as to eliminate subsequent rectification works. However in typical construction processes which require co-ordination of many architectural trades, minor chips and scratches on vulnerable materials like stone and timber cannot be completely avoided. Also, when replacing materials such as natural stones, other undesirable consequences like tonality difference, damage to adjacent stonework, etc. can occur. Rather than replacing a complete section of the works due to “minor” damages, precision repair using compatible fillers could be an alternative way out.

9 FILLERS FOR REPAIR AND REINSTATING STONE AND TIMBER

Natural stone has its inherent beauty and versatility. Although hard, it is still susceptible to accidental damage like scratches and chips. As they are made up of crystals, there are many challenges when repairing them like matching the colour, texture, and bringing out the three dimensional reflective effect as in the original condition. Generally, there are two available methods of rectifying minor chips and damages on natural stones, viz:
1. Using epoxy resins with stone chips
2. Using modified wax fillers

a. Epoxy filler method
The first step in repair work is to remove all foreign and loose materials from the surface. This is to facilitate proper bonding with glue. During this process, two precautions must be taken. First, ensure there is no excess glue as it may stain the surface after it has hardened. Second, sufficient pressure must be applied for a sufficient duration to ensure a perfect joint with the adjacent surface.

To get the reflective effect as close to the original, flakes from the same stone can be mixed with the resin. However, the ratio of flakes, resin and hardener should be calibrated by trial and error to best imitate the shade of the stone. Once the glue is cured, the surface should be dry polished with a range of sanding pads (from rough to fine grit) to create a perfect joint with the adjacent surface. Finally, to bring back the shine, localised wet polishing should be made with the slurry of polishing powder and a fibre pad.
Fig. 9.2 - Sequences in marble rectification using epoxy fillers.

1. Clean the receiving substrate.
2. Mix resin, hardener and stone chips.
3. Apply into the substrate.
4. Choose right sanding pads.
5. Dry polish according to sequence.
6. Wet polish with powder and fibre pad.
7. Get shine close to adjacent surface.
8. Finished surface.
Flowing veins and reflective effect are the natural characteristics of stone. Regardless of perfection in the touch up skill, a very slight distinction can be seen while having a very closer look. If rectification is carried out without inclusion of stone chips, this may cause the surface to have a patchy or artificial look. Further, unskilled localized polishing may result in a “blurred effect” and the surface may not blend with the adjacent surfaces.

As there are many varieties of fillers and resins available in the market for repairing stones, it is important to select compatible materials used in accordance with the manufacturer’s instructions. With the right choice of resin, application skill and time, this will ensure the repair work matches the surrounding finish and is durable.

**b. Modified wax filler technique**

The use of modified wax-based fillers and associated material is another alternative repair method for reproducing stone and timber surfaces. These fillers and special applicators not only refurbish the damaged surface, they also aid to reinstate the strength of existing surfaces. Generally, the hard wax fillers have a melting point of 130°C and the colours can be blended well, such that the tonality of the repair work can be graded closely to resemble the original surface finish.

The coloured fillers are embodied in a transparent liquid, which helps to bring back the reflective surface close to the original and it can be applied directly on the surface. Besides that, the adhesion promoter is integrated into the fillers, so a primer is not required before applying the fillers. For glossy faced natural stones, special mica fillers can be blended with the colour fillers to produce a glossy effect.

**Light curing technology for natural stones**

The main purpose of illuminating the fillers with an LED light source is that the liquid composite materials can be hardened in a few seconds. The combination of colour fillers and crystalline particles enable the user to create the surface close to the original shade and reflective effect that closely resemble natural stone. The integrated fixative components can be used on granite, marble, engineered stones and tiles. In addition, using appropriate tools such as planer and micro sanding paper, etc. help to achieve better repairs without marring the neighbouring stone surfaces.
The substrate has to be dry at room temperature. If necessary, pre-heat. The area should be wiped with cleaner and allowed to dry for approximately 30 seconds.

Apply liquid transparent and fillers to the area and place a plastic film and press lightly.

Shine the LED power light onto the filler approximately for 30 seconds per cm². The power light will switch off automatically after 30 seconds.

Make short and quick movements with the planer to strip off excess material. For marble surface, it is recommended to use cuttlebone instead of planer.

Use micro sanding paper 2400/3200/4000 with a little water and apply polishing paste. Use the handy polishing machine to achieve the perfect level and shine.

Finished surface is close to original surface with reflective effect.

Fig. 9.6 – Sequences in natural stone rectification using wax fillers.
9.2 FILLERS & TOOLS FOR CERAMIC TILES

The process of repairing ceramic surfaces is simpler compared to natural stones as ceramic tiles generally do not have three-dimensional reflective effect. The fillers for patching damaged tile surfaces are generally harder than hard wax and they have a high melting point. There is a wide range of colours available for fillers and they can be mixed well to match the surface. Due to its hardness, the fillers also suit matt rough external stone floorings. The tools such as planer with metal blade should be used for careful stripping and levelling to replicate the appearance of the original surface.

Fig. 9.7 - Sequences in ceramic tiles rectification.
9.3 Fillers & Tools for Repairing Timber Surfaces

Refurbishment of timber surfaces (both natural and artificial) requires special attention to retain its beauty and strength of the surface. Matching colours with the existing shine and grain patterns are the most challenging part in this process. There are two methods of rectification, viz.

1. Timber putty with colour pigments
2. Modified wax fillers

A. Wood putty method

Wood putty is a substance used to fill imperfections, such as nail holes, minor scratch and damages on natural and artificial timber surfaces. It is often composed of wood dust combined with binder and pigment. It is advisable to keep more than one colour on hand while trying to match the wood shade; having a variety of colours available allows to mix up just the right shade. The filling should be slightly higher than the surface, as the putty tends to shrink. Once it is dried completely, the area should be sanded with a fine sand (abrasive) paper to achieve the level and smoothness before applying the stain or paint as desired.

Fig 9.8 - Timber putty and colour pigments.

1. Dented veneer surface.
2. Clean and sand the surface.
3. Keep variety of colours to close match the surface.
4. Fill the dent with putty.
5. Sand the area with a fine sand paper.
6. Blend colour pigments to get close match.
7. Apply the right stain on the surface.
8. Apply a coat of lacquer.

Fig. 9.9 - Sequences in veneer surface rectification using timber putty.
It should be noted that wood putty often comes in handy when repairing wood. But, at times, the putty itself can cause problems when it is improperly applied or lack of skill on colour matching makes unsightly blobs on the surface. Furthermore this material and method is suitable for only minor repairs as it does not “reinstate” the damaged part of the timber.

b. Modified wax filler method
Wax fillers are available in stick form in a range of timber colours and can be blended with pigments to create many different shades. They can be used to rectify scratches and dents in the timber surfaces including pre-finished melamine boards. The choice of wax fillers is also determined by the severity of the damage i.e. from minor to intense. The following table shows some of the filler characteristics and their use for timber and artificial surfaces:

<table>
<thead>
<tr>
<th>1. Quick fillers</th>
<th>Easy to apply and use for small scratches.</th>
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<tr>
<td>2. Soft wax</td>
<td>Soft, easy to apply with the applicator and use to fill nail holes and cracks.</td>
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<tr>
<td>3. Hard wax</td>
<td>Hard, only to be applied with heat and should be stripped off with special applicator. Use for medium range damage.</td>
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<tr>
<td>4. Hard wax PLUS</td>
<td>Very hard, only to be applied with heat. Mainly for furniture with severe damage.</td>
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<tr>
<td>5. Rex-Lith</td>
<td>Two component fillers for repair to locations subject to very severe damage such as wrenched out hinges or locks.</td>
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<tr>
<td>6. Acrylic Lacquer</td>
<td>To match sheen and where more hard-wearing and weather resistance are required.</td>
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Remove all loose particles and clean the surface. Cut damaged edge and straighten down with edge planer.

Pre-colour the substrate with covering lacquer brush pen corresponding to the adjacent area.

Choose several colour shades of hard wax plus corresponding to the surface. Let colour wax mixture flow into the damage in the direction of the grain.

Remove surplus wax with special filler applicator.

Make an intermediate sealing by misting with special repair lacquer PLUS from a distance of 30-40 cm but do not spray too wet. Restore the grains with touch up paint and a marten brush.

Seal the filled damage by misting with lacquer PLUS.

Fig. 9.11 – Sequences in rectification of veneer surface using wax fillers.
9.4 LIMITATIONS AND CONSIDERATIONS

To ensure repairs are carried out to the highest possible standard, it is essential that the correct techniques should be used. Good application skills and understanding the range of products and tools are vital if the user is to maximise its potential. While intending to try with new products like wax fillers, it is strongly recommended to attend the hands-on training and short courses by the product specialist before using the product. Matching of colours may require some trial and error tests to get close to the original surface colour. Therefore it may take a longer time to learn and apply the techniques initially but with continued practice and experience, the pace and quality of touch up should improve.

While wax fillers can be employed to achieve precision repair, the cost of such repairs, its durability and compatibility should also be considered. Wherever possible, the works should be carried out getting it right the first time. This will limit the extent of costly repair works to minor scratches and damages. Where damage is severe, extensive or in prominent locations, it may be more cost effective to replace the whole section of the works instead of repairing it.