

Aam Aadmi Series - 9

HOUSE BUILDING DIGEST

(Painting)



bmtpc

Creating Enabling Environment for Affordable Housing for All



Surface Preparation

This refers to the process of making the surface fit for paint application. For example, if you are painting your interior walls you would need to make them smooth by applying Plaster of Paris (POP) or Putty. Similarly if it is a wooden or metallic surface, removal of surface defects and cleaning of the surface becomes essential.

Painting

This includes the steps to be followed in getting the final paint film on the surface. This process is different for different types of surfaces. In any case, it involves application of base coat and application of the surface finish.

A majority of defects which may occur subsequently are on account of non adherence to the ideal painting process.

3. Types of Paint

There are two basic types of paint – water based (also at times referred as Latex Paints) and oil based. Water based paints are washable and dry quickly. On the other hand, oil based paints take longer to dry but they are very rich in colour and are durable. Both oil and water based paints are available in the market in a range of finishes from dull to very high gloss.



4. Market Availability of Paints

Paints available in the markets fall under three major categories viz. distemper, emulsions and solvent based paints.





Distemper

Distemper is perhaps the most economical type of paint available in the market. It can be classified as a "Whitewash" job. The major constituents of distemper are chalk, lime, water and some coloring agents if necessary. Distemper is a water based paint.

Emulsions

This type of paint is also water based and provides a rich and matt finish to interior walls. It imparts excellent durability to the painted surface and gives the walls a 'just painted look'. It is washable and the stains can be removed easily by wiping with a cloth dipped in a mild soap solution. The paint film is also fungus resistant.

Solvent Based Paints

Lustre paints, Enamel paints and oil paints all come under the category of solvent based paints. They cannot be pre-mixed with water. The advantage with these paints is that they really last long and produce rich and desiring effects on the wall.

5. Paint Selection

The type of paint to be selected i.e. whether it should be oil based or water based is influenced by a number of factors. Water based paints are economical and easy to apply. Glossy oil based paints tend to be more impermeable to water although they will bubble up if the surface beneath is damp. They are costly and involve professional skills in their application. At the same time they last longer and give a good finish.

Normally oil paints tend to peel off when subjected to daily temperature variations including alternative wetting and drying. Accordingly paints suited for exterior locations are to be applied for the exterior of houses.





Oil-based paints should not be applied directly to fresh masonry, or galvanized iron. In either case, it will probably result in a bad finish.

Oil-based coatings are a good choice in two circumstances. First when repainting exterior surfaces with heavy "chalking" and secondly when repainting any exterior or interior surface that has multiple layers of old oil-based paint.

Oil based paints are available in the market in readymade form. However they can also be made at home by mixing the different ingredients in proper proportions.

Water-based paints are said to have an upper hand for exterior applications as it allows the house to breathe and does not crack as readily.

Water-based paints are durable, dry quickly with little odour, and can be cleaned up with soap and water. Oil-based paints, though they hold up better over the long term, have stronger fumes, dry slowly, and require flammable solvents such as turpentine and paint thinner for cleanup.

Quality latex paints offer significant performance advantages as well. Compared to oil-based paints, top-quality exterior latex paints have greater durability, color retention, and chalk resistance, so they continue to look good for years.



Paint Shade Card

It is said that top-quality acrylic latex paints are an excellent choice when painting any of the exterior surfaces particularly in areas that experience freezing temperatures, newly plastered and masonry surfaces etc.





The home owner must select the paint properly in consultation with the architect.

6. Constituents of Paints

Water Based Paints

Water based paints are most commonly used for finishing various surfaces in the house. Also called latex paint, it has a binder that is dissolved in water. In general, water-based paints are less toxic and are odourless.

Oil Based Paints

Top-quality oil-based paints have excellent adhesion characteristics and they get a tight grip on the surface being painted as a good adhesion is essential for a durable paint job. However, oil-based coatings tend to oxidize and get brittle over time, which can lead to cracking in exterior applications, and yellowing and chipping in interior applications.

The constituents of oil based paints include the following:

- a. A base
- b. An inert filler or extender
- c. Colouring pigment
- d. A vehicle
- e. A solvent or thinner
- f. A drier

a. Base

It is essentially a pigment which forms a chief ingredient of paint. A base is generally a metallic oxide and is used in the form of a powder. The most important function of the base is to form an opaque coating to hide the surface to be painted.





b. An inert filler or extender

It is a pigment added in a paint to reduce its cost. It also modifies the weight of the paint and makes it more durable.

c. Colouring pigment

It is a white or coloured pigment to get the desired colour of the paint.

d. A vehicle

It is a liquid which acts as a binder for various pigments viz. base, extender and colouring pigment. It makes the paint in the state of a fluid thereby helping in spreading its ingredients uniformly on the surface to be painted. Refined linseed oil is commonly used as vehicle in oil paints.

e. A solvent or thinner

It is a liquid which thins the consistency of the paint and evaporates after the paint film has been applied. It imparts brushability, smoothness and easy flow. Turpentine, pure oils etc are commonly used as solvent or thinner.

f. A drier

These are materials containing metallic compounds and are used in small quantities for accelerating the drying of the paint. The commonly used driers are lead oxide, lead acetate etc.

7. Common Painting and Finishing Practices

The type of paint to be applied depends upon the surface to be painted (wall, plaster, wooden or metallic etc), its location (exterior or interior), aesthetics and the budget of the home owner. It can be in the form of whitewash, colour wash, distemper etc.





8. Painting on Plasters, Concrete Surface etc.

Plasters, concrete surface etc. can be finished with whitewashing, colourwashing, distempering or applying cement paints. Salient features of these are as under:

9. Whitewashing

Whitewash is a form of paint which is made from a mixture of slaked lime, chalk, water, and other ingredients. It is extensively used in India for painting wall surfaces.

Whitewash can be applied to brick, concrete and other wall surfaces. Before a new work is whitewashed the surface should be thoroughly brushed free from mortar droppings and other foreign matter.

Preparation

It can be prepared from fresh stone white lime. The lime has to be thoroughly slaked, mixed and stirred with sufficient water to make a thin cream. Indigo (neel) upto three gm per Kg of lime dissolved in water is usually added and stirred well.

Water is then be added @ 5 litres per Kg of lime to produce a milky solution. This has to be allowed to stand for a period of 24 hours and then screened through a clean coarse cloth. Gum @ 40 gm for each 10 cubic decimeter of cream dissolved in hot water is then added, the whole solution is kept properly stirred.

Application

White wash is then applied with *moonj* brushes to the specified number of coats. Each coat is allowed to dry before the application of the next coat. For new surface three or more coats are usually applied till the surface represents a uniform and smooth finish. Doors and windows and other surface should be protected from droppings and splashes while carrying out the whitewash.





The primary advantage to whitewash is that it is very economical and it is easy to re-treat the whitewashed surface on a frequent basis. Whitewashing is an easier way to brighten the interiors of the house even during the winter months.

10. Colour Washing

Colour washing is an improvement over whitewashing as it gives a better finish and longevity although it is comparatively costlier. The process of colour washing is almost the same as white washing except for a few variations.

For preparation of the colour wash, colour minerals which do not get affected by lime are added to white wash (neel is not to be added in this case). For new work the priming coat is of white wash with lime. Two or more coats of colour wash are then applied on the entire surface to give a smooth, uniform and even finish.

11. Distemping

Distemping is costlier than white or colour washing but cheaper than paints, easier to work and lasts longer. Distemping presents a smoother and distinctive appearance than an ordinary white or colour washing. Their performance is said to be better in drier climates. They are generally used over plastered surfaces to which a priming coat of whitening has been applied.

Distempers can be defined as water paints consisting of whiting, coloring pigment and glue mixed in water. Distemper may give a washable or non washable surface depending upon the medium used. They are of two types viz. Dry Distempers and Oil Bound Distempers (OBD).

The type of distemper to be used depends upon the location, i.e. interior or exterior. Distempers for exterior use are provided with weather resistant ingredients during the process of manufacturing..





Dry Distempering

Dry distempers provide slightly better finish than colour washing and accordingly adds to the cost and are readily available in the market.

For preparation of the material for application, dry distempers obtained from the market are stirred slowly in clean water (preferably warm) using about 6 litres of water per Kg of distemper and allowed to stand for at least 30 minutes (preferably overnight) before use. The mixture is stirred well during use to maintain even consistency. Not more than one days requirement has to be mixed.

Before application, the surface for application is scrubbed clean. Newly plastered surfaces should be dried for two months before application of distemper. The priming coat should be of whitewashing followed by two or more coats of distemper till the surface shows an even colour. The application should be with proper distemping brushes. The successive coats are to applied when the previous coat has dried.

12. Oil Bound Distempering (OBD)

Oil Bound Distempering gives a better finish and lasts slightly longer although they are costlier than dry distempering. Oil Bound Washable Distempers of approved brand and manufacture are easily available in the market.

On a new work, an undercoat of paint (primer) is applied to prepare the surface for application of OBD. The main function of the priming coat or primer is to provide the foundation for the subsequent coats. The primer can be a cement primer or distemper primer as per the recommendations of the manufacturer.

The distemper has to be diluted with water or any other thinner as per the recommendations.





Before application, the surface to be distempered has to be cleaned as usual by washing and scrubbing. The surface is then allowed to dry for at least 48 hours and then be sand papered to give a smooth and even surface. Any unevenness is removed by applying putty, made with 'Plaster of Paris' mixed with water, on the entire surface including filling up the undulations and then sandpapering the surface after it has dried. A 24 hour interval is to be allowed before application of the next coat. Brushes meant for the purpose are to be used for its application.

13. Cement Paints

Cement paints give good protection from severe climatic conditions like rain, heat, water, humidity, saline atmosphere near sea-shores. By its application, the growth of fungus and bacteria on masonry surfaces is also prevented. Such a paint hides out various surface irregularities, roughness etc. thereby giving smooth and pleasing appearance.

Cement Paint has to be mixed with water in two stages. The first stage comprises of mixing two parts of cement paint with one part of water and stirred properly and allowed to stand for five minutes. The second stage comprises of adding further one part of water to the mix and stirring thoroughly to obtain a mix of uniform workability and uniform consistency.

The solution so obtained is applied on the clean and wetted surface with brushes or spraying machines. The completed surface is watered after the days work. The second coat can be applied after 24 hours of the application of the initial coat. Three or more coats of water proof cement paint are found necessary to get a uniform shade.

Cement Paint are to be mixed in such quantities which can be used within a short time of its mixing.





14. Painting of Wooden Surfaces

The process of painting on new wood work broadly includes preparation of the surface, priming and finishing.

The woodwork to be painted should be properly seasoned, clean, dry and free from dust. The surface is smoothened by rubbing it with fine grade of sand/glass paper. The next step is to apply a priming coat on the wooden surface to fill the pores of wood by penetrating the primer in the wood. The main function of the priming coat or primer is to provide the foundation for the subsequent coats.



Painting a Wooden Door

After the primer has dried, the second coat or undercoat(s) are applied till a colour of almost the desired shade is achieved. The finishing coat is applied after the under coat has dried and an even shade is obtained.

15. Varnishing

Varnishing plays an important role in finishing wooden surfaces of doors, windows and floors etc. Varnish is also applied on unpainted furniture and other wooden surfaces to decorate the surface. Painted surfaces can also be varnished to enhance the appearance of the paint and increase the durability of the paint film.

The essential constituent of all varnishes is 'resin' which is dissolved in oils, turpentine or alcohol. The liquid dries or evaporates and leaves a hard, transparent and glossy surface.



Varnishing Wooden Surfaces





A number of types of varnishes are available in the market and the type to be used is dependant on the job to be done.

16. Wax Polishing

Wax Polish is usually applied on varnished surfaces to modify its elegance and protecting the undercoat. It is mostly used for polishing cement concrete, mosaic or terrazzo floors.

17. French Polishing

French polishing is a wood finishing technique which gives a very high glossy surface with a deep colour. It is a process and not a material. The finish is considered to be one of the most beautiful ways to finish highly figured wood, but it is also recognised to be sensitive to damage. The material is shellac, although there are several other shellac-based finishes.

In this type of a finish many thin coats of shellac dissolved in alcohol are applied using a rubbing pad. The process is lengthy and very repetitive and the finish is obtained through a specific combination of different rubbing motions.

18. Painting on Metal Surfaces

On metallic surfaces painting is done in two steps involving priming followed by a application of the finishing coat.

Most new metal products available in the market either in pre-finished form or primed form. Any bare un-oxidized surface should be primed with a proper metal primer. Ferrous metals (steel, iron) can usually be primed with a standard grey or white metal primer.

Primer

Galvanized metal should be primed with a product designed for that purpose. Usually White Galvanized Metal Primer is used for the





purpose. Further, Aluminum can be primed with the galvanized metal primer, or the standard grey primer. Latex also bonds to aluminum and can be used for a primer under latex finish paint.

On slightly rusted surfaces grey metal primer can be used for good results. For heavily rusted surfaces, red metal primer (Iron Oxide) is advised to be used.

Finish Paint

Once properly primed, most metal interior metal surfaces can be painted with almost any quality paint. However metal door and heat registers usually fair better with an oil based finish paint. Gloss Metal Enamels can also be used as finish paint as they provide the good durability although sometimes they are more difficult to work with. Semi gloss or eggshell gloss trim paint are said to be a good choice for steel doors.

19. Painting on Iron and Steel Surface

Metallic surfaces are painted for the prevention of rust as well as obtaining a good appearance. For the preparation of the surface, the rust is removed by scrapping while oil and grease etc can be removed by washing the surface with petrol or lime water. The dried and clean surface is given a priming coat which usually consists of paints with oxides of iron. Two or more coats are then applied either with brush or by spraying on the metallic surface. It should be seen that each coat is applied after the previous coat has dried.

20. Painting on Galvanised Iron Works

Galvanised Iron works are amongst the most difficult surfaces to be painted due to its inherent properties. It is always advisable to paint the surface after it has been exposed to weather for almost a year. The priming and finishing coats are applied as in case of other metallic surfaces.





21. Finishing on Plastered Surfaces

The house owner may also choose to directly paint the plastered surfaces for reasons of appearance, longevity etc by methods other than whitewashing, colourwashing and distempering etc. The preparation of the plastered surface to be painted requires a good amount of attention.

The plastered surfaces should be painted only after the surface has dried properly. In case of new work, the surface should be initially washed with dilute solutions of zinc sulphate. The holes should be filled with 'plaster of paris' and the surface rubbed smooth.

Primer for base coat can be prepared by mixing equal parts of white and red lead in linseed oil. After the drying of the priming surface, two or more coats of the desired paint can be applied.

New plastered surfaces can be painted quite easily with emulsion paints. Plastered or concrete surfaces can also be painted with cement paints.

22. Methods of Applying Paints

There are three main methods of application of paints viz., brushing, rolling and spraying. The method to be adopted depends upon a large number of factors including the type of surface, type of paint, budget of the home owner.

Application with a simple brush is the least expensive method and is the most popular although it is not the most effective. Brush marks may show up quickly on the surface if painting is not applied properly. Using a professional painter and a good quality paintbrush will help in improving upon the finish.

The second method is by the use of a roller. This is an easy method of application and the expenditure involved may not be very high, although a trained painter is required for the purpose. It is possible to get a very smooth finish by rolling.





Spraying produces the best results on surfaces. It gives a finish that is truly smooth although it is expensive and requires a professional painter to do the job.

23. Common Defects in Painting

Painted surfaces can display a large number of defects if the work has not been carried out properly or the quality of materials used for painting is not upto the mark. These defects may be in the form of blistering, peeling, efflorescence, chalking etc.

Blistering paint is identified by small to medium sized bubbles or blisters under the paint film. They can be removed by scrapping the blistered paint and letting the surface dry. Priming coat is then applied on the defective surface keeping it in shade and non-humid conditions and finally applying good quality paint.

Efflorescence usually occurs in painted masonry construction and is identifiable by crusty white salt deposits that bubble through the paint film. In this case the source of dampness should be identified and eliminated. All efflorescence and loose flaking, chalking paint is then removed by scraping with a wire brush before repainting. The area is then cleaned with a trisodium phosphate cleaning solution and rinsed with clean water. After complete drying the surface is then painted with a high quality latex house paint.

Chalking is identifiable as a fine chalky powder that forms on the surface of a paint film. Although some chalking is a normal, it becomes excessive in dry arid climates where there is little rain. For repairing the surface, work can be done in the same manner as for efflorescence.

Peeling paint is a very common paint problem but can be caused either by moisture or poor adhesion. Peeling due to poor adhesion is characterized by the paint peeling and separating from an earlier





paint layer. For repairing such surfaces the peeled paint surface is scrubbed followed by smoothening by filling up the scratches etc and finally repainting with a high quality acrylic latex paint.

When peeling occurs due to external moisture, the source of moisture is first removed and painting is done as in the earlier case. On the other hand, if peeling occurs due to interior moisture, it is advisable to provide proper ventilation in the affected area and then carrying out the repair in the aforesaid manner. The finish should preferably be done with high quality acrylic latex paint.

The measures suggested above are indicative only and it is advised to hire a professional for the purpose who would first identify the problem and give suggestions based on the local conditions.

24. Conclusion

It may be seen in the preceding sections, painting of different surfaces requires specific measures to be taken for each. The type of paint to be applied depends upon the surface and location to be painted, type and colour of the paint, budget of the home owner and the level of aesthetics desired to be achieved.



A Well Painted House





The quality of paint should be such that it can be spread easily, is longer lasting, covers large area for each fixed unit of paint and is also economical.

All painting processes should necessarily commence with the preparation of the surface, application of a primer coat and application of finishing coats to give a smooth and even colour, surface and finish, which is pleasing to the eye.

Various paint manufactures come out with their shade cards, colour schemes which even provide with the details of application for achieving best results. The house owner is advised to study them carefully before finalization of painting. The advice of the architect would be very crucial in this regard to give a decent look to the house.

This is the ninth of BMTPC 'HOUSE BUILDING DIGEST SERIES' for creating awareness about construction of a house.



BMTPC

The Building Materials & Technology Promotion Council (BMTPC) was setup in 1990 as an inter ministerial organisation under the Ministry of Housing and Urban Poverty Alleviation to bridge the gap between the laboratory research and field level application.

VISION

BMTPC to be world class knowledge and demonstration hub for providing solutions to all with special focus on common man in the area of sustainable building materials, appropriate construction technologies & systems including disaster resistant construction.

MISSION

To work towards a comprehensive and integrated approach for promotion and transfer of potential, cost effective, environment-friendly, disaster resistant building materials and technologies including locally available building materials from lab to land for sustainable development of housing.

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