

'As much as necessary and as little as possible?' – Stone indenting fits the bill

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If the Burra Charter has one central tenet, it is perhaps the requirement that conservationists 'do as much as necessary and as little as possible' when seeking to conserve historic fabric. In this context, a particularly useful methodology in conserving stonework is the introduction of stone indents.

Where a stone has deteriorated partially, but the majority of the stone remains in sound condition, indenting a piece of stone to the damaged area can be a practical and minimally invasive means of ensuring that the stone continues to perform through the next conservation cycle – typically around 30 years – and beyond. It is also a method that responds to the need for a sustainable approach to building work. Natural dimension stones are a) costly to extract, and b) a limited resource – especially so in some parts of Australia. So from both a conservation and sustainability perspective, the use of indents, even in multiple quantities, may still be considered a better option than wholesale replacement of otherwise mostly sound stones.

When a piece of stone is indented into the parent stone, it is usually done so with a hairline joint. The joint contains no mortar, but usually an adhesive. The aim is to indent a piece of stone which, when sweetened into the parent stone, follows the contours of the parent stone and matches it in type. Carpenters and joiners will be familiar with scarfing-in a piece of timber, and this is essentially the methodology of stone indenting. Both the selection of a well-matching stone and a high level of craftsmanship are required to successfully

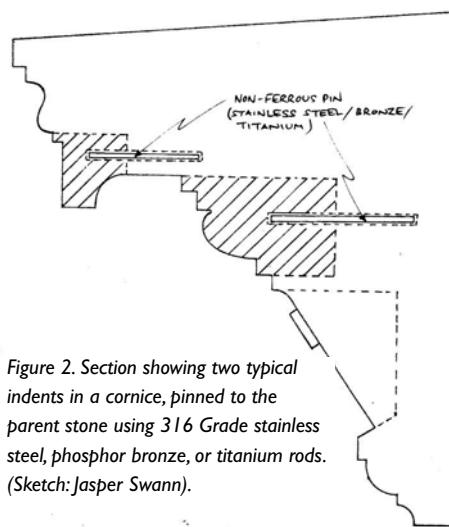


Figure 2. Section showing two typical indents in a cornice, pinned to the parent stone using 316 Grade stainless steel, phosphor bronze, or titanium rods. (Sketch: Jasper Swann).

execute the work, but when achieved, this in itself will convey to any observer whose eyes are sharp enough to spot the repair the



Figure 4. A well executed dovetailed indent in an overhanging element demonstrates craftsmanship and care. (Photo: Jasper Swann)

important message that the building or structure so repaired has been painstakingly cared for.

Stone indenting can take two forms:

- Geometric indents
- Organic indents.

Geometric Indents

Geometric indents can vary in size from something smaller than a matchbox to something the full length of a stone. The decayed or damaged section of stone is cut out square, with the joint often introduced in the termination of a section of the profile,



Figure 1. Small geometric indent in a raking string course. (Photo: Jasper Swann)



Figure 3. Indent to full length of upper moulding only of a plinth course. (Photo: Jasper Swann)

such that the joint can be easily hidden. A piece of stone is then worked to the required size, shape and profile, and inserted into the opening created. **Figure 1** shows an example of a small geometric indent in a raking string course. Unless the indent is very small, it is necessary to pin it to the substrate using non-ferrous dowels set in epoxy. A small indent may not need dowels to secure it and may be fixed using an epoxy or polyester resin, but care must be taken not to coat all surfaces of the indent with the adhesive, as to do so would set up a moisture barrier and not allow free passage of moisture from the parent stone through the indent. In



Figure 5. Hairline indent in a cornice, dovetailed at one end. (Photo: Jasper Swann).

the installation of all hairline indents, spot-application of adhesive is recommended in order to avoid this.

Geometric indents can be installed where localised decay exists, as in **Figure 1**, or alternatively along the entire length of a stone, but only to a part of its profile, as in **Figure 3**, where the upper cavetto moulding has been replaced with an indent. When indents are installed to remediate localised decay, it is preferable where possible to dovetail the indent, either in elevation or in plan, as a means of providing optimum keying-in of the indent. A good example of this is shown in **Figure 4**, where localised decay in a cornice has been repaired with a dovetailed indent. Where an indent is installed adjacent to a perpendicular joint, it will only be possible to dovetail one end of it, as in **Figure 5**.

A core drill can be used to install a circular indent where damage has been caused by, say, a redundant metal fixing. Note that two core bits are required to do this well: one with an internal diameter equal to the external diameter of the bit used to core the damage out. The initial core might be made, for instance, with a 35mm outside-diameter bit. The indent with which the mason intends to plug the hole must therefore be cored from a matching stone using a bit with a 35mm *internal* diameter. A hairline joint is thus guaranteed as the core is rotated gently back and forth into the hole, (**Figure 6**).

Unless very small, a stone indent should always be cut back into the stone to a minimum depth of 100mm, but at least equal to any overhang.



Figure 6. Circular indent installed with the use of two core bits. (Photo: Jasper Swann)



Figure 7. The missing or damaged details of this carved Ionic capital have been replaced with hairline indents. (Photo: Jasper Swann)

In the hands of a skilled mason, indenting need not be confined to simpler forms. **Figure 7** illustrates how an Ionic capital, for example, can be appropriately conserved, indenting only the missing or damaged detail.

Organic Indents

The term 'organic' here refers to the non-geometric shape of the stone indents. In parts of Europe, such indents are referred to as 'fleurs', and their use is common-place. Whereas geometric indents seek to square-up their form and to lose introduced joints in the mouldings of a given stone, organic indents make no such attempt and are an irregular shape that responds to the shape and size of a localised area of decay. **Figure 8** shows two organic indents either side of a joint in a horizontal course. As these examples illustrate, an exceptionally good hairline joint can be achieved in the execution of organic indents.

In order to successfully execute the repair, the damaged stone is cut away by hand, leaving a rebate, and a stone indent, cut to the approximate reverse profile, is then rubbed repeatedly back and forth within the rebate, preferably with water lubrication, until such time as it attains a snug fit. The substrate and the indent are then washed down and dried, (a hair-dryer can be used to dry the stone for expediency). The indent is then inserted into



Figure 8. Two organic indents in a horizontal course. (Photo: Jasper Swann)



Figure 9. Damage cut away and an indent prepared.



Figure 10. The indent is rubbed to a snug fit.



Figure 11. Indent spot-glued in preparation for dressing-in.



Figure 12. Repair complete. (Photos: Jasper Swann)

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the rebate, spot-glued, pinned if necessary, and allowed to cure. Once the adhesive has cured and the indent is secure, the excess stone is cut back and the indent rubbed on its face to ensure that it is flush with the surface. **Figures 9-12** illustrate the installation of an organic indent in Sydney yellowblock sandstone.

This method can also be employed successfully in remediating occasionally flawed stones in the banker shop. Many a mason will have spent considerable hours working a piece of stone, only to come upon a sand ball or a heavy shale deposit that disfigures the stone and might, according to the specification, render it unacceptable for use. It is not a regular occurrence, but it can be deeply frustrating experience when it occurs. The careful introduction of a hairline indent is a great way to overcome such instances, and the precision required in successful execution of the task can be rewarding for the mason. Indeed, one Sydney contractor recently told me "We think hairline indents are very sexy!" (He probably needs to get out more.) Correctly installed, the indent in such a situation need not be a weak point, but an integral part of the stone with no lesser lifespan ahead of it than the whole. In my view, such practice is part and parcel of the banker mason's trade and should be considered an acceptable solution when such instances arise.

As a final note, the term 'indenting' is sometimes applied to what is actually a 'refacing' of a stone - the outward appearance on completion being that a whole stone has been replaced. In my view, to set apart the two methods of repair, it would be useful if the industry referred to this as 'refacing' rather than 'indenting.' [©]

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