

## FINISHING ARCHITECTURAL CONCRETE

**A**FTER ALL CONCRETE has been placed and forms are removed from architectural concrete walls, various steps are necessary to finish the concrete to secure the attractive appearance desired. Tie rod holes must be filled, any honeycomb spots corrected, fins removed and the entire surface cleaned.

### PATCHING

If tie rods are the type that are entirely removed from the wall they should be pulled toward the inside face to avoid spalling the concrete on the exposed surface. The holes should be filled at least 2 days before the walls are given the final cleaning. Tie holes should be filled solid with mortar using a grease gun of the plunger type such as those used on automobile transmissions. The flexible hose on the gun should be replaced by a short pipe for this purpose. Filling should be done from the inside of the wall. A piece of burlap or canvas should be held over the hole on the outside face and when the hole is completely filled the excess mortar should be wiped off with this cloth. No other finishing is necessary.

Tie rod holes left by removing only the outer ends of the rod so as to leave no metal closer than  $1\frac{1}{2}$  inches to the surface should be filled with a small tool that will permit filling the hole solid with mortar beginning at the back of the hole.

If concrete of good workability is used and it is well puddled during placing, there should be no honeycomb. Where honeycomb does occur, the concrete should be removed immediately after stripping forms until solid concrete is revealed and to a depth of at least 1 in. Edges should be cut perpendicular to the wall surface to avoid feathered edges in the patch. An area of concrete extending several inches beyond the hole should be saturated with water.

A grout of equal parts portland cement and sand, with sufficient water to produce a brushing consistency, should then be well brushed into the surface to be patched. This should be followed immediately by the patching mortar. The mortar should be of fairly stiff consistency and it may be necessary to place it in the hole in several well compacted layers to prevent sagging. A wood float may be used for compacting the mortar. The patch should be left slightly higher than the surrounding surface. After an hour or two, depending on weather conditions, it should be finished flush with the surface of the wall, using the wood float. If a smoother finish is necessary, the surface may be wiped with cheese cloth or similar soft material. A steel trowel should not be used for finishing, as it produces a smooth spot that will show up in contrast with the surrounding surface and will even show through paint. If a very smooth finish is necessary, it is better to allow the patch to harden and then grind the surface with about a No. 80 stone using plenty of water. Care must be taken, however, not to stain the concrete below the patch.

When unlined forms are used, the board marks should be carried across the patch. This can be done by striking off the surface with a straight-edge spanning the patch and held parallel to the direction of the form marks. When screeding the patch, the straight-edge should be lifted at each joint between form boards. The straight-edge should then be replaced and the operation repeated. Thus the patch will have an irregular surface corresponding to the irregularity of the wall and traces corresponding to the joint lines will be made.

### MORTAR FOR PATCHING

Mortar for patching should be made of the same materials and in approximately the same proportions as used for the concrete, except that the coarse aggregate should

be omitted. The mix should not be richer than 1 part portland cement to 3 parts of sand. A richer mix, about 1 part portland cement to 1 or 1½ parts sand will be necessary for plugging tie holes and it is advisable to use a sand passing a No. 14 screen. Sand used for patching mortar must be clean and free of materials which cause discoloration. No more water than necessary for proper placing should be used. The mortar should be mixed thoroughly and then allowed to stand for an hour or more before using, stirring it occasionally if necessary to keep it from stiffening. It should be thoroughly remixed before using but without adding water.

Mortar patches when made of the same cement and sand as the concrete usually appear darker than the concrete. To overcome this tendency, white portland cement should be substituted for a part of the grey portland cement to give patches that will match the wall. The proper proportions are best determined by making a few samples, allowing them to dry before comparing them with the concrete. The proportion of white cement will usually vary from 10 to 30 per cent of the total cement.

## CURING

Mortar patches should be kept moist for several days. This is not always convenient and for that reason is often neglected. It is particularly important to cure the patches made in repairing honeycomb spots, as the mortar will not bond properly if it dries prematurely. Tarpaulins can often be hung over the walls to prevent them from drying too rapidly. In some cases wet burlap can be held in place over patches by means of wood props.

## CLEANING WALLS

There should be no fins of mortar projecting between form boards or panels of plywood unless a rough texture is desired, but if there should be an occasional small fin that is objectionable it may be broken off carefully with a hammer.

Rough spots, stains and hardened mortar or grout can be removed by rubbing lightly with a fine abrasive stone or hone. A hone used for sharpening tools will be satisfac-

tory. Streaks caused by leakage from the lift of concrete above can often be removed by use of a hone. Plenty of water should be used and rubbing should be sufficient only to remove the streaks without working up a lather of mortar or changing the texture of the concrete.

If an excess of oil has been used on the forms the oil can be removed from the concrete by scrubbing with a 5 to 10 per cent solution of muriatic acid, using stiff bristle brushes. The acid solution should be applied to a thoroughly wetted wall and must be rinsed off the surface with an abundance of water. In general scrubbing with acid will not be necessary if the forms have been treated properly.

When the walls of a building are entirely completed, if the surface is not as uniform in color as desired, treat the wall as follows: Mix 1 part portland cement and 1½ parts fine sand with sufficient water to give a grout having the consistency of thick paint. If a light color is desired use white portland cement for all or part of the cement, depending upon the shade wanted. Wet the surface sufficiently to prevent absorption of water from the grout and apply the grout with brushes uniformly over the entire surface, completely filling air bubbles and holes. Immediately after applying the grout, float the surface with a cork or other suitable float, scouring the wall vigorously. While the grout is still plastic the surface should be finished with a sponge rubber float, removing all the excess grout but without pulling grout from holes or depressions. Next allow the surface to dry thoroughly, then rub it vigorously with burlap to completely remove any dried grout. There should be no visible film of grout remaining after this rubbing. The entire cleaning operation for any area must be completed the day it is started. Never leave any grout on the wall overnight. This process removes slight discolorations and stains and gives a uniformly good appearance without the effect of a paint coating.

In some cases where plywood is reused, the surface may be slightly darker than adjoining surfaces due to a slight fuzziness brought about by failure to sandpaper the plywood between uses. This condition may be prevented by sandpapering the plywood after each use.

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