Building Materials III

Lecture 7

Paints

The most people paint is the colour on the walls of their home, the colour of the car, boat or caravan. So when we think of paint the first thing that comes to our mind is correct. we look at paint think of a colour much more than just a colour, the properties it possess and the uses it applies to former or just aesthetic value of colour. Paint is more than just a colour. It is a material that is applied as a liquid and dries by a variety of chemical process to a solid. So it is basically a liquid and after being applied on a on a particular surface it dries up to become a solid. There are various reasons why paint is applied in being just aesthetic. So we apply paint for decoration, we apply for protection, apply it in many cases for the sake of identification, when you have to identify a particular place or a particular use of a building, a paint comes into play and we also use it for sanitation. So paint is any liquid, liquefiable or a mastic composition that after application to a substrate in a thin layer converts to a solid film.so as I told you paint is a liquid film which after being applied on a particular surface becomes a thin solid films. It is not necessarily a solid particle but more of a sheeting of a solid film that gets prone. So it is most commonly used to protect colour or provide texture to objects. So paint is something that is applied to surfaces to objects or large areas in order to protect colour provide texture to those particular surfaces. Paint can be made or purchased in many colour and in many different types such as watercolor, synthetic etc. Paint has been evolved from a very long time and it has been differentiated into different types based on many reasons. So a paint can be differentiated based on the composition it's making, it can be differentiated in the way it has to be used and it can be differentiated in the way based on aesthetic value it provides. And it can

also be classified based on special purpose such as waterproof, high lustrous etc. Paints typically stored, sold and applied as liquid, so it is found in liquid form and after applying it becomes solid. But most types dry into solid. So paint is something that dries out and not necessarily cures or it is installed. So we will have a brief look at its history. In 2001 and 2004 South African archaeologist the reported finds in blombos cave of a hundred thousand years old human made ochre based mixture. So initially paint was made from vegetable dyes or such natural fiber. So human made ochre based mixture hundred thousand years old was supposed to be found. Further Excavation in the same cave resulted in the 2011 report of a complete toolkit for grinding pigments and making a primitive paint like substance. So initially in the beginning of mankind paints have certainly been used in the form of pigments, so they were able to find tools that were actually helped in making that were grinding pigments in order to make paint like substances. Paint was then used to signify personal, personal identification and it was used to express ones imagination on the walls of the caves. Itwas also used to signify identification in terms of danger etc. Cave paintings drawn with red or yellow, ochre, hematite, manganese oxide, and charcoal may have been made by early Homo sapiens as long as 40000 years ago. So that is how the old paint and that is how it has been used. Even though it has been evolved into many forms in various categories it will have its application in very much today. So furthermore ancient colour walls at dendera Egypt which were exposed for years to the elements, still possessed the brilliant colour. So colour is the most important feature of paint and that has been retained for so many years. It has been found in Egypt as so many other things are.pliny mentions some painted ceiling in his day in the town of ardea which had been done prior to the foundation of Rome. So even before the foundation of Rome was being laid found in the Egypt in surface and ceilings? In 1718 Marshall Smith invented a machine or engine for the grinding of

colours. So with the evolution of the industrial age paints were also promoted from just being pigment so just small scale things rather manmade or hugely manufactured substances. By the Proper onset of the industrial revolution paint was be in ground in steam powered Mills. So now we will look at some of the properties of paint. Why, it is very famous and it last for so many years. So paint typically consists of a pigment, resin, solvent and additives. Initially it was only natural pigment. But today it consists of resins, soluble in solvents and additives. So we will talk about these 3 primary important things. Pigment- it provides colour hiding and control gloss. Pigment are usually divided into two groups. One called Prime pigments includes pigments such as titanium dioxide which is basically white colour, chrome green oxide which provides green, yellow and red iron oxide etc. Which are the other primary colours that are provided. The other group of pigment is called extender pigments. So apart from these colours adding these additives sends the pigments. And includes calcite, talc mica, barites which is nothing but barium sulphate etc. So let me talk about the next component risen. The Binder to hold the pigment particles together and provide adhesion to the surface painted. So you have pigments that basically provide colours. Now it needs to be in a medium that can be painted around. That is the role of a resin which holds the particle together. So resin Binder to hold the pigment particles together and provide adhesion to the surface painted. Water borne Paints most often use acrylic emulsion polymers as binders. So there are various types of binders to a label. So based on that paints get differentially categorized. This come in a wide variety of types and combination as I said. This is the final product. Solvent- to act as a carrier for the pigments and resin the solvent may be organic or water. So in order for these particles to be held together and spread over various surfaces in its particular area solvent is what is used. The additives are something that enhance certain properties such as ease of brushing, mould resistance, scuff resistance,

drying and sag resistance. So paint needs to have the various set of physical properties that basically enhance by adding additives. So besides that the property of any particular good paint when you go to choose any particular paint, the paint should have the following aspects. A good paint should have the following properties.Obviously the paint was going to be applied on a large surface area so it has to be readily available and. The paint should be cheap. It should be easy and harmless to the user.It should retain its original colour for the long time.It should be able to cover maximum area of the surface with minimum qualities. So as I said it covers large area so minimum quantity should be able to suffice for that it should be able to retain its original colour for a long time. So a particular colour after a long time it fades out or passes away. It becomes rather very bad to look at it. So a particular paint should have a good property of being able to retain for a long time in its original form. The painted surface should dry neither too slowly nor too rapidly. When applied, the paint should form thin uniform film on painted surface. So when you paint on a particular surface it shouldn’t have undulations it shouldn't have various air gaps or air bubbles wrapped inside. It also should not try too rapidly or it should not take too long. So when you apply paint on particular paint on a particular surface it should be dried up in a particular amount of time such that it spreads evenly and stays for a longer time. Furtheron, the pain should form a hard and durable Coat on the painted surface. And the paint should not be off from the painted surface. It should be good fire and moisture resistant. So apart from it being basic physical requirement should also have fire retardant and moisture resistant properties? The painted surface should not show any crack. So these are the various things that the paint should account for. We will be looking at the defect works one particular paints. It need not have cracks such things which makes it a good paint. The painted surface should possess attractive and decorative placing appearance. Last but not least the visual property of the paint is most

importantso it should possess attractive and decorative pleasing appearance. Atmospheric Agencies should not be able to effect that painted surface. So it should be able to resist the weathering crust because in most cases paint is applied in exterior places where it is open to the air. So how does a paint exactly work? Water borne Paints are usually based on emulsion resins. As the water in these paints evaporates the resins and pigment particles get closer and closer together until they begin to touch each other. so we have Already explained that paint is nothing but a liquid which dries up to form of solid. So how does this happen? as the water in these paints evaporates the resin and the pigment particles bond together and come closer and touch each other. The resin particles touch each other and the pigments, they stick together and fuse into a tough elastic solid which we recognise as paint film. So this is what happens, they stick together and they are born in such a way that they do not apart after that and they fuse together to form a tough Elastic solid. Which is at thin film which is called as paint as we know. Solvent Borne enamel Paints are based on alkyd resin dissolved in solvent. So these are the various types of paint. When the solvent evaporates the first stage is the formation of tacky lacquer. The alkyd resin progressively reacts with oxygen from the atmosphere and polymerizes to form a hard tough coating. So this is another type of paint and this is how it forms polymerization plays an important role. Two component protective coatings paints are unreactive on their own, but when mixed together undergo chemical reaction. So apart from it from being just a normal reaction of drying up it can also be accounted for let’s say undergoing chemical reaction. The chemical reaction takes few hours depending on the temperature that is prevalent in and results in an extremely tough hard coating with great adhesion. So we look at how a paint has evolved in history. We looked at how paint dries up to form a solid film they looked at the properties that make a good paint.

Defects in Paints

Now we will look at the defects in Paints and how it can be accounted. There are various Defects in Paints in various composition it is made of and various weather or atmosphere it is exposed to. The defects which are commonly found in paint work are as follows.

Blistering: Formation of bubbles like shapes on the painted surface is known as blistering. The primary cause of this defect is water vapor. So blistering is something that is even prevalent in the human skin. Similarly the trapping of air bubbles in the paint film is what is called as blistering and the main reason for this is water vapor. So this is very prevalent in areas where the moisture content of the air humidity is higher.

Blooming: Formation of dull patches on the painted surface is known as blooming. The primary cause of this defect is poor quality of paint and improper ventilation. So when you paint in an enclosed place where there is less ventilation what happens is the paint starts to form dull patches which is called as blooming. Thesedull patches are resultant of very poor quality of paint and also because of very poor ventilation.

Fading: This is something which is very common. So we see paint fade after a particular amount of time number of years. When there is a gradual loss of colour from the painted surface, it is known as fading. Simple as that. The main cause of this defect is the reaction of Sunlight on the pigment of paint.so the direct harm of the sunlight, reaction of paints to the sunlight and UV for that matter results in fading. So we have many types of paints today that claims to be resistant to sunlight and UV. So the main advantage that they offer is against fading.

Flaking: In this type of defect some portion of the paint film is not stuck properly with the surface. Resulting flaking off of the paint layer. So we have painted layers where some of the parts of the paint begin to peel off as said this is called flaking. This is because the portion of the paint is not stuck very firmly. This is caused due to poor adhesion between the paint and the surface to be painted. So the composition of a particular paint and how it is made and the surface in which it is going to be painted also effects how the paint reacts. So even the surface is not very good and it does not react well to the surface flaking occurs.

Flashing: Another defect. Presence of glossy patches on the painted surface is known as flashing. The cause of this defect is mainly due to poor workmanship cheap paint or weather actions. So there are various reasons how the defect in Paint occur. Particularly workmanship have a big defect on the paint. Cheapness in Paints, when you go for cheap Paints obviously the property begins to detoriate a little bit. And also the weather reactions of a particular paint makes it very glossy at some points alone. This is called as flashing.

Grinning: If the thickness of the final coat of paint becomes very thin, the background can be seen clearly. This is known as grinning. So a very interesting way to put it, when you have a paint over a particular surface it either flows off or sags off feeling the original surface. This is called as grinning where the defect in the original layers is seen. Show a particular purpose of the paint is to cover the main surface behind it. So when this is particularly seen, it is actually a defect called as grinning. The reason for this is that Poor workmanship is the main cause. So poor workmanship are not applying paint in every even form of manner results in grinning. So this is something like flaking. There are other types of defects in Paints as well.

Running: This is a very common type of defect in Paint which we can experience if the mixing is of a particular paint is not proper. This type of defect is seen when the surface to be painted is very smooth. So even the surface effect effects this. If the surface of a particular area in which the paint to be applied is particularly smooth or lustrous or glossy it results in running of the paint. In case of smooth surface the paint Runs back and leaves small areas of surface uncovered. Sothis is also particularly a problem in the surface is vertical and particularly smooth.

Sagging: This type of defect is more prominent when a thick layer of paint is applied on a vertical or inclined surface. As I talked about, sagging is nothing but other form of running, it is particularly applied to vertical surfaces.

Saponification: Formation of soap patches on the painted surface is known as saponification. Chemical action of alkalis is the cause of this defect. So in some atmosphere or in some erased places the presence of Alkalis or acid in the vapor results in chemical action of the paint. Which results in soapy patches on the paint surface. This is known as saponification.

Wrinkling: This is very common type of paint defect. This is more prominent when a thick layer of paint is applied on a horizontal surface. So when a particular surface requires paint, it requires only a particular amount of paint that has to be applied. When this amount is increased what happens is the paint deposits over layers with itself and starts wrinkling when they don't stick together. So this is called as a wrinkling.

Types of Paints

Now we will look at the types of paints in a brief manner. The first or the most rather commonly used type of paint is enamel paints.

Enamel Paints: Enamel paint is a term used to reference a paint with hard glossy and opaque finish. Show interior design involves a lot of paint painting and it requires various purposes and various aesthetic values. And one type of paint is enamel paint, it has a hard, glossy and opaque finish. So the purpose of actually covering surface is actually behind the paint is one of the important functions of this enamel paint. In actuality the term enamel paint does not necessarily have generally Accepted or standardize definition. But historically enamel paint has been used to refer to any type of paint that is oil based and with a considerable glossy finish. So any paint that is glossy and has a thick and oil paste kind of film is called enamel paint. Commercial enamel Paints have been used in artworks by famous artists. So besides paint being used in many surfaces paint is an important form of art and it has been used by many artists. So enamel paint also been used in interior surface is used by famous artists works. One such work is Pablo Picasso. In one such work he have used a commercial paint by the name of ripolin that is not even meant for use in artwork. Sidney Nolan is another artist who used enamel paint in his work.so Artist get really creative different types of mediums as works. Enamel paint even it is used generally for functional purpose and aesthetic values it has also been used in artworks. So the various applications of enamel paint can be seen now. Can be applied in kitchens bathrooms, doors and windows, metal surfaces and floors. So if you notice the characteristics of these surfaces they are basically very used too hard warrantor and they need of hard surfaces so enamel paint applies to these places. Durable and easily washable makes it ideal to be used in areas in a kitchen. So these are the properties of enamel Paints make it useful to kitchens.Bathrooms are made up of shiny utilities and tiles so glossy enamel matches of well when used in these spaces. So we talked about how the enamel are very glossy. So bathrooms are generally very shiny, glossy tile usage types I'm so matching it with a good paint is very necessary. So enamel paint finds the

application here.Doors and windows: The borders and edges when painted with enamel paint, look nice while also having the benefit of being long lasting. So Blue doors and windows are exposed to lot of warrantor and they also have borders and edges. So paint should look nice and also serve functional purpose. Enamel paint find its use in doors and windows extensively.
Metal surface: metal surfaces are other set of surfaces that are required to be covered up and also protected in various cases such as corrosion and weather resistance. Metal surfaces are prone to rusting, oxidation and corrosion. Hence painting them will diminish this risk and prolong their life. So that is the primary requirement of metal surfaces and paint serves the purpose.Floats: Enamel paint is even used to paint some floors that are prone to high traffic. So in the floor paint is not necessarily used all the time. It is supposed to be used paint rarely. Buteven in such cases enamel paint find its application in force. Which have high traffic.
So we will look at some of the advantages and disadvantages of enamel paint: It is easy to apply.It is extremely durable.It has a wide range of colours and is potentially toxic.Besides having some advantages it is also very toxic but makes it very environmentally unsafe. A unique advantage of enamel paint is its ability to dry quickly when exposed to air. People don't have to worry about it dripping and ruining. So you don't have to wait particularly long time for it to dry which makes it easy to apply.It is extremely durable, once Hardened enamel paint can last for many years. Wide range of colours: for aesthetic value, is important part of the paint and a wide range of colours as far as the enamel Paints is concern for any paint that matters. So for any paint to be made a lot of water is to be used. Which makes it very unstable as far as environmental concerns are concerned. Oil based enamel Paints have strong orders that can be very irritating and sometimes harmful. So apart from using a lot of water it has volatility which is an important problem. Besides that when you apply paint in a particular area especially when it

is enclosed it's forms an irritating odor which can be harmful .they are made out of solvents such as urethane they are potentially flammable while still in wet form. So it is important to take care while applying paint because it can b flammable before it gets dried up so that has to be taken care of. So we looked at the pros and cons of a particular paint. We will now move onto another widely used form of paint it is called as distemper.

Distemper: Distemper paint is an ancient type of paint made of water chalk and pigment bond with either an animal glue or the adhesive qualities of casein. So distemper paint has also been used in various methods from beginning of time. The composition is changed. But it being distemper type of paint .so as opposed tempera distemper paint is thin and not durable but can be made inexpensively and tinted nearly any colour. It is more thin form of paint applied to suitable surfaces which requires thin paint film. It is not very durable can be made very cheaply.

This is may be the most economical kind of painting accessible in Indian market currently. It is classified as whitewash job and the term is slightly profound in our vocabulary as home owners White wash their homes before leasing it out. So particularly every surface is basically whitewashed. You would have heard of the term whitewash, so when a particular surface is done before the Paints can be decided if it is to be decided whether the paint is to be painted or not whitewash is something that is basically done to cover the basic surface. So when there is a brick wall or a concrete wall or concrete finish any surface needs to be at least white washed and distemper is the most common form of paint for the White wash white job. So we will talk about the applications of distemper. Distemper is an early form of whitewash. As a decorative paint it is easily marked and cannot get wet. It has

been used since antiquity for wall painting and other types of house decoration either on interior surface or outside in regions that seldom if ever see rain. Since it is not so durable it is avoided in places where it can come in contact with water or rain for that matter. Besides that any furniture or any surface which needs to be completed or needs to be transported is basically at least whitewashed. So distemper is used there. Distemper is much less expensive than all oil paint, so the cheapness a d inexpensiveness is important quality. It is also used for posters and scenic backdrops on the stage. Apart from being applied to stages and surfaces it has been used extensively on stages and dramatic. It has almost never been used for fine art painting. So being just a white wash job it is used for very functional purpose particularly used in art paintings. The advent of oil and latex based house Paints have rendered distemper obsolete. So distemper as a particular final surface paint has been reduced in its use in the event of oil and latex based house Paints but nevertheless it finds its use in white wash. Will be talking about some of the advantages and disadvantages

Pros: Paint can be applied directly on cement dividers with no other covering on them. Hence called cement paint. So it can be directly applied on cement surface which is not something other Paints boast about.It is less expensive alternative. They stay at last a good 5 years or more. Which is why it is called as whitewash job. So when every 5 years or so when a building has to be renewed or re done whitewash is the first thing that they do.It is durable and economic that provides a super smooth matte finish. So very easily and economically done smooth matte finish can be achieved. It is utilized for the beautification of walls and roofs. So most roofs do not extensively be covered by other materials or other furnishes so white washing them or giving a white distemper to the paint is a very basic finish to the roof. Cons: Some of the disadvantage is thatoil bound Distemper is not

washable it is progressive comes out if wet.The quality may not be that great when contrasted with emulsion. So enamel paints and emulsion Paints give a much more final product result so when compared to that the quality is not as that great with distemper Paints.

We will now look at great another great and widely used emulsion Paints. Emulsion Paints: they are type of paint used for walls consisting of pigment bound in a synthetic resin which forms emulsion with water.Modern emulsions are water based with Vinyl or acrylic resin added to make them more hard wearing than traditional emulsions. Emulsions are generally water based but now they can be added with Vinyl or acrylic resins too. Which makes it more modern and usable today. This results in varying degrees of sheen in the finish, as the Shine increases paint tends to be more hard wearing. So when you want to make a particular surface very Shiny and have a lot of sheen with it this emulsion Paints are very good options. The Ranges usually offer matt, egg shell, silk, satin and full gloss. So for a particular surface to be finished in various types such as matt, egg shell, silk, satin and full gloss this is not available as a finish option in all the types of paints. Emulsion Paints offer that as a very good advantage. So we will be looking at some of the applications. The first benefit is that since it is a water based emulsion paint so it is less toxic as compared to other oil based paint. We talked about can be toxic since emulsion Paints used a lot of water or rather resins as such, resins and polymers it is very less toxic and this is the first and foremost advantage of emulsion Paints. Soyou do not have nasty odors. Less volatile organic compounds this is the primary harmful agent that is applied and there will be less skin irritations. Emulsion Paints are easy to apply and dries quickly in about 1 to 2 hours. Much faster than other water based paint and oil based Paints.These water based paints are ideas for ceilings and walls because they are thick and easy to

apply. They are humidity resistant as well so they can be easily used in steamy rooms like kitchen or bathrooms. The surface of paint is tough and can be cleaned by washing with water... One of the big benefit of using emulsion paint is that it can be painted on to any surface like metal radiators, wooden furniture and walls lining papered walls. So any type of wall, any type of furniture, or any type of use emulsion paints. So another type of paint is fire proof paint.We have talked about fire proof in various manners and fire retardant Paints are such type of paints which offers fire retarding. Luminous Paints are also another type of paints testing application of paint this that also luminous paints. They exuberate light and that of shininess. So it also provides fluorescence in some cases.