Sketching and model Making
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Lecture
Painting and polishing

1. Painting and Polishing

Painting is the process of applying paint, pigment, colour or other medium to a solid surface. The medium is commonly applied to the base with a brush, but other implements, such as knives, sponges, and airbrushes, can be used. Painting in done in two phases:

First the painters will apply the primer and putty. They will try to fill some of the cracks in the walls and smooth the surfaces. This step can be done almost at any time after the floor tiling is done. The main painting is done in the second phase. Here they further open up existing cracks, fill them up with lambi, do minor PoP finishing, and then do the painting. The actual painting is done in two coats and does not take very long. The general trend is to choose a cream or white or a pastel color for the bulk of the walls, white for the ceiling to get maximum light reflection, and then highlight one of the walls in the room, typically the TV wall or the bed wall. Note that this can also be done with wood and laminates, and wallpapers. There is too much choice in wallpapers which you can find in laminate shops such as Dalal's as well as specialized wallpaper shops in Timber Market. Selecting paints is tricky. You get extensive catalogs with hundreds of colors but the colors do not look the same

on the wall as in the catalog. It is pretty difficult to choose highlight colors and we spent quite some time on it :). Also the sample paints are available in a minimum quantity of 250 or 500ml so you end up spending quite a bit on every sample you try. You also get some fancier textures for highlights, glow-in-the-dark paints, etc. These will cost more and there are limited shade choices for textures. There are different kinds of paints and textures for outside walls which are exposed to water. Your painter should be able to recommend the right paint to use. Navnitlal and sons in Camp area is a good shop to see catalogs for paint choices; they also have some panels to display different textures, etc. Actual paint can be purchased at any shop. Painting is charged on a per sq. ft. basis. The rate is around Rs. 20-25/sq.ft. This is inclusive of all the material and labor. Ideally the labor has to cover all your belongings properly but they do not do a very good job and end up spending a lot of time cleaning up the mess. And they may not do a very good job at the end of it. So be careful to warn them earlier on to cover your stuff well.

Polishing is a process to generate a reflective surface. Normally, the polish is generated by using a fine-micron or sub-micron abrasive particle in combination with a liquid. Polishing is a "wet" process. Often the polishing process utilizes a pad to contain the abrasive, so polishing may not be a "loose abrasive process." The pad is softer than the part. Very little material is removed during the polishing process, normally measured in microns. The surface finish of the work-piece to be polished must be of a high quality prior to the polishing process taking place.

Painting and polishing go hand in hand; so much so that ideally they should be done by the same contractor. Polish can get on to painted surfaces and paint can get on to polished surfaces. If you have two contractors, cleaning and finishing falls between the cracks. We got polishing done before the painting, but had the polish guy come back for a day or two after painting to touch up some of the polish that had been covered by paint. But there was a lot of back and forth about who would do what cleaning; from that perspective its best to get a single contractor. Also get a painter who will do minor PoP work too. We had some minor PoP work to do but our painter would not do it and we could not get a PoP guy to come for such small work. We had to really convince our painter to do this small work for us, and it is generally the norm that the painter can do some minor PoP work for last-minute finishing.

Polishing is a major item when you use veneers in your furniture because the entire furniture piece has to be polished. Since we did not use veneers, I do not know how much it costs or how long it takes. We just did minor polishing for the edges of our furniture where they put the wooden lipping patti. My guess is that this edge-polishing is more costly since it has to be done by hand whereas they just use spray machines for polishing entire pieces of furniture. All such polishing is charged on a running-foot basis with the material provided by the polish fellow. Polishing teams work like carpenters - long hours. Its best to sync up the carpenters and polishing teams so that their work can overlap and you can save some time. Without veneers, our polish work for furniture in about three rooms hardly took a week. You have to be careful about examining polished work as its very easy to miss small parts. And choose your colors well. If you are re-using material from old furniture, lighter polish does not apply well on darker surfaces from an earlier polishing job. Its best to stick to darker colors as much as possible.

There are three types of polish:

1. Natural polish: This will leave the natural color of the wood underneath. It will not match the laminate color. Its the cheapest option around Rs. 10/r.ft.
2. Color polish: As the name suggests, this will match the color of the laminate. It will cost any where from Rs. 12/r.ft. to Rs. 20/r.ft.
3. Melamine polish: After the color polish, melamine is sprayed on the surface to make it last longer. You can get a glossy or a matte finish. This is the most expensive polish and can cost between Rs. 15/r.ft. and Rs. 25/r.ft. You can do melamine polishing in the more visible and high-usage areas such as living room pieces and cupboard doors, and stick to regular color or natural polish on inside surfaces such as shelves, drawers, etc.

2.0 Painting Tools and Materials

To apply the paint we require painting tools and painting materials as listed below in order to successfully complete any painting project:

- Step ladders and extension ladders – to help you reach elevated areas
- Paint scraper – to remove loose or peeling paint from wood, plaster, and other surfaces

- Triangular-load scraper – to remove paint in small or tight areas
- Steel wool – to remove corrosion from metal surfaces
- Bristle brush – to clear loose material from masonry
- Wire brush – to remove efflorescence and loose material from masonry, or to remove loose, flaking paint
- Putty knife – to scrape away loose paint, or to apply filler
- Broad putty knife – to fill in and smooth patching compounds in plaster and wallboard
- Glazing compound – to replace cracked, broken, or missing panes of glass
- Spackling paste – to fill nail holes and small imperfections in walls
- Long-handled brush – to clean large exterior surfaces
- Scrub brush – to remove mildew and dirt
- Sandpaper (various grits) – to smooth and feather previously painted surfaces, or to roughen glossy surfaces so paint will adhere better
- Sanding block – to hold sandpaper and help you sand surfaces to an even finish
- Caulking gun – to apply caulk to cracks in walls, gaps, and seams in woodwork, and the junction of different surfaces (e.g., wood siding and stone)
- Tubes of caulk – same as above (note that all-acrylic and siliconized acrylic caulks are paintable; silicone caulk is not)
- Masking tape – to protect window panes and trim from paint
- Paint guide – to protect carpets and walls when painting baseboards and other trim
- Roller tray and grid – to load rollers with paint
- Brush comb – to clean paint brushes
- Paint pail – to mix paint and carry it to the worksite
- Drop cloths – to protect furniture, floors, and shrubbery from paint

https://www.thebesthomeappliance.com/best-house-painting-tools-and-equipment/

https://www.homestratosphere.com/types-of-painting-tools/

https://www.homestratosphere.com/types-of-painting-tools/

3.0 Surface Preparation before painting metal surfaces

Adequate surface preparation is a vital prerequisite for ensuring the quality and longevity of metal coatings. Without proper preparation, even the most advanced metal coating technologies will fail. The various steps to be followed for preparing metal surface before painting are:

1. **Clean the surface**. Properly prepare new metal surfaces by using mineral spirits to remove grease and apply a rust-inhibitive primer before painting. For painted surfaces that are in sound condition, remove dust with a clean, dry cloth, de-gloss the surface with light sanding, and wipe with mineral spirits to ensure good adhesion. To remove persistent dirt, wash surfaces with a mild detergent solution or with a commercial product recommended for cleaning painted surfaces.
2. **Remove loose and peeling paint**. If the old paint is in poor condition, you can remove it by hand wire brushing, sanding, or scraping. Since these methods are labour intensive and usually fail to deliver the results expected, many professionals opt for power tool cleaning, which can help remove paintphoto_100.jpg quickly and easily. However, one drawback of using power tools is that they can polish metal surfaces, potentially causing paint-adhesion problems.
3. **Remove rust.** When preparing metal for paint, checking for rust is important to make sure that the paint will adhere properly to the surface. To restore lightly rusted metal

surfaces to their original state, use a brush to clean off loose rust, sand the area, and apply a high-quality rust-inhibitive primer (e.g. Rust-Oleum Rust Reformer). Also known as rust converters, rust-inhibitive primers can be used to cover rusted spots and turn them into non-rusting, paintable surfaces.

4. **Repair small holes and dents.** To repair holes and dents, sand the area until you reach bare metal and wipe with a degreaser mixed with mineral spirits. For small holes and dents, inject an appropriate epoxy-based composite directly into the hole and/or dent. For larger holes, apply epoxy filler to the edge of the hole, cut a piece of fiberglass mesh approximately one inch larger than the hole, and press it into the filler. Then, cover the mesh with epoxy, working your way from the edge toward the center of the hole.
5. **Prime the surface**. Priming is a very important step in preparing metal for paint, especially if the surface will be exposed to moisture. To select the right primer, the type of metal to be coated along with the desired appearance, performance requirements, and environmental conditions should be considered. To begin with, water-based (latex) primers shouldn't be used on metal surfaces, as moisture can seep through and cause paint to fail within weeks or months. Professionals recommend two types of metal primers: the rust converters mentioned above and galvanized metal primers. While a rust converter is ideal for preventing rust from recurring and making a rusted surface easier to paint, a galvanized primer is appropriate for metals (e.g. aluminum) that prevent paint from adhering to the surface. You can also find iron oxide and zinc chromate primers, which can be used on most metal surfaces, including interior and exterior iron and steel.

Priming immediately after cleaning the surface is imperative to prevent dust or dirt from accumulating and flash rust (rust that occurs within hours) from forming.

4.0 Surface Preparation before painting wooden surfaces

The wooden surface to be coated/ painted must be seasoned (moisture level between 10-15%). It indicates proper level of moisture and treatment to prevent deformation in extreme hot/ cold climate. In the case of new wood surface, sand the surface with emery paper along the direction of the grain of wood to remove the roughness. Follow this by applying suitable wood filler. The purpose of the filler is to fill the grains and pores, and it should not be used as putty. The excess filler must be removed by strokes along the grain pattern. After 30

minutes, the filler may be applied again if required. Allow 2 to 3 hours drying time. Sand the filled surface with emery paper no. 320. Staining with Apcolite Wood Stains is optional. Do not use Apcolite Wood Stains on exterior wooden surfaces.

For, Painting New Wood, it must be ensured that the surface to be coated is free from dust. Choose any transparent coating from Asian Paints like Touchwood, Melamyne or PU Clear Finish. Two to three coats of finish coating application are recommended to achieve the best results in terms of gloss and decorative appeal. Containers should be tightly closed after use.

Previously painted wooden surfaces must be thoroughly sanded to remove any dust or grease. Apply wood primer by brush after thinning to given ratio by recommended thinner. Allow it to dry for 6-8 hours before applying putty or lambi.Sand the applied putty with sand paper no. 180 and apply 2nd coat of wood primer. Begin painting the wooden surface with top coat.

For Pre-Polished Wood following are required to be done:

Sand the surface along the grain with emery paper no. 180 followed by no. 320 to get a smooth uniform surface.If staining is desired, completely remove the old finish. Wipe the surface free of loose dust. Proceed with the finish paint coats as explained above.

Weathered wood can pose a real challenge for a homeowner trying to revive the look of his furniture, trim, siding, or deck. To learn how to properly prepare wood for painting, review our helpful guidelines on wood preparation, including cleaning, sanding, repairing flaws, and priming.

Cleaning Surfaces: Old paint in sound condition usually delivers an excellent base for a new coat of paint. In this case, cleaning wood surfaces with a trisodium phosphate (TSP) and bleach solution or a substitute is the only thing you need to do to prepare wood for painting. TSP is a potent cleaner, degreaser, and deglosser, which cleans surfaces and breaks down the glossiness of the previous paint coat to ensure a good bond between the surface and the new finish. Additionally, using TSP-bleach on areas affected by mold will not only remove mold and unpleasant stains but also kill off mold spores, preventing future recurrences. According to experts, the easiest method for cleaning exterior surfaces is pressure washing.

Sanding: Before painting new wood, sand all surfaces and edges lightly to smooth the grain. Then, remove the sanding dust and apply a suitable primer. To prepare previously painted wood, strip off cracking, flaking, or chipping paint, sand the surface with 180-grit sandpaper, remove the dust, and wipe with a damp sponge. Another thing you should do is to look for soft, crumbly wood, which could indicate the presence of dry or wet rot, typically occurring in hot, damp climates. While small areas of rotten wood can be scrapped off, cleaned out, and treated with fungicides (substances that kill off wood rot fungus and spores), badly damaged sections should be replaced with new wood. To prevent recurrences of rot infestations, treat new wood with fungicides and/or preservatives. Since each type of wood preservative has different uses and risks, we strongly recommend that you check out EPA's website before opting for a specific product.

Patching Holes, Dents, and Cracks: You can find a variety of wood repairing products, ranging from oil-based fillers and epoxies to colored wood patch materials and paintable latex caulks. When choosing a wood repair compound, consider whether it's designed for interior or exterior wood repair and whether you're going to paint, stain, or varnish woodwork. If you intend to apply a stain or varnish, make sure that you choose a filler that won't be visible through the final finish. Also, fill the gaps between woodwork and walls, and sand all repair areas for a smoother appearance.

Priming: According to an old adage, "a paint job is only as good as the preparation that precedes it." This is also valid for priming. Choosing the right primer and applying it correctly will ensure a uniform, smooth, long-lasting paint job. Besides improving topcoat adhesion, the right primer can prevent flashing and block the stains that may seep through the top coat. You can use the primer as it is or tint it to match the final shade. When priming, follow the manufacturer's recommended mixing and application techniques, drying times, etc. To get a smooth surface, re-sand it lightly before applying the paint.

5.0 Primer Application

Primer is an undercoat that you paint onto the wall before painting it with color. If you're changing the color of your wall from very dark to very light, priming it first will make it easier to cover with the lighter color and could save you from applying a second or even third coat of paint. No matter what type of surface you're painting, it has to be clean, free of loose

or cracked paint, rust scale, oil, grease, dirt, mildew and chemical residue before application of primer. Primer or undercoat has two main purposes:

1. to seal the substrate in order to prevent the chemistry in the substrate from migrating into and interfering with the chemistry of the finish coat;
2. to help bind the finish coat to the surface being painted.

There is a specialty primer for just about every type of surface - wood, masonry, metal, etc. Essentially, the primer serves as a foundation that supports the finish coat. Understanding this should help you understand the importance of primer. Primer is a paint product that allows finishing paint to adhere much better than if it was used alone. It is designed to adhere to surfaces and to form a binding layer that is better prepared to receive the paint. Compared to paint, a primer is not intended to be used as the outermost durable finish and can instead be engineered to have improved filling and binding properties with the material underneath. Sometimes this is achieved by chemistry, as in the case of aluminium primer, but more often this is achieved through controlling the primer's physical properties such as its porosity, tackiness, and hygroscopy.

In practice, primer is often used when painting porous materials, including concrete and wood. Using a primer is considered mandatory if the material is not water resistant and will be exposed to the elements. Priming gypsum board (drywall) is also standard practice with new construction because it seals the wall from moisture and can prevent the growth of mold. Primers can also be used on dirty surfaces which cannot be cleaned or before painting light colors over a dark finish.

Some primers can be tinted to match more closely with the color of the finishing paint. If the finishing paint is a deep color, tinting the primer can reduce the number of layers of finishing paint that are necessary for good uniformity across the painted surface. Primers are also used to hide joints and seams to give a finished look.

Some primers require that the topcoat be applied within a certain amount of time after the primer dries to ensure optimal adhesion. This varies from 24 hours to up to two weeks after the primer has dried. Painting after the suggested time-frame may cause performance issues depending on the specific situation. It is common to apply the finishing coat of paint before the primer fully cures in order to improve adhesion between the primer and the topcoat. The

level of exposure, such as indoors versus outdoors, may affect how important applying the topcoat within the time-frame will be.

5.1 On wood

Wood is very porous and will absorb the solvent in paint and cause it to dry more quickly. This is undesirable because most paints undergo chemical reactions during the process of curing (for example, latex- and alkyd-based paints polymerise when curing) which is dependent on the water or solvent evaporating slowly. A layer of primer will prevent the underlying wood from prematurely absorbing the solvents in the finishing paint. Primer can reduce the number of paint coats needed for good coverage and even color. A thin layer of paint may still be permeable to water. Water can permeate into the wood and cause warping, mildew, or dry rot. Primer improves the waterproofing of the finish. Primers are often comparable in price to finish paints and the price is influenced by the quality of the ingredients. Primers for some specialty applications can be expensive. Primers are not used as part of a wood stain treatment because they obscure the wood grain. Primer differs from wood sealers in that sealers typically don't obscure the wood grain completely.

5.2 On metal

Some metals, such as untreated aluminium, require a primer; others may not. A primer designed for metal is still highly recommended if a part is to be exposed to moisture. Once water seeps through to the bare metal, oxidation will begin (plain steel will simply rust). Metal primers might contain additional materials to protect against corrosion, such as sacrificial zinc.

Metal hydroxides/oxides do not provide a solid surface for the paint to adhere to, and paint will come off in large flakes. Using a primer will provide extra insurance against such a scenario. An additional reason for using a primer on metal could be the poor condition of the surface. A steel part can be rusty, for example. Although the metal can be thoroughly cleaned by blasting, when this is not possible then special kinds of primer can be used that chemically convert rust to the solid metal salts. Even though such a surface is still lacking in comparison to new metal, it is much better than weak, porous rust. Painting and gluing aluminium is especially important in the aircraft industry, which uses toxic zinc chromate primers and chromating to add the necessary adhesion properties.

6.0 Painting Wood

Apply wood primer by brush after thinning it to the specified ratio with the recommended thinner. Allow it to dry for 6-8 hours, then apply putty or lambi.Sand the applied putty with sand paper no. 180 and apply second coat of wood primer. Now the wooden surface is ready for painting with the top coat. Enamels are normally applied by brushing, although they can also be sprayed. Enamels take longer to dry hence, extra care must be taken to ensure a dust-free environment while the paint is drying. Two coats of paint are sufficient in most cases, however, if the earlier paint shade was significantly darker than the new one, an additional coat of paint is recommended.

7.0 Painting Metal

Painting of a metal surface depends on good adhesion, and paint adheres best to surfaces that are well prepared, clean and free of contaminants. It is important to ensure the surface is in this condition before coating it, as the avoidance of important steps in surface preparation can cause even the highest quality of metal paints to fail. Inadequate surface preparation is the number one cause of metal coating failures. Iron and steel are two of the most commonly used metals, with both types of metal being subject to corrosion and rust. Rusting of metals can cause disintegration resulting in the weakness of the structure. To ensure the longevity of these metal surfaces, below are the recommendations for the protection of the two of the most common metal surfaces: ferrous and galvanised.

Preparing Ferrous Metals for painting

Ferrous metals contain or derive from iron that is commonly used in the manufacture of castings, fabricated sheet steel, and wrought iron. With the exception of stainless steel, all of these metals will rust, which can eat away at the metal as well as spoil its appearance and undermine any applied coatings. Rusting can start almost immediately when the unprotected ferrous metal is exposed to the elements such as rain, snow, or moisture in any form. it is in your best interest to stop any rusting that has begun by keeping the moisture and air from interfacing with the metal after painting. Therefore, ferrous metals require very thorough surface preparation. Anything less than this will not only seriously compromise the integrity of the metal itself but also the appearance and durability of the finished paint job.

The importance of metal surface preparation

The first step to preparing a ferrous metal surface is to ensure that the surface for painting is noncorrosive by removing any loose rust and peeling paint. For smaller surfaces, using a

chisel-style scraper will take off heavy rusting and loose paint then a hand-held wire brush will remove any of the rust residue left. However, it is not necessary to remove every bit of rust to take the surface down to the bare metal, but rather to remove as much rust as these tools can allow. On larger surfaces, power wire-brushing or disk sanding with aluminium oxide paper are effective methods. Whatever the chosen method, it is important to wear PPE (personal protective equipment), including eye protection and a good dust mask.

Note: Wire-brushing will leave surfaces with rust residue/small particles of loose rust and dust, simply brush these particles with a soft bristle brush followed with a thorough rinsing with clean water.

If you are working with a new iron or steel surface, surface preparation is equally as important. New ferrous metals often are covered in mill oil on it and in some cases, have small amounts of rusting that is not visible to the naked eye which will often result, in the premature failure of the paint job.

See the following links to get the practical idea of painting.

https://www.wikihow.com/Prepare-Exterior-Wood-for-Painting

https://inspectapedia.com/BestPractices/Paint_Surface_Preparation.php

https://www.doityourself.com/stry/metal-paint-primer-when-is-it-necessary

8.0 Spray Paint Metal

The spray painting is done with the help of spray guns. The various steps to be followed are:

Step 1

Proper surface prep is essential for spray paint adhesion, so sand or brush off all loose paint and rust spots. Because shiny objects seldom allow paint to bond well, use the metal brush and sandpaper to lightly scour and dull the surface till it looks lightly scratched, almost like brushed nickel. A very lightly scoured surface will help paint bond; don't be overly zealous or you'll get gouges or scratches.

Step 2

Wipe thoroughly with clean, dry cloth to remove any dust, dirt, and debris. You may need a water-dampened rag to remove stubborn crud, but ensure metal is 100 percent dry before painting.

Step 3

Prepare your work location, which ideally will be outdoors and protected from wind. Not only can wind blow leaves and pollen onto your project, it can literally push your paint around, causing uneven results. If working indoors, ventilate the area well, opening doors and windows. Move all furniture from the area or cover with drop cloths, and also protect floors with drop cloths or newspaper for as much as 10 feet around your work zone for large projects. Using masking tape, tape off areas of your piece that you want to keep unpainted.

Step 4

Get your mask, gloves, and goggles on and test your spray paint to ensure it provides a thin, fine mist. Shake the can vigorously for 45 to 60 seconds and spray onto a cardboard box or the bottom of your project. If you see spitting or uneven spray on a new can, return it for a replacement. Spitting can mean a malfunctioning nozzle, but it also might be a bit clogged; if dealing with a can of paint you've had for a while, try cleaning the nozzle with warm water. If that doesn't resolve matters, dab lacquer or paint thinner onto the nozzle with a rag, then wipe it off and test it again.

Step 5

If your paint doesn't include primer, follow the painting techniques in Step 6 with a spray primer formulated for use on metal, such as Rust-Oleum Metal Primer Spray Paint (view on Amazon). Allow it to dry thoroughly before repeating Step 6 for your first colour coat.

Step 6

These techniques will ensure smooth, even results. Repeat with as many as three applications, working in light, even coats.

- Always begin and end spraying *off* your project, by simply spritzing the air beside it, to ensure that once paint hits the target, you're shooting a steady, even, misting spray.
- Holding the can a foot from the painting surface, aim the light, fine mist on the object and sweep side to side or up and down to coat the width or length of your project. Each time you complete a single pass or row, stop spraying and give your can a quick shake for 5 to 10 seconds, then start spraying off the item before you do another pass. For every new spray, overlap with the last row of paint. Briefly shake the can regularly throughout the process.

- If painting larger items, like bookshelves or an iron fence, step along sideways toward the direction of your spray. If you only move your arm, you may not maintain the same density of spray.

- Pausing even briefly, or hovering, while spraying can create drips or spots. If this happens, remove all excess wet paint with a clean, dry, lint-free cloth. If you don't notice these drips until after the drying process, sand them down with a fine-grit paper and dry-wipe the dust off.

Step 7

If you get paint on anything accidentally, use the label-recommended paint thinner or cleaning agent and a rag to clean up as soon as possible, before paint dries or cures. Then allow your project to dry thoroughly. Drying time varies by paint type, coat thickness, and even weather and humidity—it could take anywhere from three hours to overnight. Just be sure to wait 24 hours before using spray-painted items.

See the following links for practical understanding of Spray painting.

https://www.doityourself.com/stry/10-tips-for-spray-painting-metal

https://www.doityourself.com/stry/metal-paint-primer-when-is-it-necessary