



BUILDING RESEARCH NOTE

B. R. N. 21

CEMENT PAINTS

Introduction

Painting of masonry surfaces, such as brickwork concrete, asbestos cement sheets and cement and lime plastered surfaces often presents difficulties to the decorator because of alkaline nature of the surfaces. Well known types of paint for such surfaces are colour washes, distempers, cement paints, plastic emulsion paints, flat oil paints and chlorinated rubber paints. Of these, cement paints are particularly suitable for immediate decoration of new construction because the paint film permits moisture to escape through it. Cement paint does not alter the character of cement sand rendering or concrete except to adjust the colour to give an even appearance. The painted surface may later become the substrate for other types of paint.

Cement paints are water-dilutable paints and consist of white cement, alkali fast pigments such as chromium oxide, green oxides of iron and natural earth colour accelerators like calcium chloride and sodium chloride and water repellents such as aluminium stearate and calcium stearate. Some contain a proportion of hydrated lime also. Portland cement is used where dark shades are not objectionable.

These paints, being inorganic in nature, provide a very durable coating. They are applied both as decorative and waterproof coating mostly on exterior wall surface. They are not suitable for application on metal, wood, gypsum plaster, nor for surfaces treated with water repellents or finished with limewash, distemper, oil paint, synthetic resin emulsion paint or any impermeable film.

These paints are available in powder form and are mixed with water before application. The paint film hardens by hydration of cement in the composition and gives a hard matt finish which resists penetration by water.

Mixing the paint

The dry paint powder is added to water and not water to the powder. Two parts of dry powder are added to one part of water (by volume), in a clean container and mixed thoroughly till all the particles are wetted and paste obtained. A further one part of water is then added and stirring continued to obtain a slurry of uniform consistency. Where extra body in the paint slurry is desired, only one quarter to half part water is added at the second stage. The quantity of water will vary according to the fineness of the powder and should be determined by trial. The slurry is strained through a fine sieve. For spray application, sieving should be done twice and residue, if any, should be rejected. Quantity of slurry prepared should be such that it can be consumed within two hours. The slurry usually tends to stiffen during use due to chemical reactions and evaporation of water and it is common practice to thin it with additional water when necessary. Any additional water required should be added in small increments and thoroughly mixed.

Surface preparation

The surface to which the paint is to be applied should be thoroughly cleaned free of all dirt, dust, efflorescence and loose adhering materials. Dirt and dust should be washed off with

clean water. Lime deposits, if present even after wire brushing and washing with water, can be removed cautiously with 10 per cent hydrochloric acid. The surface must then be thoroughly rinsed with clean water.

If the surface is infected with fungus growth, it should be thoroughly rubbed down with an abrasive such as waterproof abrasive paper or pumice stone, washed with clean water and allowed to dry. A coat of antiseptic wash, such as 2 per cent sodium pentachlorophenate, should then be applied and allowed to dry.

To prepare a surface for repainting, all loose paint should be removed by wire brushing and stripping. Rough spots should be sanded and holes and wide cracks filled with a lean cement sand mortar.

If the existing paint has failed due to flaking caused by salt deposition behind the film the wall should be examined for the presence of more salt before repainting. After brushing down, the surface is washed with water and left to dry. If efflorescence reappears, the painting should be put off for some more time so that soluble salts have sufficient time to come to the surface from where they can be again brushed off.

Before the application of paint, the surface should be thoroughly wetted with clean water to control variable surface suction and to provide a reserve of moisture which aids in proper hardening of the paint. If the surface tends to dry rapidly, as it may in hot weather, it should be redampened slightly just in advance of painting. But care should be taken that the surface is not dripping wet when the paint is applied. Excess water may be soaked into a damp cloth.

Application of paint

Painting should not be carried out if it is likely to rain within a few hours. If possible direct exposure to sun should be avoided and it is advisable to work in the shade. It helps to prevent too rapid drying of the paint and keeps the surface uniformly damp.

The paint should be applied in two coats;

a third coat may be required where the background is of a dark colour. First coat should be well worked into the surface with a stiff brush. Second coat is usually applied 24 hours after the first one. A longer interval is permissible if the first coat has not fully hardened. Water should be sprinkled to keep the surface moist during this period. First coat should be slightly moistened with water before applying the second coat. Application of a single thick coat is not conducive to good results.

Cement paints cannot be satisfactorily applied with ordinary hair-bristle paint brush. Proper application requires a brush with relatively short stiff hog or fibre bristles. To obtain satisfactory decorative and waterproofing properties, both the coats should be vigorously scrubbed on in such a manner as to work the paint into voids and provide a continuous paint film free from pinholes. Spray application of paint provides less water resistance to the masonry than a brushed on coating. This method is therefore recommended only for dense concrete or interior surfaces where paint is not required for waterproofing purposes.

Texture finishes are possible with cement paint. A thick coat is applied and the desired finish is obtained by sponging or stippling

Proper hardening of cement paint film depends on the availability of moisture for chemical reaction with cement. The moisture in the substrate, in the paint film itself and in the atmosphere is utilized for this purpose but sometimes it is not enough. In most situations it is desirable to sprinkle water on the painted surface two or three times a day, preferably with a fog spray. Spraying should be continued for two days after the application of the second coat. Damp curing in this way improves the hardness and durability of the paint.

Covering capacity of cement paint is usually good and depends on the porosity and texture of the surface being painted and on the mode of application. When mixed to normal consistency (equal volumes) the cover-

ing capacity for two coat brush work on plastered surface is 3.3 to 4.2 sq m/kg.

Factors influencing durability

Durability depends on choice of the paint, condition of the surface, and proper application and curing of the paint film. Main points to be considered are given below :

(a) *Map-cracking* : Owing to poor workmanship and lack of curing, cement renderings are generally badly affected by surface crazing and hair cracks. Cement paint film is hard, strong and relatively brittle. It does not accommodate the stresses set up across the cracks in the plaster by expansion and contraction caused by periodic wetting and drying and by large variations in temperature. As a result the film cracks and provides a foothold for dirt and mould. It is this defect which often necessitates repainting. Therefore, it is important to have a paint composition which gives a highly water repellent film which can minimise rain water penetration into the substrate.

(b) *Lime - blooming*—The deposition, on the surface of free lime, liberated from paint film and the substrate, during hydration of cement, is called lime-blooming. It is usually patchy and presents an unsightly appearance. This phenomenon restricts the use of brighter colours in cement paint formulations. In very damp locations and over north facing walls, lime-blooming is generally not very pronounced but it brings about an apparent fading of colour.

(c) *Vegetable growth* : Cement paints, like colour washes, are prone to unsightly organic

growth in damp locations. Prevention of such growth is very much a matter of design of the structure to eliminate flow or retention of water on its surface. All features that lead to lodging or entrapping of water should be avoided. Greater the water resistance of a paint film the greater will be its resistance to mould growth.

Redecoration of surface coated with cement paint

Two points have to be considered in redecorating a surface : First, the condition of the surface and second, the proposed new finish i.e., whether it is to be a water paint or a paint based on oil. The existing coat serves as the foundation for the new coat and hence a proper assessment of its condition is important. If it shows signs of flaking and chipping it should be stripped off by dry scraping. If the surface is loaded with several coats of paint, these should be removed. Complete removal is essential if a first class finish is desired. Such surfaces should be examined to see whether there is any salt deposition below the paint film. If it is present, the surface should be treated as described earlier. Treatment for organic growth has also been described earlier.

If existing paint is in good condition the new finish can be applied directly over it after removing any dirt or efflorescence. Paint recommended for alkaline surfaces can be applied over surfaces finished previously with cement paint.

Compiled by : S.M. Singh & Joseph George
Published by :

Central Building Research Institute,
Roorkee (U.P.), INDIA

First Printed as B.D. No. 35 : September 1964

Reprinted : April 1984 , March 1986 and
January 1995

Printed at :
Anubhav Printers & Packers, Civil Lines, Roorkee
Copies : 2000