

Architects Memo

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SURFACE PREPARATION

This month we continue the important subject of surface preparation, discussing concrete surfaces. Concrete may be considered a permanent material but the performance of concrete as a weathering surface leaves much to be desired.

Cementitious Surfaces General

Concrete is the complex reaction product of aggregates, silica sand, and calcium silicates present in cement. Lime is produced during the setting reaction which slowly, further reacts with the silica sand to form more cement. This lime production accounts for the high initial alkalinity of concrete and is influenced by the amount of water added, type of aggregate, and additive used. Excess lime can migrate to the surface as laitance or efflorescence. The cement matrix is slowly eroded by acids normally present in rain, so that old concrete has a weak, unbound layer of sand on the surface.

The above holds true for all concrete products although the different forms do have some individual differences.

- a) **Poured Concrete** — More likely to have efflorescence and laitance due to higher slump mixes. Strong likelihood of form oils and/or curing agents being present.
- b) **Concrete Masonry** — The very low slump mixtures used in this area reduce alkalinity but increase porosity. Mortars used for jointing and reinforcing are generally highly alkaline.
- c) **Cement Renders & Stucco** — Can have weak surface layers due to water loss from relatively thin layers leading to poor curing.
- d) **Asbestos Cement** — Low incidence of alkalinity and efflorescence in flat sheet; greater danger in moulded sheet. Some possibility of mould release oil contamination.

- e) **Concrete Roofing Tiles** — The factory applied cementitious coating breaks down on extended weathering to a fine powder which, untreated, provides a weak substrate for paint.

Surface preparation

a) New Concrete, Concrete Masonry and Asbestos Cement

Remove any laitance or efflorescence by dry wire brushing or grinding; remove any remaining form oil or curing agents by scrubbing with Resene Super Brush Cleaner and rinsing off with water; remove all dust and dirt.

b) Old Concrete, Concrete Masonry, Asbestos Cement, New and Old Stucco, Weathered Roof Tiles

In order to assess the condition of these surfaces prior to painting, scratch the surface with a pen-knife blade — if the surface can be scratched off as a powder the whole area must be thoroughly cleaned. Treat efflorescence as in a); remove any powdery layer by vigorous wire brushing or preferably water-blasting; sand off any protruding fibres from asbestos cement. When dry the surface must be conditioned by using a penetrating sealer such as Resene Sureseal. Mouldy surfaces should be treated with Resene Moss and Mould Killer.

c) Glassy Concrete and Old Cement Floors

Dampen surface with clean water then sprinkle, from a plastic watering can, a 10% solution of Hydrochloric Acid in water. Bubbling indicates a reaction between the acid and the concrete. Continue the process until a uniform, fine etch covers the surface. Flush off with copious quantities of clean water then allow to dry.

N.B. Wear protective clothing and a face mask while handling acid.