External stone cladding: focus on two techniques

As architects seek to design buildings which are easier to maintain, attention inevitably turns to creation of sustainable building facades.

A key consideration is ventilation of the space created between the back of the tile and the skin of the building. A façade clad in stone produces lower temperatures within the building, which in turn moderates the cost of air conditioning and heating.

Each façade presents fresh challenges in regard to selection of the correct fixing system. As David West wrote in Sharing the Load - An Introduction - Fixing Stone Cladding (issue 9, Discovering Stone) there are at least ten alternative methods of connecting stone panels to the supporting structure.

Before any decision is made in regard to hanging, fixing, or anchoring the stone, the fascia of the building will have to be assessed with regard to its stability and load bearing capacity. It is not advisable to assume that one can simply add a substantial load to the facade of a building.

The quality of the stone must be assessed. It must be free of cracks and obvious seams or flaws that might cause it to crack during handling or installation.

The trend to big format material is often accompanied by a desire to use thin product, which can pose a problem where it increases the possibility of material cracking. Regardless of the method employed to fix the stone, specification of the correct thickness is imperative.

In general industry has tended to recommend 30 mm as a general dimension for granite used externally. This width is considered to be one which is unlikely to crack, and sufficient to withstand the highest wind loads.

In the aforementioned article David West described the following fixing techniques; self supporting ashlar, mortar spots and wire ties, self angles and cramps, mechanical fixing, precast concrete, strong back truss, curtain wall systems, lightweight panels, adhesive, and ventilated cladding systems.

Natural stone has a history of use on the façades of major buildings in a number of our state capitals. This article by Anthony Stock examines two external cladding techniques, which both reduce costs, in very different ways.

Above: The cladding was applied to the surface of core-filled concrete block masonary using Latapoxy 310 adhesive. Right: Brackets are used to take up spans greater than 20mm. Below Left: A second granite façade completed with Latapoxy 310.

For our purposes we will focus on advances made in regard to the last two techniques mentioned.

Adhesive fixing

The risks associated with the adhesive fixing of large stone or ceramic tiles to a building façade are well documented, and in general terms local adhesive manufacturers advise those wishing to adhesive fix stone or tile to a building's façade to limit the height to 3 metres, and to place fairly rigorous restrictions on the thickness of the chosen material. Even if the overall dimensions of the selected product are deemed to be favourable, concerns may still arise in regard to the suitability of the substrate and its load bearing capacity.

Having said that, leading adhesive manufacturer Laticrete has successfully launched Latapoxy 310, a two-part epoxy, which can be built out to a thickness of 25 mm without the use of brackets. This generally provides sufficient flexibility to complete most installations, even when large format material is proposed. The illustrated project in Double Bay, Sydney featured installation of 200 square metres of 300 x 600 x 20 mm Jura Gold granite tiles to the exterior of a 3-storey residential building (Photos 1 & 2), using the new Laticrete product.

Latapoxy 310 is applied using a cordless mixer. In normal circumstances spot-fixing is frowned upon, but this revolutionary product can be successfully employed to spot fix large tile formats providing the user strictly follows the fixing procedures prescribed by Laticrete and pays proper attention to the limitations of use set out in Laticrete's product data sheet.

"These relatively new products and technologies provide fresh cladding alternatives, which both offer all round cost savings and benefits for building owners and installers. "

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Ventilated façade systems can house large format stone and tile products, and reduce the cost of cooling and heating buildings.

This relatively new product provides a very useful option for those who wish to save money, by reducing the time spent on fixing conventional mechanical anchors. It provides an alternative to conventional tiling practices and mechanical fixing.

Ventilated cladding systems

This fixing system is gaining popularity in Australia, following extensive acceptance in Europe, where specifiers have grasped the benefits associated with reducing the heating and cooling costs of a building.

By adopting this system the possibility of stone tiles or panels dropping into the street below is greatly reduced. Much depends on the successful fixing of the sub-frame to the building and the correct calculation of the overall weight that will be added to the building façade.

Once the lightweight metal frame is accurately fixed, fixings are attached to the back of each stone unit, to which clips are attached. These clips locate into the horizontal rails which are bolted to the vertical posts. (Photo 3.) In this way stone tiles or panels can be quickly slid into place. No grout is employed and the void between the fascia of the building and the back of the stone, assists in moderating the ambient temperature of the building.

In the event that the building owner decided to change the appearance of the building, it would be possible to effect a reasonably rapid transformation, providing the sub-frame was in good condition. One set of stone or ceramic tiles could effectively be removed and replaced with another providing the dimensions were the same, and the weight compatible, or less.

These relatively new products and technologies provide fresh cladding alternatives, which both offer all round cost savings and benefits for building owners and installers.