5.5 Paint and Color Technical Guidelines

5.5.1 INTRODUCTION

A good coat of paint is one of the most important defenses exterior wood has against the elements. Paint applied to exterior wood must withstand yearly extremes of both temperature and humidity; the Texas summers are extremely hard on painted surfaces. While never expected to be more than a temporary physical shield - requiring reapplication every five to eight years - the importance of paint should not be minimized.

Because one of the main causes of wood deterioration is moisture penetration, a primary purpose for painting wood is to exclude such moisture, thereby slowing deterioration not only of a building's exterior siding and decorative features but, ultimately, its underlying structural members. Another important purpose for painting wood is, of course, to define and accent architectural features and to improve appearance of a structure.

Refer to *'Paint and Color Trim Design Guidelines,'* section 4.5 for design information regarding paint and colors.

Exterior paint is constantly deteriorating through the process of weathering, but in a program of regular maintenance - assuming all other building systems are functioning properly - surfaces can be cleaned, lightly scraped and hand sanded in preparation for a new finish coat. Unfortunately, these are ideal conditions. More often, complex maintenance problems are inherited by owners of historic buildings, including areas of paint that have failed beyond the point of mere cleaning, scraping and hard sanding (although much so-called 'paint failure' is attributable to interior or exterior moisture problems or surface preparation and application mistakes with previous coats). Repainting should not occur until problems with leaking water, moisture infiltration, or gutters and downspouts repaired.

It must be emphasized that removing paint from historic buildings - with the exception of cleaning, light scraping and hand sanding as part of routine maintenance - should be avoided unless absolutely essential. Once conditions warranting removal have been identified the general approach should be to remove paint to the next layer using the gentlest means possible.

There are four stages to painting the exterior of any structure:

- Surface preparation
- Color selection
- Paint application and
- Clean-up

These stages are defined and information on each is provided following.

Please note that as this section discusses the removal and repainting of exterior finished surfaces, the total removal obliterates evidence of the historical paints and their sequence and architectural context. If removal is necessary, it is recommended that an area of the original paint finish be retained for future reference and access to the history this can provide in the types of paints used at this structure, colors applied over the life of the structure, and other information. Such an area may be located in an area of the building exterior which is not accessible or visible from the street – behind an added element, air conditioner, or located in an enclosure; it is recommended such an area be several square feet in size.

5.5.2 PAINT SURFACE CONDITIONS

The historic building will undoubtedly exhibit a variety of exterior paint surface conditions. For example, paint on the wood siding and doors may be adhering firmly; paint on the eaves peeling; and paint on the porch balusters and window sills cracking and alligatoring. The accurate identification of each paint problem is therefore the first step in planning an appropriate overall solution.

Paint surface conditions can be grouped according to their relative severity; these classes have been determined by the National Park Service:

- **Class I conditions** include minor blemishes or dirt collection and generally require no paint removal.
- **Class II conditions** include failure of the top layer or layers of paint and generally require limited paint removal, and
- **Class III conditions** include substantial or multiple-layer failure and generally require total paint removal.

CLASS I exterior surface conditions generally require no paint removal, and are due to dirt, soot, pollution, mildew, staining, chalking, cobwebs, insect cocoons, etc. accumulating on the painted surface.

CLASS I PAINT CONDITION

This **environmental "grime"** or organic matter that tends to cling to painted exterior surfaces and, in particular, protected surfaces such as eaves, do not constitute a paint problem unless painted over rather than removed prior to repainting. If not removed, the surface deposits can be a barrier to proper adhesion and cause peeling.

The treatment for this grime is to loosen these materials by a strong, direct stream of water from the nozzle of a garden hose. Stubborn dirt and soot will need to be scrubbed off using l/2 cup of household detergent in a gallon of water with a medium soft bristle brush. The cleaned surface should then be rinsed thoroughly, and permitted to dry before further inspection to determine if repainting is necessary. Quite often, cleaning provides a satisfactory enough result to postpone repainting.

Mildew is caused by fungi feeding on nutrients contained in the paint film or on dirt adhering to any surface. Because moisture is the single most important factor in its growth, mildew tends to thrive in areas where dampness and lack of sunshine are problems such as window sills, under eaves, around gutters and downspouts, on the north side of buildings, or in shaded areas near shrubbery. It may sometimes be difficult to distinguish mildew from dirt, but there is a simple test to differentiate: if a drop of household bleach is placed on the suspected surface, mildew will immediately turn white whereas dirt will continue to look like dirt.

Because mildew can only exist in shady, warm, moist areas, treatment must pay attention to altering the environment that is conducive to fungal growth. Trees may need to be pruned back to allow sunlight to strike the building;

rain gutters may be added, or drainage around the base of the building may be altered to provide proper drainage, and solve the underlying problem creating the mildew.

A recommended solution for removing mildew consists of one cup non-ammoniated detergent, one quart household bleach, and one gallon water. When the surface is scrubbed with this solution using a medium soft brush, the mildew should disappear; however, for particularly stubborn spots, an additional quart of bleach may be added. After the area is mildew-free, it should then be rinsed with a direct stream of water from the nozzle of a garden hose, and permitted to dry thoroughly. When repainting, specially formulated "mildew-resistant" primer and finish coats should be used.

Chalking - or powdering of the paint surface - is caused by the gradual disintegration of the resin in the paint film. In moderation, chalking is the ideal way for a paint to "age," because the chalk, when rinsed by rainwater, carries discoloration and dirt away with it and thus provides an ideal surface for repainting. In excess the chalk can wash down onto a surface of a different color beneath the painted area and cause streaking as well as rapid disintegration of the paint film itself. If a paint contains too much pigment for the amount of binder (as the old white lead carbonate/oil paints often did), excessive chalking can result.

The chalk should be cleaned off with a solution of l/2 cup household detergent to one gallon water, using a medium soft bristle brush. After scrubbing to remove the chalk, the surface should be rinsed with a direct stream of water from the nozzle of a garden hose, allowed to dry thoroughly, (but not long enough for the chalking process to recur) and repainted, using a non-chalking paint.

Staining of paint coatings usually results from excess moisture reacting with materials within the wood substrate. There are two common types of staining, neither of which requires paint removal; the most prevalent type of stain is due to the oxidation or rusting of iron nails or metal (iron, steel, or copper) anchorage devices. A second type of stain is caused by a chemical reaction between moisture and natural extractives in certain woods (red cedar or redwood) which results in a surface deposit of colored matter. This is most apt to occur in new replacement wood within the first 10 to 15 years.

For treatment in both cases, the source of the stain should first be located and the moisture problem corrected. When stains are caused by rusting of the heads of nails used to attach shingles or siding to an exterior wall or by rusting or oxidizing iron, steel, or copper anchorage devices adjacent to a painted surface, the metal objects themselves should be hand sanded and coated with a rust-inhibitive primer followed by two finish coats. (Exposed nail heads should ideally be countersunk, spot primed, and the holes filled with a high quality wood filler except where exposure of the nail head was part of the original construction system or the wood is too fragile to withstand the countersinking procedure.)

CLASS II Exterior Surface Conditions Generally Requiring Limited Paint Removal.

Crazing – a fine, jagged interconnected breaks in the top layer of paint - results when paint that is several layers thick becomes excessively hard and brittle with age and is consequently no longer able to expand and contract with the wood in response to changes in temperature and humidity. As the wood swells, the bond between paint layers is broken and hairline cracks appear. Although somewhat more difficult to detect as opposed to other more obvious paint problems, it is well worth the time to scrutinize all surfaces for crazing. If not corrected, exterior moisture will enter the crazed surface, resulting in further swelling of the wood and, eventually, deep cracking and alligatoring, a more extreme condition which requires total paint removal.

Crazing can be treated by hand or mechanically by sanding the surface, then repainting. Although the hairline cracks may tend to show through the new paint, the surface will be protected against exterior moisture penetration.

PEELING PAINT

Intercoat peeling can be the result of improper surface preparation prior to the last repainting. This most often occurs in protected areas such as eaves and covered porches because these surfaces do not receive a regular rinsing from rainfall, and salts from airborne pollutants thus accumulate on the surface. If not cleaned off, the new paint coat will not adhere properly and that layer will peel.

INTERCOAT PEELING

Another common cause of intercoat peeling is incompatibility between paint types. For example, if oil paint is applied over latex (or water based paint) paint, peeling of the top coat can sometimes result since, upon aging, the oil paint becomes harder and less elastic than the latex paint. If latex paint is applied over old, chalking oil paint, peeling can also occur because the latex paint is unable to penetrate the chalky surface and adhere.

Recommended treatment for peeling due to salts or impurities include washing down the affected thoroughly after scraping, then wiping it dry. Finally, the surface should be hand or mechanically sanded, then repainted.

Where peeling was the result of using incompatible paints, the peeling top coat should be scraped and hand or mechanically sanded. Application of a high quality oil type exterior primer will provide a surface over which either an oil or a latex topcoat can be successfully used.

Solvent Blistering is the result of a less common application error and is not caused by moisture, but by the action of ambient heat on paint solvent or thinners in the paint film. If solvent rich paint is applied in direct sunlight, the top surface can dry too quickly and, as a result, solvents become trapped beneath the dried paint film. When the solvent vaporizes, it forces its way through the paint film, resulting in surface blisters. This problem occurs more often with dark colored paints because darker colors absorb more heat than lighter ones. To distinguish between solvent blistering and blistering caused by moisture, a blister should be cut open. If another layer of paint is visible, then solvent blistering is likely the problem whereas if bare wood is revealed, moisture is probably to blame. Solvent blisters are generally small.

Solvent-blistered areas can be scraped, hand or mechanically sanded to the next sound layer, then repainted. In order to prevent blistering of painted surfaces, paint should not be applied in direct sunlight.

Wrinkling is another error in application that can easily be avoided; this occurs when the top layer of paint dries before the layer underneath. The top layer of paint actually moves as the paint underneath (a primer, for example) is drying. Specific causes of wrinkling include: applying paint too thick; applying a second coat before the first one dries; inadequate brushing out; and painting in temperatures higher than recommended by the manufacturer.

The wrinkled layer can be removed by scraping followed by hand or mechanical sanding to provide as even a surface as possible, then

repainted following manufacturer's application instructions.

CLASS III Exterior Surface Conditions Generally Requiring Total Paint Removal.

If surface conditions are such that the majority of paint will have to be removed prior to repainting, it is suggested that a small sample of intact paint be left in an inconspicuous area either by covering the area with a metal plate, or by marking the area and identifying it in some way. When repainting does take place, the sample should not be painted over; this will enable future investigators to have a record of the building's paint history.

Peeling of bare wood is most often caused by excess interior or exterior moisture that collects behind the paint film, thus impairing adhesion. Generally beginning as blisters, cracking and peeling occur as moisture causes the wood to swell, breaking the adhesion of the bottom layer.

PEELING PAINT DUE TO LACK OF MAINTENANCE

There is no sense in repainting before dealing with the moisture problems because new paint will simply fail. Therefore, the first step in treating peeling is to locate and remove the source or sources of the moisture, not only because moisture will jeopardize the protective coating of paint but because, if left unattended, it can ultimately cause permanent damage to the wood. Excess interior moisture should be removed from the building through installation of exhaust fans and vents. Exterior moisture should be eliminated by correcting the following conditions prior to repainting: faulty flashing; leaking gutters; defective roof shingles; cracks and holes in siding and trim; deteriorated caulking in joints and seams; or shrubbery growing too close to painted wood.

After the moisture problems have been solved, the wood must be permitted to dry out thoroughly. The damaged paint can then be scraped off with a putty knife, hand or mechanically sanded, primed, and repainted.

Cracking and alligatoring are advanced stages of crazing. Once the bond between layers has been broken due to intercoat paint failure, exterior moisture is able to penetrate the surface cracks, causing the wood to swell and deeper cracking to take place.

This process continues until cracking, which forms parallel to grain, extends to bare wood. Ultimately, the cracking becomes an overall pattern of horizontal and vertical breaks in the paint layers that looks like reptile skin; hence, "alligatoring." In advanced stages of cracking and alligatoring, the surfaces will also flake badly.

SEVERE CRACKING AND ALLIGATORING PAINT SURFACE, WITH BARE WOOD VISIBLE

If cracking and alligatoring are present only in the top layers they can probably be scraped, hand or mechanically sanded to the next sound layer, then repainted. However, if cracking and/or alligatoring have progressed to bare wood and the paint has begun to flake, the paint will need to be totally removed. Methods

include scraping or paint removal with the electric heat plate, electric heat gun, or chemical strippers, depending on the particular area involved. Bare wood should be primed within 48 hours then repainted.

5.5.3 SELECTION OF THE MOST APPROPRIATE/SAFEST METHOD TO REMOVE PAINT

After having presented the "hierarchy" of exterior paint surface conditions - from a mild condition such as mildewing which simply requires cleaning prior to repainting to serious conditions such as peeling and alligatoring which require total paint removal - one important thought bears repeating: if a paint problem has been identified that warrants either limited or total paint removal, the gentlest method possible for the particular wooden element of the historic building should be selected from the many available methods.

The treatments recommended are those which take three overriding issues into consideration (1) the continued protection and preservation of the historic exterior woodwork; (2) the retention of the sequence of historic paint layers; and (3) the health and safety of those individuals performing the paint removal. By applying these criteria, it will be seen that no paint removal method is without its drawbacks and all recommendations are qualified in varying degrees.

5.5.4 PAINT REMOVAL

Paint may be removed by one of several different methods:

- **Abrasive** - "Abrading" the painted surface by manual and/or mechanical means such as scraping and sanding. Generally used for surface preparation and limited paint removal.
- **Thermal -** Softening and raising the paint layers by applying heat followed by scraping and sanding. Generally used for total paint removal.
- **Chemical** - Softening of the paint layers with chemical strippers followed by scraping and sanding. Generally used for total paint removal.

5.5.5 PAINT REMOVAL PRECAUTIONS

Because paint removal is a difficult and painstaking process, a number of costly, regrettable experiences have occurred - and continue to occur - for both the historic building and the building owner. Historic buildings have been set on fire with blow torches; wood irreversibly scarred by sandblasting or by harsh mechanical devices such as rotary sanders and rotary wire strippers; and layers of historic paint inadvertently and unnecessarily removed. In addition, property owners, using techniques that substitute speed for safety, have been injured by toxic lead vapors or dust from the paint they were trying to remove or by misuse of the paint removers themselves.

5.5.6 ABRASIVE METHODS

If conditions have been identified that require limited paint removal such as crazing, intercoat peeling, solvent blistering, and wrinkling, scraping and hand sanding should be the first methods employed before using mechanical means. Even in the case of more serious conditions such as peeling - where the damaged paint is weak and already sufficiently loosened from the wood surface - scraping and hand sanding may be all that is needed prior to repainting.

Manual Abrasive Methods: Scraping is usually accomplished with either a putty knife or a paint scraper, or both. Putty knives range in width from one to six inches and have a beveled edge. A putty knife is used in a pushing motion going under the paint and working from an area of loose paint toward the edge where the paint is still firmly adhered and, in effect, "beveling" the remaining layers so that as smooth a transition as possible is made between damaged and undamaged areas.

PAINT SCRAPPERS, SANDPAPER AND OTHER TOOLS FOR SCRAPPING PAINT FROM WOOD
(Courtesy of Elliott's Hardware)

Paint scrapers are commonly available in 1-5/16, 2-1/2, and 3-1/2 inch widths and have replaceable blades. In addition, profiled scrapers can be made specifically for use on moldings. As opposed to the putty knife, the paint scraper is used in a pulling motion and works by raking the damaged areas of paint away.

The obvious goal in using the putty knife or the paint scraper is to selectively remove the affected layer or layers of paint; however, both of these tools, particularly the paint scraper with its hooked edge, must be used with care to properly prepare the surface and to avoid gouging the wood.

Sandpaper/Sanding Block/Sanding sponge: After manually removing the damaged layer or layers by scraping, the uneven surface will need to be smoothed or "feathered out" prior to repainting. As stated before, hand sanding, as opposed to harsher mechanical sanding, is recommended if the area is relatively limited. A coarse grit, open-coat flint sandpaper - the least expensive kind - is useful for this purpose because, as the sandpaper clogs with paint it must be discarded and this process repeated until all layers adhere uniformly.

Blocks made of wood or hard rubber and covered with sandpaper are useful for hand-sanding flat surfaces. Sanding sponges - rectangular sponges with an abrasive aggregate on their surfaces - are also available for detail work that requires reaching into grooves because the sponge easily conforms to curves and irregular surfaces. All sanding should be done with the grain.

SANDPAPER and SANDING TOOLS FOR SANDING PAINT FROM WOOD
(Courtesy of Elliott's Hardware)

In all abrasive methods, precautions should be taken against lead dust and eye damage; dispose of lead paint residue properly.

Mechanical Abrasive Methods: If hand sanding for purposes of surface preparation has not been productive or if the affected area is too large to consider hand sanding by itself, mechanical abrasive methods, i.e., power-operated tools may need to be employed; however, it should be noted that the majority of tools available for paint removal can cause damage to fragile wood and must be used with great care.

ORBITAL SANDER w/ SANDPAPER
(Courtesy of Elliott's Hardware)

Designed as a finishing or smoothing tool - not for the removal of multiple layers of paint - the orbital sander is thus recommended when limited paint removal is required prior to repainting. Because it sands in a small diameter circular motion (some models can also be switched to a back-and-forth vibrating action), this tool is particularly effective for "feathering" areas where paint has first been scraped. The abrasive surface varies from about 3" x 7" to 4"

x 9” and sandpaper is attached either by clamps or sliding clips. A medium grit, open-coat aluminum oxide sandpaper should be used; fine sandpaper clogs up so quickly that it is ineffective for smoothing paint.

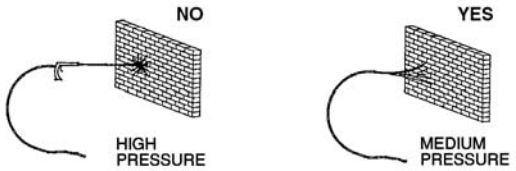
A second type of power tool - the belt sander - can also be used for removing limited layers of paint but, in this case, the abrasive surface is a continuous belt of sandpaper that travels at high speeds and consequently offers much less control than the orbital sander. Because of the potential for more damage to the paint or the wood, use of the belt sander (also with a medium grit sandpaper) should be limited to flat surfaces and only skilled operators should be permitted to operate it within a historic preservation project.

BELT SANDER
(Courtesy of Elliott’s Hardware)

There are several mechanical tools that are <u>not</u> recommended for removal of paint due to their propensity to damage the wood: rotary drill attachments, water blasting and sandblasting.

Rotary drill attachments such as the rotary sanding disc can easily leave visible circular depressions in the wood which are difficult to hide, even with repainting. The rotary wire stripper can actually shred a wooden surface and is thus to be used exclusively for removing corrosion and paint from metals.

Waterblasting above 600 p.s.i. to remove paint is not recommended because it can force water into the woodwork rather than cleaning loose paint and grime from the surface; at worst, high pressure waterblasting causes the water to penetrate exterior sheathing and damages interior finishes. A detergent solution, a medium soft bristle brush, and a garden hose for purposes of rinsing, is the gentlest method involving water and is recommended when cleaning exterior surfaces prior to repainting.



WATER BLASTING TO REMOVE PAINT FROM MASONRY

Finally - and undoubtedly most vehemently "<u>not recommended</u>" - sandblasting painted exterior and interior woodwork will indeed remove paint, but at the same time can scar wooden elements beyond recognition. Sandblasting erodes the soft porous fibers faster than the hard, dense fibers, leaving a pitted surface with ridges and valleys. Sandblasting will also erode projecting areas of carvings and moldings before it removes paint from concave areas. Hence, this abrasive method is potentially the most damaging of all possibilities.

5.5 7 THERMAL METHODS

Where exterior surface conditions have been identified that warrant total paint removal such as peeling, cracking, or alligatoring, two thermal devices - the electric heat plate and the electric heat gun - have proven to be quite successful for use on different wooden elements. These tools heat, and soften and raise the paint layers by applying heat followed by scraping and sanding.

The blow torch is <u>not recommended</u> because it can scorch the wood and has been the cause of numerous building fires.

The electric heat plate operates between 500 and 800 degrees Fahrenheit (not hot enough to vaporize lead paint), using about 15 amps of power. The plate is held close to the painted exterior surface until the layers of paint begin to soften and blister, then moved to an adjacent location on the wood while the softened paint is scraped off with a putty knife. Since the electric heat plate's coil is "red hot," extreme caution should be taken to avoid igniting clothing or burning the skin. If an extension cord is used, it

should be a heavy-duty cord (with 3-prong grounded plugs). A heat plate can overload a circuit or, even worse, cause an electrical fire; therefore, it is recommended that this implement be used with a single circuit and that a fire extinguisher always be kept close at hand.

The electric heat gun (electric hot-air gun) looks like a hand-held hairdryer with a heavy-duty metal case. It has an electrical resistance coil that typically heats between 500 and 750 degrees Fahrenheit and, again, uses about 15 amps of power which requires a heavy-duty extension cord. There are some heat guns that operate at higher temperatures but they should not be purchased for removing old paint because of the danger of lead paint vapors.

ELECTRIC HEAT GUN

The temperature is controlled by a vent on the side of the heat gun. When the vent is closed, the heat increases. A fan forces a stream of hot air against the painted woodwork, causing a blister to form. At that point, the softened paint can be peeled back with a putty knife. Like the heat plate, the heat gun works best on a heavy paint buildup.

Although the heat gun is heavier and more tiring to use than the heat plate, it is particularly effective for removing paint from detail work because the nozzle can be directed at curved and intricate surfaces.

The blow torch, such as a hand-held propane or butane torches, were widely used in the past for paint removal because other thermal devices were not available. Blow torches operate at temperatures between 3200 and 3800 degrees Fahrenheit, and the open flame is not only capable of burning a careless operator and causing severe damage to eyes or skin, it can easily scorch or ignite the wood. The other fire hazard is more insidious; most frame buildings have an air space between the exterior sheathing and siding and interior lath and plaster. This cavity usually has an accumulation of dust which is also easily ignited by the open flame of a blow torch. Finally, lead base paints will vaporize at high temperatures, releasing toxic fumes that can be unknowingly inhaled. Therefore the blow torch should not be used.

When using any method of removing paint thermally, a fire extinguisher should be provided nearby for easy access in the case of sparks or a fire.

5.5.8 CHEMICAL METHODS

With the availability of effective thermal methods for total paint removal, the need for chemical methods becomes quite limited. Solvent-base or caustic strippers may, however, play a supplemental role in a number of situations, including:

- Removing paint residue from intricate decorative features, or in cracks or hard to reach areas if a heat gun has not been completely effective
- Removing paint on window muntins because heat devices can easily break the glass
- Removing varnish on exterior doors after all layers of paint have been removed by a heat plate/heat gun if the original varnish finish is being restored
- Removing paint from detachable wooden elements such as exterior shutters, balusters, columns, and doors by dip stripping when other methods are too laborious.

Because all chemical paint removers can involve potential health and safety hazards, no wholehearted recommendations can be made

from that standpoint. Commonly known as "paint removers" or "strippers," both solvent-base or caustic products are commercially available that, when poured, brushed, or sprayed on painted exterior woodwork are capable of softening several layers of paint at a time so that the resulting "sludge" can be removed with a putty knife. Detachable wood elements such as exterior shutters and doors can also be "dip-stripped."

There are two important points to stress when using any solvent-base stripper: first, the vapors from the organic chemicals can be highly toxic if inhaled; skin contact is equally dangerous because the solvents can be absorbed; second, many solvent-base strippers are flammable. Even though application out-of-doors may somewhat mitigate health and safety hazards, a respirator with special filters for organic solvents is recommended and, of course, solvent-base strippers should never be used around open flames, lighted cigarettes, or with steel wool around electrical outlets.

Removal of sludge during the paint removal process should be considered, especially when lead paint is being removed. Rinsable strippers are rinsed off with water, and this must be collected for proper disposable if lead paint is removed. The regular strippers (used with hand scrappers) are perhaps better from the standpoint of proper sludge disposal because they must be hand 'scraped and the sludge can easily be collected in a container, and disposed of according to local health regulations.

Until the advent of solvent-base strippers, caustic strippers were used exclusively when a chemical method was deemed appropriate for total paint removal prior to repainting or refinishing. Now, it is more difficult to find commercially prepared caustic solutions in hardware and paint stores for homeowner use with the exception of lye (caustic soda) because solvent-base strippers packaged in small quantities tend to dominate the market.

Most commercial dip stripping companies, however, continue to use variations of the caustic bath process because it is still the cheapest method available for removing paint. Generally, dip stripping should be left to professional companies because caustic solutions can dissolve skin and permanently damage eyes as well as present serious disposal problems in large quantities.

5.5 9 FINAL PREPARATION FOR NEW PAINT

Practically speaking as well, paint can adhere just as effectively to existing paint as to bare wood, providing the previous coats of paint are also adhering uniformly and tightly to the wood and the surface is properly prepared for repainting - cleaned of dirt and chalk and dulled by sanding. But, if painted exterior wood surfaces display continuous patterns of deep cracks or if they are extensively blistering and peeling so that bare wood is visible, then the old paint should be completely removed before repainting. The only other justification for removing all previous layers of paint is if doors, shutters, or windows have literally been "painted shut," or if new wood is being pieced-in adjacent to old painted wood and a smooth transition is desired.

Finally, if the exterior woodwork has been stripped to bare wood, priming should take place within 48 hours (unless the wood is wet, in which case it should be permitted to dry before painting). Application of a high quality oil type exterior primer will provide a surface over which either an oil or latex top coat can be successfully used.

5.5.10 TYPE OF PAINT (WATER VS. OIL BASED)

Based on the assumption that the exterior wood has been painted with oil paint many times in the past, and the existing topcoat is therefore an oil paint, it is recommended that a topcoat of high quality oil paint be applied when repairing. The reason for recommending oil rather than latex (water based) paints are that a coat of latex applied directly over old oil paint is more apt to fail. The considerations are twofold – first, because oil paints continue to harden with age, the old surface is sensitive to the added stress of shrinkage which occurs as a new coat of paint dries. Oil paints shrink less upon drying than

latex paints and thus do not have as great a tendency to pull the old paint loose. Second, when exterior oil paints age, the binder releases pigment particles, causing chalky surface. Although for best results, the chalk (or dirt, etc.) should always be cleaned off prior to repainting, a coat of new oil paint is more able to penetrate a chalky residue and adhere than is latex paint. Therefore, unless it is possible to thoroughly clean a heavily chalked surface, oil paints – balance – give better adhesion.

If however, a latex topcoat is going to be applied over several layers of old oil-base paint, an oil primer should applied first (the primer creates a flat, porous surface to which the latex can adhere). After the primer has thoroughly dried, a latex topcoat may be applied. In the long run, changing paint types is more time consuming and expensive. An application of new oil-type topcoat on the old oil paint is, thus, the preferred course of action.

5.5.11 PAINTING OF NON-WOOD SURFACES

Original stone or masonry surfaces should be maintained and not be painted, unless severe deterioration of the brick or stone can be shown to require painting and other consolidation or stabilization methods cannot be shown to be appropriate. If masonry was previously painted, it is often not appropriate or possible to remove paint, and appropriate repainting should be considered. If color or texture of replacement brick or stone cannot be matched with existing masonry material, painting may be an appropriate treatment; the color of such surfaces should approximate the color of the original masonry or, if not appropriate, that of a natural masonry color.

Painting of stucco that has never been painted is not recommended for the same reasons as painting of stone or masonry surfaces. In addition, there are often details in the stucco that painting will obscure as well as adversely affect the wall's vapor transmission performance.

When removing paint from a previously painted masonry, use gentle treatments that have been previously tested in a inconspicuous location. Do not sandblast or use acid-based cleaners. On existing previously painted masonry, use a 'breathable' masonry paint that is compatible with and can create a strong bond with existing paint.

Paint should not be applied to metal types that require protection from the elements or to metals such as brass, copper, or stainless steel that were historically meant to be exposed.