



Element combining 3D properties and exposed aggregates for a project in London.



Half-stick mould pattern creating sharp details.



Combination of crushed bricks and burnt flint exposed post-casting.

# Endless surface options with GRC

*GRC has long been known as a go-to material for architects when there is a need for complex geometry, light weight and high durability. The most recent development with GRC now also provides architects with endless options when choosing a surface for their project. Nikolaj Ringberg Brandt of BB fiberbeton reports.*

**S**pecial surfaces have always been possible with GRC. Whether due to a market trend or improvement of production techniques, more and more projects are emerging with special surfaces and architects increasingly ask for a wider variety of options.

In broad terms, there are two options for creating specialised surfaces: precasting and post-casting.

Precasting is the skill of creating a mould that forms the invert of the desired surface, whereas post-casting is a process conducted on the element after demoulding.

As GRC, and especially sprayed GRC, is produced with very fine aggregate, the elements take the surface of every detail in the mould. This sets great requirements for the mould builder but also creates a canvas for the architect. Rubber in particular

is often used in moulds to create various patterns or imitations of wood, stone, brick, etc. Combining these surface patterns with the 3D capability of sprayed GRC provides unique options for the architect.

As well as the aesthetic benefits of making moulds with various patterns, this technique is also used to create functional properties such as anti-slip surface on balcony bases and steps, sound-absorbing panels, and signs and direction symbols embedded in elements.

These precasting techniques bring individuality to the elements and projects and are the surface creation option that has been known to architects the longest.

The post-casting option is less well known but is becoming increasingly popular in projects across Europe. The main benefit of the post-casting option is that, in one way or another, it exposes the aggregate in the GRC.

“ Combining the 3D capability of sprayed GRC with exposing the aggregate is popular for both renovation projects and new buildings. ”

The rise in popularity is the combination of lightweight 3D elements with exposed aggregates.

Typically, four different techniques are used to expose the aggregate: grinding, sandblasting, retarder paper and washing. Previously acid etching was also frequently used; however, this is now in steady decline.

Often the post-casting techniques are combined with mixing different aggregates into the GRC to achieve the specific look and feel that the architect is after. This provides anything from a more exclusive look to a look of a more worn-out surface. As aggregates have very different properties, so does the surface when the aggregates are exposed in these surfaces – providing shine, colour, texture, etc.

When the architect is looking for larger aggregates to be visible, it often requires a

facing mix in front of the normal GRC.

This allows for a greater surface roughness – for example, to better mimic the looks of traditional concrete with 50 years of exposure to weather and pollution. The topic of facing mixes is, however, a different issue altogether.

### Post-casting

The post-casting techniques of grinding, sandblasting and retarding, and washing are simply just different ways of exposing the aggregate. It is a matter of best technique for the required look of the elements. It is a question of roughness/smoothness of the surface and the amount of aggregate to be visible.

Retarder paper is a little different from the other techniques and is, as the name implies, always dependent on the retarder in the paper. The retarder paper can give very fine



Element with half-stick pattern for project in Copenhagen, Denmark.



Wash-out surface providing a more exclusive look with blue and green aggregates.





Balcony base with precise mould details of anti-slip surface and water gutter.



Example of possibilities with retarder paper.



Element for project in Malmö, Sweden with complex mould pattern mimicking wood.

patterns or images by removing the cement's 'skin' in selected areas. It is even possible to have photos made into a retarder paper and have these forever imprinted in concrete.

Combining the 3D capability of sprayed GRC with exposing the aggregate is popular for both renovation projects and new buildings. The exposed aggregate creates a less uniform surface and adds texture to elements.

For renovation projects it is a question of mimicking the previous concrete façade, while replacing it with a much thinner and more durable version that allows room for extra insulation, etc. There can even be preservation reasons for the GRC having to precisely match the previous surface.

For new projects, we see architects experimenting with different aggregates. Typically, it is an expression of exclusivity, which the architect can achieve by combining and using the different aggregates. And as all elements are coloured through, the combinations of these aspects give endless number of options for design.

Combining the many surface possibilities with the inherent 3D properties of GRC will give a further boost to the popularity of GRC.

An increasing number of successful projects with a range of different surfaces will most likely foster even more interesting and original projects, where architects can be allowed to dream and unfold their creativity without damaging a project's budget. ■