Decorative Concrete Pavements

For many years, concrete has been used as a simple, effective and low cost surface for all sorts of areas ranging from car parks to driveways to commercial freight yards. However, the one factor you rarely hear being praised is its looks. There's no point beating about the bush: plain concrete is bloody boring.

Techniques to improve the aesthetic appeal of monolithic and many technices finded to approve the shape and the look for the concrete surface espessially for the land scap and urban area to give a nice and natural veiw .

and the must popular type of decorative concrete pavement that used in all the world and its look appear i kurdistan now as bellow

1: stamped concrete

2: Exposed Aggregate

3:Concrete with Drainage Capability

4: Sprayed Concrete

5 :Deco Wall

6 : Adtex

7: GeoPave

in this research we give some general information and looks of this items that it will be useful for use this applications it in the projects in future for more attractiv views in the solid building and in the landscape area .

and espesially we will take alock for procedder and construction of the **stamped concrete** because its now the popular item use in our zone and projects .

-1- Stamped Concrete

Stamped concrete is concrete that has been stamped and pressed into a design so that it looks like stone, flagstones, slate, tile, brick, wood ... It can be freshly laid on new walkways or it can be applied as an overlay to the top of existing walkways as a cost-effective and attractive way of renewing old pavements. It can also be used on driveways, patios, terraces, swimming pool surrounds, and interior floors domestically, in retail outlets and shopping malls.

Although stamped concrete has been available since the 1950s, it really began to gain in popularity in the 1970s. Industry began to develop new colouring products, stamping patterns and products like sealers. These days a wide range of colours and patterns are available which can be combined to create an array of effects. Concrete paints, acid stain, and concrete dyes create different colours. Sealers protect the surface in gloss or matt. Stamps, rollers, and concrete cutters create surface moulding patterns and effects.

* comparing sheet between the type of pavements

	Asphalt	Natural Stone	Precast Pavers	Stamped Concrete
Available in an array of patterns and colors	No	No	Yes	Unlimited
Longevity and performance	Poor	Good	Good	Excellent
Speed of installation	Fast	Slow	Slow	Moderate
Special maintenance requirements	Annual seal coating	Removal of weeds and moss that grow in the joints; refilling joints with sand as needed.	Removal of weeds and moss that grow in the joints; refilling joints with sand as needed.	Resealing every few years or as needed to protect the surface from stains and maintain colour vibrancy.

* procedure of work and contains

Stamped concrete requires a highly resistant, low contraction concrete without clay or impurities. **Glass fibres should be mixed into the concrete in the ratio of at least 500g per square metre.** The concrete should contain gravel, crushed stone if possible, of no more than 20 mm width. In terms of additives and admixtures, the exact concrete mixture depends on the weather, whether it is day or night, and particularly on the ambient temperature. In general, a concrete retarder is required. Accelerating admixtures should not be added to the concrete because otherwise the concrete surface would harden before it has been stamped. Before stamped concrete is laid, it is important to prepare the area to be stamped. First of all, **the ground must be graded and levelled. After grading and levelling, 20 cm of sub-base should be laid. Sub-base type A or B should be selected depending on the intended use of the finished surface. The sub-base should be well compacted with no less than 95% compaction.**

In the next step, the shape of the walkway, patio, or the area to be concreted should be marked out with forming materials. Flexible forming materials can be used to create a range of shapes and designs. Flexible forming materials are also easy to use and can be laid quickly. Finally, a nylon sheet and steel mesh (5 mm, 15 x 15 cm) is laid to increase the strength of the concrete.

After the area has been prepared, the actual stamping process can begin. To lay a basic standard stamped concrete you should follow three steps.

1- you create the base colour in the concrete. This is done using colour hardener.

2- you add release colour powder.

3- you can stamp the concrete. For the stamping you require a set of good stamps including hard and flexible pieces which tessellate to create a seamless design.

4- As part of finishing, sealer should also be applied to the surface of the concrete as this increases durability and creates an attractive finish.

Colour hardener serves two functions: to colour the concrete and to strengthen the surface and cause it to dry so it can be stamped. Colour hardener can be applied to the concrete in a number of ways. It can be added to the concrete in the mixer. It can be sprayed onto the surface of the wet concrete. However, cast-on colour hardener powder is a more popular way of applying colour hardener. Using the cast-on system, 2.5 – 4 kg of colour hardener should be used per metre squared. The colour hardener should be broadcast onto the concrete surface to attain a random finish.

The colour hardener must penetrate the surface of the concrete and bleed down into the concrete. To aid the surface penetration, a bull float is used to smooth the surface and mix the upper layer of concrete. A magnesium bull float should be used so that water does not rise to the surface.

Following this, release colour powder should be used. The release colour powder helps prevent the stamps from sticking to the concrete and helps to create a close moulding of the concrete surface to the rubber stamp. It also adds a second colour to the concrete surface creating depth, texture and richness to the colour. It is this that makes stamped concrete look like a different material. The release colour powder can be broadcast onto the surface as a powder or it can be sprayed on as a liquid.

The concrete is now ready for stamping. The stamps are specially designed to look like other building materials, such as stone, brick, or flagstones. The stamps are laid next to each other and the stamps are pounded into the concrete surface using a heavy wooden pounding tool or feet. When the stamps are removed the imprint of the stamp remains.

After about 24-48 hours, depending on the weather when the concrete has completely hardened, you should wash it thoroughly with a jet sprayer at 250 bar. The surface should be washed until the water runs clear. It is very important to completely clean the remaining products away, so it is better if you can use a smooth brush machine on the surface as well. Following the washing, the concrete should be left to dry again.

At this stage, if you want to change some colours you can use acid stain and concrete dyes. Acid stain contains harmless, non-toxic chemicals that react with the lime in concrete to create a permanent colour. There are many different colours of acid stain. After application, the stains are thoroughly cleaned, neutralized, and dried before sealing. Concrete dyes contain very fine colouring agents that penetrate deep into the concrete surface to create a lasting colour effect. Stencils can be used in combination with concrete dyes to create some wonderful, creative effects.

After the concrete surface has dried, it is also important to add expansion joints. These can be best added by running a grinder along the outlines of the stamp shape. In this way the joints blend in with the surrounding shapes.

Finally a special polyurethane sealer is added to the surface. The sealer improves the durability of the finished product and gives a glossy finish to the concrete. There are various ways of applying the sealer: by roller, by brush, or using a spray gun. It is best to apply two layers of sealer. The first layer should be thinned so that it seeps into the concrete and strengthens the concrete. The second layer should be applied without thinner and it should remain on the surface as the concrete should no longer be porous. It is also advisable to reapply the sealer every couple of years. This prevents the stamped concrete from aging, protects it, and refreshes the surface.

*** final surface and patterns of stamps forms**

after completion the work the final surface will appear as shown

there is deferent patterns and forms for stamps the figure bellow show some of this patterns that popularly used and available.


Seamless Belgium Slate


Seamless Blue Stone


Seamless Italian Slate


Seamless Old Granite Cleft Stone


Seamless Roman Slate


Random Sandstone Hammered Edge


London Coble Stone


Ashler New England Slate


Random Boardwalk 6" Wood Plank


Sidewalk Roman Slate

* general technical information that can be used in projects details

1. SCOPE OF WORK

This item shall consist of all work associated with furnishing and installing concrete stamped surfaces in accordance with these specifications, as detailed on the plans or as directed by the Engineer. This shall include all labour, materials, testing, submittals, tools, and equipment necessary to saw cut, excavate, prepare the base and install the stamped concrete surface to the lines and grades shown on the plans including any incidentals there to.

2. MATERIALS

Base material shall be medium gradation processed aggregate base conforming to Technical Specification “Processed Aggregate Base”.

Concrete shall be Portland Cement Concrete conforming to Technical Specification “Portland Cement Concrete Sidewalks and Ramps”.

Concrete finish to be an Increate Systems stamped concrete decorative finish or an approved equal. The pattern, colours, and dimensions shall be as follows for the following surfaces:

- the patterns it will be according to the drawing and available stamps forms in the local area and in the nearest manufactured side .
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The colours used shall be blended throughout the entire concrete mixture. Colour hardeners on the stamped concrete surfaces shall be used as part of the installation. All materials used shall meet the applicable manufacturer’s specifications and recommendations for an installation of this type.

Dowels and welded steel fabric shall conform according to the drawing and instruction of the manufacture sides .

Expansion joint material shall be used and according to the manufacture side instruction

3. SUBMITTALS

The following submittals shall be submitted to the Engineer for review and approval prior to installation:

All pertinent manufacturers information for stamped concrete systems shall be submitted for approval. This includes: engineering calculations, colours, patterns , certificate of origin for the all material used for this item (colour hardener material , release material , sealer material Glass fibres material) with all information about the (product date) and (expire date).

and the attached doc. must be prepared and executed .

- Gradation test results for processed aggregate base
- Gradation test results for dowels and welded steel fabric
- Concrete specifications from supplier
- Manufacturer's cut sheet for joint sealer
- Manufacturer's cut sheet for expansion joint material

4. CONSTRUCTION METHODS

Construction methods for the installation shall conform to the following requirements:

1. Excavation, forms, concrete finishing, backfilling and removal of surplus materials shall meet the requirements of Technical Specification

2. the stamped concrete surfaces shall be performed by a trained and certified contractor for the product used. All work shall meet the manufacturer's specifications and recommendations for an installation of this type.

2. Reinforcing shall be installed free from dirt, oil, paint, grease, mill scale and loose or thick rust which could impair the bond of steel with the concrete.

5. MEASUREMENT

Measurement for this item will be based on the number of square meter of stamped concrete surface, completed and accepted.

6. PAYMENT

Payment for this item will be based on the unit price per Square meter of Stamped Concrete surfaces constructed and accepted, including all labour, materials, testing, submittals, tools, and equipment necessary to complete the work as specified.

* general information about the another type of decorative pavements

-2- Exposed Aggregate

Exposed aggregate is an effect which is created by mixing a colourful, eye-catching aggregate with the concrete and washing the top surface of concrete back to expose the aggregate. As well as the colourful aggregate chips, a special colour hardener can also be added to the concrete to achieve an attractive colour combination. Exposed aggregate can be used as an overlay on existing walkways and floors or can be applied to new walkways and floors. It is also durable and is best suited to outdoor applications, such as walkways, patios, garages, parking spaces and pool sides.

The ratio of the components for the exposed aggregate concrete mix is as follows: five 25kg bags of aggregate should be mixed with one 25 kg bag of special colour hardener and 50 kg of cement. The colour of the cement can be white or normal and should be selected depending on the desired colour.

The area to be concreted should be prepared the same way as for stamped concrete, with grading, levelling, sub-base compaction, and forming materials. There are two different ways of laying the exposed aggregate. The first method involves laying 10 cm of exposed aggregate mix. A deactivator is broadcast on the surface and, depending on the weather, the concrete should be left for about 12 hours to dry. Then the concrete surface should be thoroughly washed using a pressure jet of 2500 psi. A brush machine can also be used. In the washing process, the top layer of concrete is washed away, leaving the aggregate exposed below. After drying, surface should be sealed. It is better to apply two coats of sealer to allow for porous concrete.

The second way to lay exposed aggregate is more cost effective. It involves laying normal concrete, without coloured aggregates or special colour hardener, with a thickness of 7 – 8 cm, depending on the design and intended use of the surface. After this has fully dried, a bonding agent should be applied to the upper surface. This bonding agent causes the lower concrete surface and the exposed aggregate layer above to adhere to each other. Following this, 2 – 3 cm of exposed aggregate mixture should be laid. The exact thickness depends on size of aggregate in the exposed aggregate concrete mixture. A larger aggregate requires a thicker application layer. Deactivator is then broadcast on the surface and the concrete is left for about 12 hours to dry. The concrete surface is then washed and/or brushed to expose the aggregates. After the surface has completely dried, sealer is applied.

There are many options available for creating attractive designs with exposed aggregate. Firstly, you can select attractively coloured aggregates and special colour hardener

combinations. You can also use metal inserts to make eye-catching designs. The metal inserts also act as attractive expansion joints. The various parts of the design can be filled with different coloured aggregate and special colour hardener mixtures.

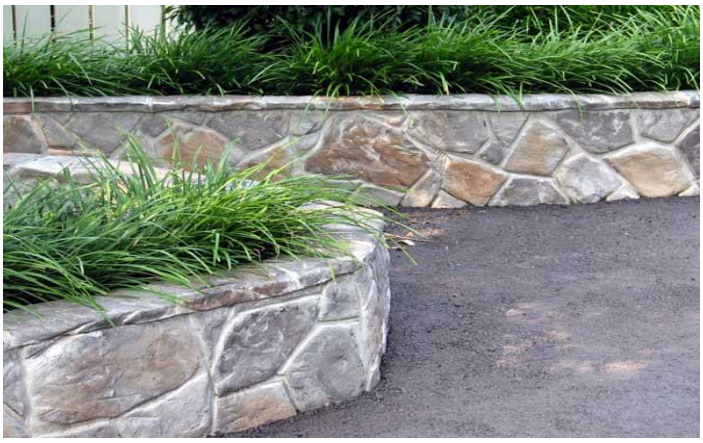
-3- Concrete with Drainage Capability

Concrete with drainage capability is concrete which contains 15 – 30% void space to allow rain and water to drain away. This type of concrete is very useful in areas prone to flash floods where storm water management is important. It can be used in parking areas, street and roadway shoulders, patios, driveways, walkways, recreational areas, and in garden areas where the concrete should be laid around trees.

-4- Sprayed Concrete

Sprayed concrete is an application in which liquid concrete is sprayed through a gun onto a stencil to create an effect on a floor or wall. A range of designs and effects can be created by combining different patterns with different colours. Sprayed concrete is a wonderful, cheap, quick and effective way of brightening up existing concrete floor. No overlay is required and no stamping is necessary. Sprayed concrete can simply be applied to the existing concrete floor in a 4 mm layer. It is also possible to apply sprayed concrete to fresh concrete. It is a very durable, making it particularly well suited to commercial and outdoor applications, like parking areas and walkways. However, it can be used for the same applications as stamped concrete, including interior flooring. If you are applying the sprayed concrete to an existing concrete floor, the first step is to thoroughly clean the floor of all dust. The next step is to make a design on the floor using the stencil paper. Patterns are available for covering larger areas, edging stencils are available to frame the area to be sprayed, and rosettes are available to make attractive centre-pieces. Two main types of stencil are available: those that are sticky-backed and those that are not. There are lots of different designs to choose from, for example flagstones and euro-fan. After the design is complete, the mix should be prepared. The concrete should contain colour hardener and special liquid polymers. The prepared concrete mix will then be sprayed through a special spray concrete gun with an air pressure of no less than 3 bar. The mixture should be sprayed over the stencil on the ground with a thickness of 3 – 4 mm. The stencils should be removed while the sprayed concrete is still fresh if possible. If this is not possible, the stencils can be removed later, but special care should be taken so that the sprayed concrete surface is not chipped. After the sprayed concrete has dried, the area should be cleaned carefully with a fine brush. Finally, polyurethane sealer should be applied to the surface.

-5- Deco Wall



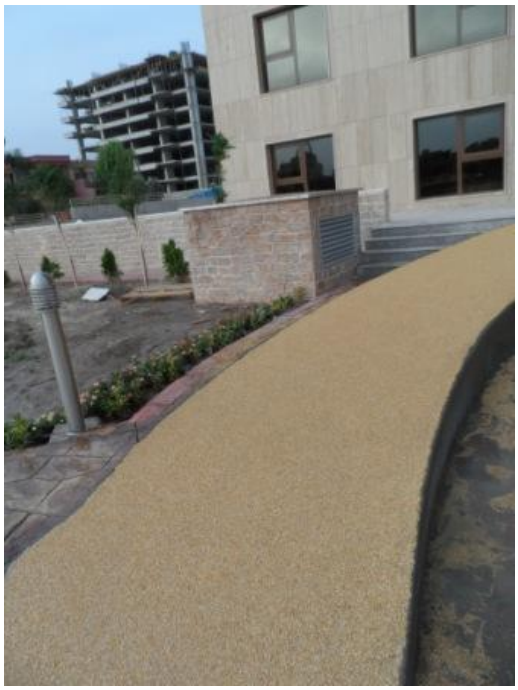
Deco-wall and rock-wall are similar to stamped concrete but for plastered walls on the vertical plane. This special product is applied to the wall and is then stamped and/ or cut into the desired design. As with stamped concrete, the application of the product is easy, fast and clean and the end product looks like a different building material. Among other things, walls can be made to look like brick, stone, wood, slate, or rock. The finished surface can be coloured according to your wishes and will finally be sealed. As with stamped concrete, a range of stamp designs and colours are available.

Deco-wall can be applied to interior or exterior walls. For example, it can be used to create an attractive authentic brick design for a sitting room or kitchen, or a natural stone look for a garden wall. Rock-wall can also be applied to a range of wall surfaces, but has been specially formulated for extra strength. In particular, rock-wall can be used to create natural looking pools and fountains. Both deco-wall and rock-wall increase the waterproofing quality of your walls and are resistant to ultraviolet rays.

Deco-wall and rock-wall are available as a special mixture in bags. To prepare the wall mixture, just water is required. It may also be necessary to prepare the surface of the wall to be covered. This is because the wall surface should not be smooth in order to aid bonding. The mixture should be plastered 2 – 4 cm thick vertically. The exact thickness depends on the texture of the stamp.

The wall can now be stamped. To being with, liquid release is sprayed on the wall and the stamps to prevent the stamps from sticking to the deco-wall or rock-wall mixture. Release colour powder can also be used, but is generally not as effective. Next the intended design should be transferred to the wall. There are two ways of doing this. The design can either be transferred to the wall through printing with stamps. The other method is to use texture skins and hand-cut the stone or brick designs into the texture surface. The wall should then be left to dry. Following this, a special paint can be used to colour the wall. Finally the wall should be sealed with a water-based sealer.

-6- Adtex



Adtex is a product developed by the Adbruf Company in Great Britain. They are flooring systems which create a natural stone finish. Adtex is known as a resin bonded flooring system, which means that it is a 'coat and scatter' or a 'broadcast' system because of the technique of spreading the small sized aggregate dressing onto the wet resin surface. Resin bonded aggregate surfacing has the appearance of a loose gravel driveway but with the aggregate anchored by the resin.

Adtex resin bonded surfacing binder is a two part, solvent free polyurethane hybrid resin system which provides a complete resin bonded surfacing system. A wide variety of colours, shades and textures is achievable to suit the surrounding environment.

Adtex provides an aesthetically pleasing, highly durable surface. It is particularly suitable for use in prestige developments to give a luxury ‘feel’. Various types of aggregates are available including gravel, pea shingle, crushed stone such as granite, basalt, quartz and man-made aggregates such as calcined bauxite can also be used.

In order to lay the Adtex, the first step is to prepare the surface, which should be free of dust and oily patches. The humidity of the concrete should not be more than 2%. Next the two provided components for the resin should be mixed together well. The prepared resin is then spread on the surface to be covered and the aggregate are broadcast onto the surface. The resin bonds with the stone in a matter of minutes, leaving a loose gravel look where the gravel is in fact attached to the surface. After the resin has properly dried, the excess aggregate can be brushed off the surface and collected.

-7- GeoPave

GeoPave is the binder used a range of resin bound paving systems which can be used for external surfacing, internal flooring and for low maintenance tree pit surfacing. GeoPave can be used for paving driveways, paths, public spaces, tree pits and internal floors. A GeoPave resin bound surfacing system is a brighter, modern alternative to established concrete, block paving, pattern imprinted concrete or asphalt.

The properties of GeoPave can be tailored to meet individual client requirements. There is a wide range of suitable aggregates in different colours and textures. This allows a high degree of freedom for the architect or landscape designer to use these characteristics to compliment or contrast with other elements of the project. Natural gravels in light buff to darker brown shades are the most popular but crushed rock derived aggregates such as granite, basalt offer alternative looks.

GeoPave resins are available in two basic grades – Standard and UVR (Ultra Violet Resistant). GeoPave Standard is a high-strength resin system, most suitable for buff to brown coloured aggregates. GeoPave UVR is highly resistant to UV light and is the resin system of choice for light coloured aggregates where any weathering of the resin binder may be noticed.

A GeoPave based resin bound surfacing system is typically pervious meaning that water can freely drain through it. This makes GeoPave particularly suitable for areas prone to flash floods as part of a drainage system. GeoPave can also be used for tree pits as GeoPave is a fully porous product which allows water to pass through the surface to feed the roots of the tree without the need for watering tubes.

GeoPave can be applied a wide range of surfaces and very little surface preparation is required before the application. The customer's choice of stone is simply mixed with the resin in a mixer and then applied to the surface using a trowel. A little white spirit can be used to prevent the GeoPave from sticking to the trowel and to create a smooth upper surface. The surface is then left to dry. It is a good idea to reapply a suitable sealer to the surface of the GeoPave every couple of years to refresh the surface and keep the GeoPave looking new.