

COLOR ON CONCRETE

This second portion of our two-part article on coloring of concrete, covers the methods for applying color to the hardened surface of concrete.

Probably the most commonly used ways of coloring concrete are those achieved after the concrete has completely hardened. These applied color techniques include paints, stains, plaster and stucco.

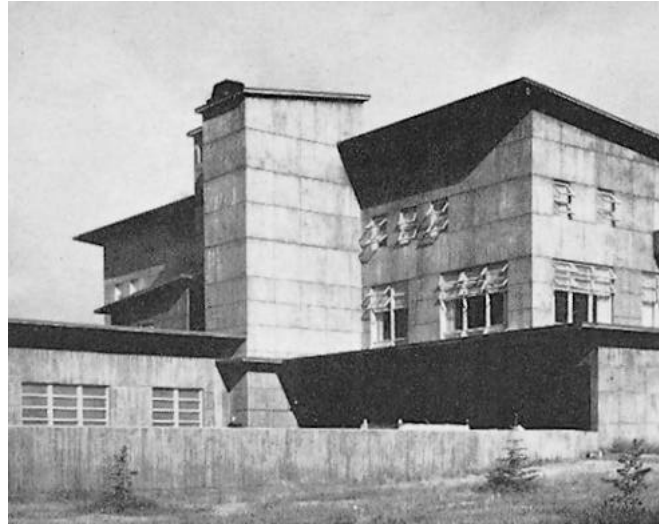
Paints

Imposing volumes have been written on the subject of paints; here we can present only some general suggestions on how to achieve a long-lasting, striking job. Many types of paint, varying as to their base material, are on the market. The newest and perhaps most promising coatings are those using epoxy resins. They offer a durability which has surprised all who have used them. They offer high resistance to water infiltration and attack of acids and they also retard the growth of molds. At present the cost of epoxy paints is high, but refinements in production and increasing demand are expected to lower prices in the near future and make widespread use feasible.

Application practices dictate that a discussion of paints be split into two parts: (1) portland cement base paints; and (2) other types of paints.

Cement paints are noted for their durability in both exterior and interior applications (except on floors or other surfaces subject to abrasion). They even afford a certain degree of protection from water leakage and attack from some foreign agencies when several coatings are correctly applied. They should not be used when the atmosphere contains reactive fumes.

The concrete or stucco to be painted should be allowed to age at least three weeks before application. An even longer period should elapse when using colored paints to prevent efflorescence, allow weathering to lessen staining, make surface suction uniform and minimize crazing. The surface should be hosed clean or, if needed, thoroughly brushed. Remove any glazing and/or old coatings by acid etching or sand blasting. After wetting the surface, apply the mixed cement paint in a uniform layer (without doubling back) using an ordinary scrub brush. (Spraying of cement paints does not provide waterproofing properties as good as scrubbed-on coatings). With cement paints, proper curing is necessary to attain the hardness required for good performance. Therefore, the surface should be fog sprayed with water two or three times daily for at least two days



Skillful application of stain gave the cast-in-place walls of this resort lodge a striking resemblance to natural wood. For a detailed description of this particular project, see *Concrete Construction Magazine*, October 1958, #580009.

after application of the final coat. This spraying should be started as soon as the surface is hard enough to withstand the force of the spray—usually about 12 hours after application of the final coat.

Other paints used on concrete include the following types: oil-base, varnish-base, lacquer-base, water-thinned, clear coatings and bituminous coatings. A look at the accompanying table, from the American Concrete Institute's "Guide for Painting Concrete," will show the correct uses for these six types of paints.

The concrete to be painted should be seasoned and dry. Blistering and peeling of the paint is likely to result if the concrete is damp on the exterior or interior surface. This applies to all except the bituminous coatings and water-thinned paints. Since a clean surface is necessary for good results, the concrete should be hosed, brushed, airblown or blast cleaned, depending upon the amount and kind of dirt or stain which must be removed. The paint should be carefully brushed, sprayed or rolled on to the clean, dry surface in air temperatures of at least 45 degrees F. Usually at least two coats are needed to achieve a durable film of paint in exterior work. This film

COMMON USAGE OF PAINT ON CONCRETE								
General type of paint	Outside walls				Inside walls (partitions)	Floors		Surfaces exposed to water
	Above grade		Below grade			On subgrade	Not on subgrade	
	Exterior surface	Interior surface	Interior surface	Buried surface				
Oil-base	X							
Varnish-base		X			X		X	
Lacquer-base	X					X		X
Water-thinned	X	X	X		X			
Clear coatings	X							
Bituminous coatings				X				X

should be at least 0.005 inches thick, which would require two coats of oil-base paint if it is applied at a rate of 500 square feet per gallon on a smooth surface. Interior surfaces do not require a coating this thick. Drying times range from 30 minutes for some lacquer-base and water-thinned paints up to 48 hours for some oil-base types.

Stains

Decorative staining of concrete has become quite popular, especially when used in conjunction with surfaces cast against sand-blasted forms to simulate wood planks. In resort areas where fire resistance is often highly important, this makes possible a building which is both harmonious with its surroundings and safe.

Oil stains are commonly used for achieving wood-like coloring on concrete. For this purpose, a dilute solution of zinc sulfate (two pounds per gallon of water) is first applied to the surface to prevent saponification of the vehicle in the stain. Several metallic salt solutions (mild solutions of ferrous, ferric or cupric sulfates or chlorides) can be used to get brown, yellow, and green stains. It is possible to apply two separate solutions of different metallic salts to produce additional colors. For example, ferric chloride produces a brown stain. A surface so stained could then be given a coating of sodium ferrocyanide to result in a dark blue color. Organic dyes offer a wide range of colors. These aniline dyes are used in wax solutions employing a solvent such as naphtha.

Other means

Plaster and stucco offer additional means of producing color on concrete surfaces. In recent years the colors and textures in these media have been considerably augmented. Although stucco is not as popular in the North as it once was, it is still a favorite in the South and West where it is used with great imagination and versatility. Graffito is a variation on plastering in which several superimposed layers of variously colored plaster are applied to a wall. The surface is then scraped to various depths to produce a design. Although the technique called for is considerable, the finished surface has great beauty and depth. This is not a new method, having been used in Italy during the early Renaissance.

It is obvious that there are many ways in which color can be achieved on concrete surfaces. Undoubtedly more will be developed in the future. Work is now in progress to develop colored cements. With modern exact ready mixed concrete batching equipment, colored cement would make possible low-cost uniformly colored concrete. Its excellent adaptability to color is just another reason why concrete is fast becoming the preferred material throughout the American construction scene for buildings of all sizes and occupancies.