

BUILDING DIGEST

CENTRAL BUILDING RESEARCH INSTITUTE, INDIA



PROTECTION OF BUILDINGS AGAINST VEGETATIVE GROWTH

Exposed surfaces of buildings such as external wall surfaces and roofs are commonly found to be stained with black and grey patches. Surfaces in the interior of a building, where dampness persists, are also similarly affected. These stains are due to Vegetative growth. Appearance of these growths on rendered and bare surfaces of masonry necessitates frequent cleaning and white or colour washing. Removal of these stains may, at times, pose a problem. One has, therefore, to adopt measures which may discourage such growths.

Considerable reduction in vegetative growth on roofs can be affected by providing adequate and quick drainage of rain water. For interior surfaces, good ventilation and prevention of walls from becoming wet are the best measures to inhibit such growth. Much of the disfiguring on the exterior walls can be avoided by ensuring free flowing of water and by preventing it to get logged or entrapped. Trees and vegetation which can provide shade should be trimmed as shade helps organic growth on buildings (Fig. 1).

Types of Vegetative Growth

Vegetative growth on buildings are broadly

classified into two groups, algae and moulds.

Algae, are simple vegetative bodies capable of synthesising their food from carbon dioxide and water in presence of sunlight. Those generally found on walls and roofs are terrestrial algae and are different from marine and fresh water algae. They grow on surfaces which are exposed to sun and are in constant touch with water. They are generally green in colour and produce dark grey, green or blue stains on the surfaces.

Moulds, also known as mildew, are the members of the family of fungi which lack chlorophyll and depend on other organic matters (dead or living, plants or animals) for their food. Light is not essential and is often harmful while humidity is a pre-condition for their growth. They generally appear as surface growth of black, green or brown colour but they may penetrate deep into the surface of some porous structures. The most widely found species are the black pigmented *Pullularia Pullulans* and *cladosporium herbarum*.

Mosses and Lichens are other forms of vegeta-

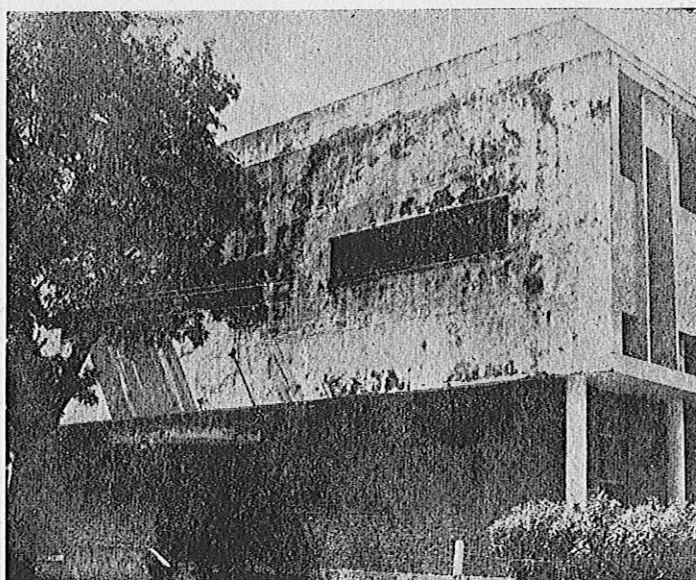


Fig. 1. Exterior mould growth due to shade.

tive growth similar to algae and fungi and grow in abundance when the surface remains constantly wet. Sometimes they cause greater damage than either by algae or moulds.

Vegetative growth depends on water supply, food supply (dirt and air contains enough organic matter for their nutrition) and light.

The most important factor favourable for their activity is high humidity (85 percent and above). The local accumulation of free water on walls is largely responsible for their growth.

Cleaning of Infected Surfaces

The cleaning of vegetative growth from the surface is a difficult task as they are deeply embedded into the pores of the substrate. The growth reappears and becomes active again after one or two rains. A fungicidal wash should, therefore, be brushed after thorough cleaning of the surface to ensure complete destruction of infection left inside the pores.

The following schedule should be followed for cleaning the unpainted surfaces infected with such growth.

Brick-Work. The growth on brickwork is more penetrating than on a smooth surface. Wire brushing and washing with plenty of water removes the growth and dirt. Prior wetting of the surface with water makes cleaning easier. Cleaning the surface with acid should be avoided as it may lead to efflorescence. A coat of fungicidal wash should be applied and allowed to dry before painting.

Plaster-Work. Smooth finish plasters are cleaned by scraping and stiff brushing. Care should, however, be taken to see that the hard brushing does not leave scratches on the surface of the plaster. A coat of fungicidal wash is applied after dusting off the surface.

Rough cast plaster work is difficult to clean properly. Adequate wire brushing alone can do the job. Normally two coats of fungicidal wash are applied instead of one. The second coat should be applied after the first has dried.

Clay tiles and A. C. Sheets. Since these are mostly open to the sun, they are covered with

algae and lichens which in turn form a good base for mould growth. A stiff brushing removes the growth from the surface. Prewetting the surface with water helps the process. The surface is dusted and dried. This is followed by the application of a single coat of fungicidal wash. Precaution should be taken not to stand directly on A. C. sheets or tiles, as this may cause an accident through the failure of the sheets.

Fungicidal Wash. A fungicidal wash is a solution or a dispersion of toxic chemicals in water or some organic solvent which when applied on the infected surface kills the growth of vegetation. It should, however, be used with caution and kept away from contact with skin and eyes.

The following are generally used as fungicidal wash in order of their efficacy:

1. A mixture of solutions of 15 g copper carbonate in 0.5 litre of water and 60 ml liquor ammonia in 0.5 litre of water.
2. Copper sulphate, 15 g dissolved in one litre of water.
3. Sodium pentachlorophenate, 30 g dissolved in one litre of water.
4. Bleaching powder, 50 g dispersed in one litre of water.
5. Formalin, 50 ml diluted with water to one litre.

The effective life of such treatments depends on the porosity of the surface and on the extent to which it is washed away by rains. Porous surfaces retain them for a longer period.

Brickwork, if left unpainted, should always be treated with a dispersion of soap in water (4 percent) followed by a coat of 1 percent alum solution in water to increase the effectiveness of the fungicidal wash. Colour and whitewash, which provide a rough and porous coating, should contain copper sulphate 1.5 percent or sodium pentachlorophenate 3 percent (by weight of lime) to prevent subsequent growth. The quantities of copper sulphate and sodium pentachlorophenate may be reduced to 1 percent and 2 percent respectively if soap (4 percent) is added to these washes. The copings, parapets and vertical edges of canopies (Fig. 2) should receive an extra coat of fungicidal wash as these portions remain wet for a longer period and thus become highly susceptible to such growths. The wall above the sun-shades of door and window should also be given an extra coat of fungicidal wash.



Fig. 2. Exterior algae growth on parapets.

On decorated surfaces, the application of fungicidal wash will depend on the type of decoration and the extent to which it has been affected. In general the decoration that has been attacked should be removed and the surface sterilized by the application of a fungicidal wash. If the area of attack is limited, local stripping and sterilization may be all that is needed. The surface should then

be allowed to dry. The sign of any renewed growth on the treated surface should be given one more fungicidal wash before redecoration. The addition of toxic chemicals to oil paints, enamels or synthetic emulsion paints at the time of application is not advisable, since it is difficult to ensure thorough mixing and the performance and other properties of the paint are adversely affected.

There is a demand for short notes summarising available information on selected building topics for the use of Engineers and Architects in India. To meet the need, this Institute is bringing out a series of Building Digests from time to time and the present one is the 80th in the series. Readers are requested to send to the Institute their experience of adopting the suggestions given in this Digest.

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