

DÉCOR EXPOSED-AGG™

Notes for Seeded Exposed Aggregate Concrete

Placement of Base Concrete

The work output per cement mason for exposed-aggregate finishes will vary greatly accordingly to the mason's skill, weather conditions, and the workability of the mix. In general, a finisher can produce only about one-third of the area that he would normally finish for a steel-troweled surface. The strike off operation in the base slab should be such that a flat surface is obtained 3 - 11 mm below the desired final finish grade to allow the addition of the seeding aggregate.

Seeding and Embedment

The seeding operation is usually started immediately after the concrete has been placed, struck off and darbyed or bullfloated. It is important that the slump of the base concrete be not less than 75mm when the concrete temperature is 21°C or lower, so that the seeded aggregate can be worked into the slab. This minimum slump should be increased as the concrete temperature increases above 21°C, but the maximum slump should not exceed 125mm.

The select aggregate is carefully seeded by shovel or by hand to cover completely the entire surface with one layer of stone. Seeding by hand may be necessary in difficult locations such as corners and along edges.

The seeded aggregate is normally embedded in the concrete by tapping with a wooden hand float, a darby or a bullfloat. Sometimes a straightedge or rolling device is used. Final embedment can be obtained with a magnesium float or darby until all the aggregate is entirely embedded and mortar completely surrounds and slightly covers all particles.

Appearance after final embedment should be similar to a normal slab after floating with all voids and imperfections removed.

Special care must be taken to see that the aggregate is not over embedded and that the finished surface is not deformed. If too high a slump is used in the base mix, the seeded aggregate will settle and the completed surface may be below the final finish grade and below the top of any permanent left-in-place forms.

A layer of mortar about 2mm thick over all embedded aggregate is desired. Care should be taken that none of the seeding aggregate is mixed with the base concrete in order to get sufficient mortar to complete the embedment. If this happens the colour of the coarse aggregate in the base concrete will show up in the finished surface. The need for additional mortar is generally due to an improper mix design or too long a delay in the seeding and embedment operation. When very small areas require additional mortar, excess mortar from nearby areas may be used.

Exposing the Aggregate

Timing of the start of the aggregate exposure operation is critical and is usually based on previous experience. In general, this slab should be delayed until the slab will bear the weight of a cement mason on knee boards with no indentation. At this time the slab is lightly brushed with a stiff nylon bristle broom to remove excess mortar. If aggregate is dislodged the operation must be delayed until none of the aggregate is dislodged, (To test for the proper time of exposure when large areas are involved, a sample

Exposing the Aggregate (cont..)

panel, say 1m² can be prepared at the same time that the project is cast). Next, brushing combined with a fine water spray can begin. Adequate delay is required between each pass, the length of delay depending upon the rate of set of the slab. As the slab sets, washing and brushing can proceed at a more vigorous pace. Soft and hard bristle brooms and special exposed aggregate brooms with water jets are available to complete the job. Occasionally, wire bristle brooms may be needed for a particularly stubborn area, but such brooms should be used with caution as they may stain the aggregate.

It is extremely important that the aggregate have a uniform exposure at the end of the washing and brushing operations. Some areas may need special attention. Several passes will be required before the proper exposure is obtained. Continue washing and brushing until exposure is uniform and at the proper depth, the flush water runs clear and there is no noticeable cement film on the aggregate.

Surface Retarders

Surface set retarders may be used to advantage. For example, because of placing conditions it may be necessary to use a retarder on large jobs or during hot weather to delay the time of washing and brushing. When using smaller aggregate sizes, it is desirable to delay the time of set of the surface matrix by using a surface retarder to allow the base concrete to attain its initial set. This procedure will help prevent dislodgement of the small-size aggregates.

The retarder is sprayed over the surface according to manufacturer recommendations with an ordinary, low-pressure garden sprayer, after the seeded

concrete is floated. The surface should then be covered with plastic sheeting to continue curing. After the concrete sets the procedure of washing and brushing the surface is performed to expose the aggregate. Areas where the retarder had not been properly applied may set and resist exposure with hot temperatures or when high-early-strength concrete is used. The surface should be checked periodically, and the aggregate exposed only a few hours after the retarder application.

When using surface retarders the following tips are helpful:

- Choose a reliable surface retarder.
- Make certain that the surface retarder is compatible with the concrete materials to be used
- Apply the surface retarder uniformly; this is essential for good results.
- Know the effects of concrete temperature on length of delay of set for the particular retarder used.
- Read the instructions and literature issued by the manufacturer for any brand of retarder being used for the first time.
- Make sample panels under actual job conditions.
- Use a coloured retarder to assure observable coverage.

Retarders are usually applied at a dosage rate of 0.4 to 0.2 litres per m.

Weather conditions

During hot, dry, windy days the surface may set prematurely (sometimes called crusting). Covering the slab with damp burlap, waterproof paper, plastic sheeting or an evaporation retarder immediately after embedding the select aggregate will prevent this and will help retain surface moisture until the start of washing and brushing.

Sealing

Clear coatings bring out the true colour of the exposed aggregate and help keep the exposed matrix from discolouring with use. However, care is needed in the selection of a coating material. Some coating materials, such as linseed oil, may darken the matrix, and some may oxidize from exposure to sunlight and become a dirty yellow or possibly brown. Many better coatings consist of methyl methacrylate. Pebble coat sealer is available from Décor Pebble

Applications.

Décor Seeded Exposed-Agg concrete is a popular decorative finish for concrete slabs because of its durability and its wide range of texture and colour in unlimited applications. It can be used both indoors and outdoors, driveways, patios, steps, pathways, plazas, streets, malls, swimming pool decks and in countless other residential, commercial, industrial and public works applications.

Size

Aggregates may vary from 6.3mm up to stone and rubble sizes of 180mm in diameter and larger. The extent to which they are exposed or "revealed" is largely determined by their size. Reveal should be no greater than 1/3 the average diameter of the aggregate particle

Colour

An architect or contractor involved with an exposed aggregate concrete job should select an aggregate that is decidedly darker in colour than that specified by the customer. The reason given is that the general appearance of large areas after installation tends to be lighter than indicated by the trial samples.

The relative importance of aggregate versus cement in determining the colour of exposed-aggregate concrete depends largely upon the treatment given to the surface of the concrete.

In most exposed-aggregate finishes, the colour of the cement is less important because a major part of the visible area is covered by the aggregate. Nevertheless, the cement has an effect on the general tone value of the finish; for this reason it should be considered when the aggregate is chosen. While grey cement can be combined with a number of aggregates, the use of white cement, with or without colour pigments greatly extends the range of possible colour combinations.

Shape

Aggregate shape will affect surface pattern and texture and may affect colour slightly. Large irregular shaped aggregate may permit more of the concrete matrix to show, changing the overall effect. Cubical or rounded aggregates will give the best area coverage. Flat pieces and slivers do not hold well in the concrete matrix and should not be used.

Aggregates with a rough surface have better bonding properties than those with slick glassy surfaces. Bond is more important in cases where small size aggregates are used, as some of the aggregate pieces may be only half embedded in the cement matrix. With larger aggregate sizes, say 12.5mm or larger, enough of each piece will be embedded to insure against loss of bond, even in the case of glassy, smooth aggregates. Aggregates shape affects the tone of a surface after weathering. Rounded aggregates are largely self-cleaning while angular aggregates of rough texture tend to collect dirt, but this dirt pickup is generally confined to the matrix. For this reason, as well as architectural appearance, the area of exposed matrix between the pieces of stone should be minimized. It may be advisable for the matrix to be darker than the aggregate for regions of the country subjected to considerable atmospheric pollution. Sharp, angular crushed aggregate should be avoided in barefoot use areas such as swimming pool decks to avoid foot injury.

Cost and Availability

Even the most expensive aggregates are often practical in exposed-aggregate concrete, especially when they are used only in seeded applications. In monolithic exposed-aggregate concrete, the cost of the select aggregate will be more significant.

In general, aggregates used in concrete of any type represent only a small part of the cost of concrete in place. Any mistakes made through use of an inferior aggregate cannot readily be corrected. So, it is often wiser to use high-quality aggregates from a distant source, if need be, rather than a local material of questionable quality.

Disclaimer

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