

ARCHITECTURAL PRECAST CONCRETE

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Almost every Architect and Developer wants their buildings and structures to be somewhat unique and unmistakable... and nowadays Green!

One special subset of concrete is called ***architectural & decorative concrete***, which refers to a concrete that provides an aesthetic finish and structural capabilities in one. Because of its versatility, concrete offers endless design possibilities. Moreover, concrete permanently captures the chosen look. Concrete is a visually rich material that allows the architect to be innovative and obtain design objectives that cannot be achieved with other materials. Whether that involves special moulds, special finishing techniques, or special ingredients, the variety of effects is almost unlimited. Fair-faced concrete is in vogue and the demands on its performance are continuously rising. Exposed concrete with innovative decorative methods is the name of the game, which are not only gorgeous, but also affordable.

Concrete can easily replicate the high-end look of masonry, marble, cut stone and even exotic and sculpted motifs in both physical beauty and durability.

A step further... is Precast Concrete. Now Architectural Precast Concrete offers exceptional aesthetic and structural versatility, speed of enclosure, and durability. No other material combines the range of shapes, colors, and textures, fire-resistance, acoustical insulation, weather tightness, long-term durability, low maintenance, and rapid, Indoor Air Quality-friendly enclosure, like Architectural Precast Concrete. They consist of a variety of structural and non-structural panels, columns covers, infill, and re-cladding panels.

Architectural Precast Concrete facade systems work seamlessly with a wide range of other building materials, enabling easy incorporation of brick, tile, stone, and glazing systems into a single, elegant, expressive facade that can stand the test of time. They can contribute to credits for LEED / IGBC certification for Green Sustainable Buildings.



Important Aspects in ARCHITECTURAL PRECAST CONCRETE

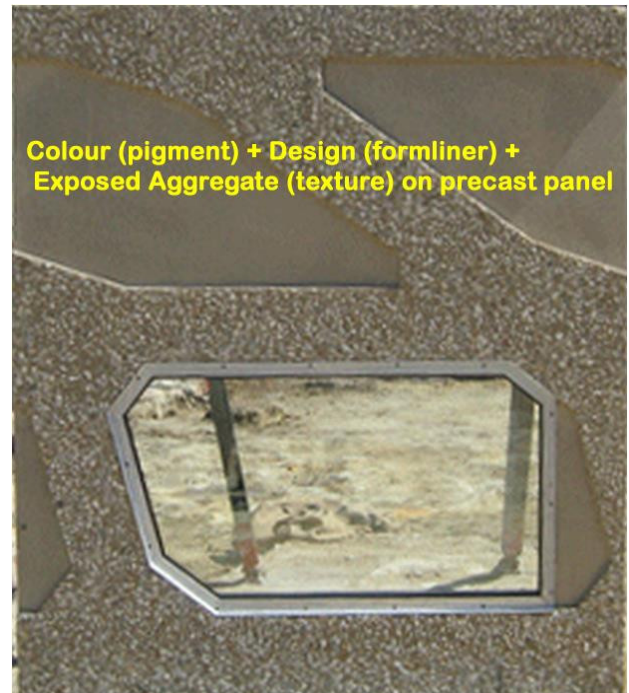
(1) COLOURS, STAINS:

Precast Concrete can be tinted or coloured to provide several tones by using various surface treatments allow designers to specify any color they want. A wide range of finish combinations can be achieved easily.

Integral Colour: Colour is introduced by using pigments to colour the concrete matrix to enhance the tone of the aggregates in the concrete mix or to duplicate the appearance of other materials. This colouring system encompasses subtly muted earth tones. It is based on synthetic oxides for UV-stability and conforms to DIN/EN standards. Integral color is typically added to concrete-mix. It is long-lasting. It cannot be applied to the surface of fresh concrete because it will not permanently bond to the concrete as stains do.

Chemically non-reactive / reactive stains:

Including a limited range of translucent, variegated, and mottled earth tones, chemically reactive stains consist of metallic salts in an acidic solution that reacts with the CaOH formed as cement hydrates. These stains are applied to hardened concrete and cementitious overlays, with surface preparation being important. Stains cannot be applied to uncured precast concrete because the calcium hydroxide needed for the colouring reaction is more readily and consistently available once the concrete hardens.



When selecting from a colour chart, it is imperative to ensure the product in question is aesthetically and functionally appropriate for the installation in question. Though colouring systems are not interchangeable, they can be combined for more colourful

and creative effects.

(2) TEXTURES ON PRECAST CONCRETE SURFACE:

The inherent natural beauty of sand and stone are most often expressed in architectural concrete. A wide variety of textures can be created in the concrete to add interest. The most common of these are:

Smooth or off-the-form finishes show the natural look of the concrete without trying to simulate any other building product.

Deactivator: Exposed-aggregate finishes, via chemical deactivators (liquid or paper), are achieved with a non-abrasive process that effectively brings out the full color, texture and beauty of the coarse aggregate. It deactivates the setting of the concrete matrix near the surface creating an exposed aggregate (or washed) surface, which is removed by pressure washing.

Micro/Acid etching via acid-gel dissolves the surface cement paste to reveal the sand, with only a small percentage of coarse aggregate being visible, providing a light exposure.

Sand or abrasive blasting however has limitations.

Honing or polished finishes are achieved by grinding the surface to produce smooth, exposed-aggregate appearances so as to reach a certain level of gloss. The use of a densifier is also possible to achieve a better luster.

Combination Finishes two or more finishes can be



readily achieved using the same concrete mix.

(3) DESIGNS ON PRECAST CONCRETE:

A variety of attractive patterns shapes and surface textures can be achieved by using pre-shaped formliners as the casting surface. The formliners are normally made of special PU elastomer with fibre-reinforced backing for 10x or 100x repetitions for heavy duty or light duty applications for higher concrete imprint depths, or special PP sheet of

2mm for 150x repetitions or special plastic for single use.

Some of the designs used are:

Stone Replication: Special mixes and finish techniques are used to mimic limestone, sandstone, granite and any other type of stone desired. The finishes are produced far more economically than real stone can be laid, and they can be erected much quicker. Formliners can replicate unusual pieces such as cut stone or slate, limiting options only to the designer's imagination.



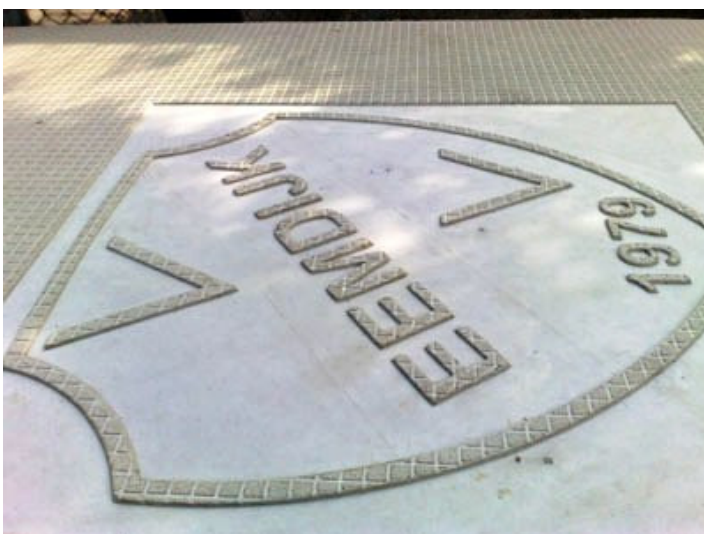
Contemporary Designs: Concrete offers a plasticity in shapes, curves and geometries that can create any desired look. They interface smoothly with glass and other modern materials.



Timber Designs: Wood, bamboo, grass related designs can be casted on concrete using these formliners.

Replicating Existing Styles: With its ability to replicate such a wide range of materials, precast concrete panels ensure new buildings blend with existing ones.

Embellishments: Corporate or school names, emblems, logos and other custom touches can be embedded into concrete, creating unique accents at an attractive cost. Special formliners can create sculptural forms for custom designs that create a standout facility.



(4) ARCHITECTURAL AGGREGATES:

Use of natural crushed rock aggregates... Dolomite, Quartz, Aluminium silica slag, Sandstone, Limestone, Granite, Porphyry, Syenite, Andesite, Marble, Diabase, Calcite, Altered Granite, Quartzite, Basalt, Anorthosite in a wide range of gradings (1-3, 2-5, 2-8, 5-8, 8-12, 8-16, 12-16 mm) and in various colours.

Artificial coloured aggregates with low specific gravity and higher strengths are used commonly to create a unique effect.

The large choice of raw materials opens the way for the fulfillment of the desire of designers, architects and developers for customised architectural precast.



(5) PRECAST MOULD RELEASING AGENT:

Conventional de-shuttering oils are not suitable as they lead to cloud formation and the excess oil, which accumulates in the often deep structures of the moulds, causes increased formation of pores. In addition surfaces produced with this type of release agent result in dusty concrete surfaces, which leads to faster weathering.

The releasing agents make it easier to strip the formwork/mould without damaging the casted design, and protect the formliner thereby increasing its durability, and enhancing the concrete surface finish.

(6) SURFACE PROTECTION:

Architectural precast concrete are often used as outside wall or façade or flooring and are therefore exposed to dirt and weathering. The sensitive concrete surfaces however make the cleaning very difficult, if not impossible, as the cleaning with standard cleaners very often leaves stains and remain visible. It is therefore recommendable to protect



the sensitive and priced concrete product with a suitable protective agent. Conventional protective coatings are not suitable, as they either contain solvents or are not compatible with the residual moisture in the concrete, or they do not offer sufficient breathability and show a tendency to discolouration. Hence use of specific concrete-protective hydrophobic & oleophobic coating will protect against efflorescence, frost, weathering effects, soiling, moss formation.

Nano TiO₂ coating helps in the reduction & formation of mold/algae on the concrete surface, in addition to the de-pollution viz. removal of vehicular emission (SO, NO, CO, VOC, PM2.5).

(6) GLAZE-STAIN (3-in-1) Protection + Camouflage + Colour:

Glazes are water-based, solvent-free, eco-friendly unique surface-treatment on concrete, cementitious surfaces and natural stone. It is used to achieve (rather maintain) the concrete character & finish, but without using any coatings, plaster, putty, paint... and provide a long-lasting & easy-to-clean surface. It aligns the optical flaws without "covering up". Glaze is not a covering colour, hence it will not mask the concrete surface texture like a colour, hence cannot peel or crack. It is used to improve the exposed concrete appearance. The desired appearance is achieved with nano-sized pigmented or transparent particles that penetrate deeply into the concrete surface. Glazes can be used in a multitude of ways, producing: (a) Subtle tints or (b) Dramatic colour variation.



Concrete offers a virtually **unlimited palette of options for creating unique aesthetic treatments** ranging from a historic appearance to blend with nearby landmarks or a contemporary style that makes a strong statement of its own. The versatility of architectural precast concrete gives designers a freedom that is not available with most other materials.

Now, the newest innovation in precast is **Ultra High Performance Concrete (UHPC)** precast facades. They are lighter & thinner, with higher compressive & flexural strength, and more durable. Using UHPC façade in lieu of conventional precast is ideal for cladding or enclosing lightweight steel-framed structures, high-rises, and buildings.

Precast Concrete can provide any appearance desired in a **cost-effective way** with added benefits no other cladding material can match, and provides concrete answers to your design objectives!

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