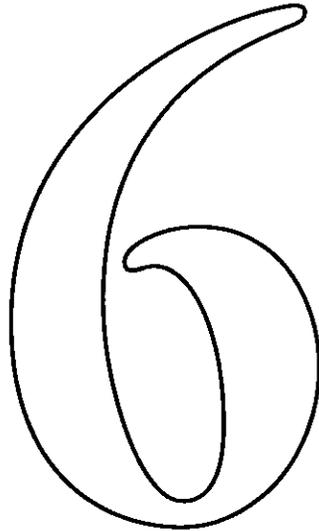




HUD MAINTENANCE GUIDEBOOKS

GUIDEBOOK



PAINTING MAINTENANCE



September 1995

HUD MAINTENANCE GUIDEBOOKS

GUIDEBOOK SIX

PAINTING MAINTENANCE

Department of Housing and Urban Development
Office of Public and Indian Housing

September 1995

HUD Maintenance Guidebook Six
Painting Maintenance

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MAINTENANCE GUIDEBOOK VI - PAINTING MAINTENANCE

CHAPTER ONE - INTRODUCTION

SECTION A GENERAL

The purpose of painting is to preserve structures and equipment from premature deterioration and maintain them in appealing condition. Such maintenance should result in substantial savings to public agencies and housing authorities (jointly referred to as HAs), and a pleasant environment. Timely protection of components from deterioration minimizes or even eliminates costly repairs and replacements. Painting, therefore, should be an integral part of the HA's preventive-maintenance painting program.

These guidelines should enable HAs to organize their painting programs and effectively carry out their painting and decorating work. They also address the methodology of good painting and decorating practices. While they do not attempt to define the level of skill needed to execute any of the tasks referenced, it should be recognized that some of this work requires skills only available from properly trained personnel.

SECTION B THE PURPOSE OF PAINTS AND COATINGS

The purpose of paints and coatings is to protect and beautify. Paints and coatings can protect surfaces from physical damage and substrates from corrosion and deterioration. They can beautify by enhancing color, adding color, and decorating otherwise drab or unsightly surfaces. They can highlight desirable architectural features, and can lessen the visual impact of undesirable ones.

Paints can enhance safety by increasing visibility through the use of established standard safety colors—for instance the yellow-and-black stripes used to suggest caution. Paints and coatings can protect by making surfaces easier to clean and stain resistant. The variety of maintenance paints and coatings includes the following:

- Fire-retardant and resistant coatings;
- Mildew- and fungus-resistant coatings;
- Wood rot-resistant coatings;
- Rust-inhibitive paint;
- Graffiti-resistant coatings;
- Lead encapsulants;
- Line-marking (traffic paints);
- Water-resistant and water-repellent coatings;
- Tile-like (epoxy) coatings.

The listing above might seem to imply that paints and coatings can do just about anything. But the fact is that all paints and coatings must be properly applied to a clean and sound surface if they are to perform as intended. Paints nor coatings are not designed to glue together or consolidate weak or crumbling plaster, decomposed gypsum board, or rotted wood. These substrates must be replaced or repaired before any attempt is made to repaint or recoat.

"Slapping on a coat of paint" to clean up a dirty surface or cover up a failing surface makes it difficult to correct any problem at a later date. The affected item deteriorates more quickly and its repair is more expensive than it would have been with timely repair.

SECTION C WHEN NOT TO PAINT

All paint manufacturers require their paints be applied to a clean and sound surface or substrate. Examples of surfaces which are clearly not sound and should not be painted are the following:

- Rotted wood;
- Masonry with efflorescence or other contamination;
- Corroded metal surfaces;
- Surfaces contaminated with mildew, mold, or fungus;
- Wet or damp gypsum drywall, plaster, or wood;
- Any surface clearly in need of repair.

Most paint failures are caused by painting over dirty but otherwise sound paint surfaces.

SECTION D WHEN TO PAINT

The painting of facilities should be timely to serve its purpose. It is time to paint when one of the following requires it:

- Peeling or otherwise failing paint;
- Scratched, marred, or worn out paint;
- Repaired surfaces;
- A rehabilitation program;
- A safety requirement;
- Redecoration.

The benefits of timely painting are:

- Reduction in or elimination of corrosion on exposed metal surfaces;
- Reduction in or elimination of deterioration to nonmetallic surfaces caused by their environments;
- Surfaces more easily and less expensively maintained;
- Safer surfaces and fewer accidents;
- Reduced cost because of less need to replace deteriorated components;
- An aesthetically more pleasing appearance.

SECTION E INSPECTION PROCEDURES

Regular (at least annual) inspections by the HA should be an integral part of the painting maintenance program. Painting inspections should be conducted before, during, and after all paint jobs. Inspection is generally conducted at three levels:

- Pre-job—Identifying surface conditions that might require repair painting, and recommending the required repair, cleaning, and other surface preparation.
- Work-in-progress—Inspecting for compliance with specifications, which should include surface preparation, the removal or corrosion and loose paint, priming, the quality and type of paint used, the quality of the application, and for compliance with other HA's requirements, and any applicable regulations.
- Completion—Inspecting the completed painting work and requiring corrections if applicable.

Who does the inspection depends upon the size of the HA. In a small HA, it might be the supervisor, while a larger HA might have a staff or a contracted inspector. By law, it is the employer's (in this case the HA's) responsibility to comply with OSHA regulations on worker safety and EPA regulations on environmental protection and safety. This is also true of other federal, state, and local laws and regulations.

SECTION F PLANNING PROCEDURES

Planned periodic maintenance does not mean that all surfaces should be painted regardless of the condition of the existing paint. It is neither technically correct nor economically expedient to paint when there is no need for it. Some surfaces, like washable paints in living areas, might require only yearly washing or cleaning. Others (such as hallways or other public areas) might require monthly or bi-monthly washing or cleaning. Such consideration should be given to all accepted painted surfaces. The removal of surface contaminants can greatly prolong the life of a paint or coating.

In order to avoid premature and unnecessary painting, ensure that:

- There is realistic periodic painting;
- Steps are taken to prevent surface abuse, including graffiti;
- The right paint is specified;
- There is adequate surface preparation;
- Paint is properly applied.

A properly planned painting-maintenance program addresses all of these issues.

SECTION G PREVENTIVE MAINTENANCE INSPECTIONS

1. THE IMPORTANCE OF REGULAR INSPECTIONS

Perhaps a better heading for this section would be "How to Prevent Maintenance Painting." The best preventive maintenance should focus on timely correction of painting defects, which can be accomplished by inspections. The frequency of inspection should be in compliance with HUD's Public Housing Management Assessment Program (PHMAP), and as required by conditions in each development.

2. THE INSPECTION AND REPORT

A good inspection report should include, but not be limited to, the following information:

- The unit/area examined;
- Identification of surface examined;
- The condition of surface;
- If the surface is in need of attention, can it be
 - Cleaned?
 - Touched-up? (Effective touch-up requires either a standard color/finish program or retention of samples of the paints used.)
 - Partially painted? (If so, what surface preparation will be needed?)
- If there was a paint failure, did it fail because of
 - Improper product selection? Questions to ask are:
 - Did the product deteriorate prematurely? (Records might determine that poor quality was used).
 - Was it used in an inappropriate location? (Records might reveal that a nondurable paint was used in a high-traffic area).
 - Was it an interior paint used outdoors? (Checking manufacturers recommendations could reveal misuse).

- Improper system selection? Some indications of this might be
 - Intercoat delamination;
 - Alligatoring;
 - Uneven sheen.
- Improper surface preparation? Indicators are many, for example:
 - Additional coats are required;
 - Coating blisters, flashes, wrinkles, or separates;
 - Mildew forms;
 - Fish eyes or cratering develop;
 - Surface is rough;
 - Surface cracks develop;
 - Iron or steel surfaces rust through the film;
 - Hydrocarbon wax bleeds through;
 - The whole paint system peels and falls off.
- Building/substrate damage. In addition to describing the cause of the paint failure, the report should recommend a specific approach to repairing the damage. For example:
 - Damage: water stain and crack in ceiling;
 - Probable cause: roof leak;
 - Remediation: repair roof, then repair ceiling before repainting.
- Correction recommendations
 - Does the area/surface need something other than paint?
 - What can be done to reduce frequency of repainting?

SECTION H MAINTENANCE PAINTING

Repainting should only be done on an as-needed basis, as determined by inspection-identified surface damage, paint delamination, or graffiti. The following chapters of this guidebook deal in detail with the how-tos of painting. Chapter Two deals with pre-painting surface preparation for various materials, Chapter Three discusses the types and uses of paints and coatings, and Chapter Four describes proper application procedures. Chapters Six and Seven respectively define post-painting procedures and present some tips on solving paint and coating problems.

1. THE SUPPLIER AS AN INFORMATION SOURCE

The HA should take advantage of any help offered by paint-products suppliers and manufacturers. Most offer services and information beyond that given on the product's label, including system specifications, product-use recommendations, product-performance criteria, product limitations, and warnings. There are also often recommendations for surface preparation, paint-mixing instructions,

and application and spread rates. Many suppliers also offer inspections and guarantees or warranties. In almost all cases, these services are available when asked, along with an assortment of paint caps, stirring paddles, can openers, and wet-paint signs.

The supplier must also supply Material Safety Data Sheets (MSDS) on all products delivered. The law requires that MSDSs be on the job site and available to all workers, including those doing the painting.

2. DEALING WITH GRAFFITI

Graffiti should be addressed by some method other than by painting over it. The affected surfaces should be protected, for example, with commercially available graffiti-resistant coatings. Painting over graffiti only presents the "artist" with a new canvas, which usually results in additional defacement.

Graffiti should be removed as soon as it is discovered, if possible while the paint is fresh, since the longer it remains on the surface the more difficult it is to remove. Immediate removal also discourages additions or responses to it. Depending on what the graffitied surface is, the kind of material applied, and how long it has been on the surface, some of the following methods may be effective for removal of graffiti.

- Waterless hand cleaner and garden hosing;
- Mild solvent (alcohol);
- Solvent-saturated newspaper taped to the graffitied surface for a few hours;
- Hot-water blasting or steam cleaning;
- Water blasting with bicarbonate of soda.

3. ACCOMPLISHING MAINTENANCE PAINTING

a. In-House Painting

In-house painting by HA employees is generally less expensive than contracting-out painting. For this reason, large HAs often have in-house painting crews to do their phased painting and to repaint vacant apartments quickly enough to meet reoccupancy goals. Small HAs, however, may not even have a dedicated painter, let alone a crew, and may need to consider means other than using regular employees to meet their painting needs.

One alternative which is often cost-effective is to offer residents the opportunity to paint their own units (see item c below). In determining whether this is truly cost-effective, however, the HA should factor in considerations such as the training and monitoring of residents required to ensure compliance with the HA's standards.

Even when it is cost-effective to use resident labor, there are occasions when this alternative is not feasible, such as when emergency repairs must be made quickly, or when the work required is on the exterior of a building, in common spaces, or in an unoccupied unit. In such cases, the choice is usually limited to using in-house labor or contracting-out the work.

b. Painting by Residents

Under adequately established procedures, it is cost effective to permit residents to paint their dwelling units. However, the HA is responsible for ensuring that the intent of the resident painting program is met, and that all applicable rules, regulations, safety, health, and environmental guidelines are followed.

After the HA determines that painting work needs to be done, it might be necessary to make pre-painting repairs usually performed by HA maintenance staff. Along with paint distribution, the residents should be given instructions on the work to be performed. They should also be given instruction if they are expected to do the pre-painting preparation work (see Chapter Two—Surface Preparation). For application of paints, coatings, and cleanup, residents should receive instruction from the HA on the contents of Chapter Four—Paint and Coating Application Procedures and Chapter Five—Post-Painting Procedures. The resident's attention also should be directed to the safety procedures discussed in Section J of this chapter. After residents have received instructions and materials, an inspection schedule should be set up. It is important to start this process off well; otherwise damage, danger, exposure to litigation, and a loss of pride by the resident can result.

c. Painting by Contractors

When painting is to be completed by non-HA forces, the work should be clearly specified and painting services procured in accordance with HUD's procurement regulations. Upon execution of the painting contract, the HA should appoint an Inspector to ensure that the work is completed in accordance with the specifications and all applicable regulations. Issues which should receive particular attention include:

- Inspection of paint to be used.

- Scraping and Sanding:

All scraping and sanding should be done in compliance with OSHA, EPA, and HUD regulations on managing dust, which can be a health hazard in addition to being messy. Dry scraping and sanding should be discouraged. Special attention needs to be given to lead-based paint removal and abatement.

- Surface Preparation Cleaning:

Washing a surface before painting is a normal part of surface preparation, which is particularly important when using latex paints. Latex paints contain surfactants which act like detergents and tend to dissolve or loosen any surface contamination not removed by cleaning. This increases the chances that paint will fail, and makes covering more difficult.

- **Paint Spraying:**

Extraordinary care must be taken to control spray-dust generation. Since overspray and drifting spray can damage surrounding property, the Inspector should ensure that the contractor has taken adequate care to move, cover, mask, or otherwise protect property from damage.

- **Contractor's Employees' Equipment:**

Contractors are bound by law to train their employees and to supply them with needed safety equipment. The inspector should promptly report any infraction of regulations to the proper authorities.

SECTION I HUD GUIDE

"Managing Maintenance in Public Housing," published by the Department of Housing and Urban Development, provides guidance for the painting of dwelling units.

SECTION J COMPLIANCE WITH SAFETY REGULATIONS

The painting work should be done in compliance with all safety regulations, with particular attention to:

- A hazard communication standard;
- A respiratory-protection program;
- Hazardous-waste handling;
- OSHA's ladders and stairways standard.

1. THE FEDERAL HAZARD COMMUNICATION STANDARDS

These standards are also known as HAZ-COM, HAZCOMM, and the "Right To Know Law." Officially they are identified as The Federal Hazard Communication Standards, 29 CFR 1910.1200, 29 CFR 1926. In general this regulation requires the following:

- Compiling an inventory list of materials used;
- Collecting a Material Safety Data Sheet (MSDS) for each material;
- Determining which materials on the inventory list are considered hazardous under the Hazard Communication Standards by reviewing the MSDSs;
- Inspecting containers to make sure that each pail, drum, package, and tube is labeled with the

- name of the product and who manufactures or distributes it, and an appropriate hazard warning;
- Developing a written Hazard Communications program which describes how the requirements of the standard will be met;
- Providing information and training to employees, covering the requirements of the standard and specific hazard information.

2. RESPIRATORY PROTECTION PROGRAM

In general, the need for respiratory protection is covered in the Material Safety Data Sheets for the specific materials being used. Respiratory protection is also covered in OSHA regulation 29 CFR 1926.013. In addition to following the regulations, points to remember are:

- If possible, substitute a safer material for one requiring respiratory protection;
- Reduce exposure levels by increasing ventilation using fans or by other means;
- If respirators are still necessary, select the correct type for the job;
- Persons who must wear respirators must usually be medically certified annually as able to work safely while wearing the device;
- All respirator users must be trained in the proper fitting, use, inspection, and maintenance of their devices;
- Provisions should be made to clean and store respirators between uses.
- All facial hair (beards, sideburns, mustaches) which affect the seal of the respirator to the skin must be shaved;
- Each respirator must be fit-tested on the individual to whom it is assigned.

3. HAZARDOUS WASTE HANDLING

Since the handling of hazardous waste is regulated, Has should identify the types of waste they generate, the chemicals they use, and such characteristics as ignitability, toxicity, corrosiveness, or reactivity. If hazardous material (for instance, old paint) is removed from a building, structure, or equipment, even by a contractor, the responsibility for properly disposing of the waste remains the owner's, in this case the HA's. Even if the contractor agrees to remove the hazardous material from the premises, the HA is still considered a co-generator. The HA cannot contract away its responsibility for the proper disposal of hazardous waste.

Waste is considered hazardous if it is:

- Ignitable (with a flash-point of less than 140 degrees F),
- Corrosive (with a pH below 2.0 or above 12.5),
- Reactive (capable of exploding or creating toxic vapors),
- Toxic (by EPA definition of toxicity).

4. OSHA'S LADDERS AND STAIRWAY STANDARDS

OSHA's ladders and stairways standards can be found in the Construction Standard, 29 CFR 1926, Sub L "Scaffolding" and Sub X "Stairways and Ladders." Some of the more pertinent and often overlooked sections of the regulations are:

- Select the proper ladder for the job.
- Do not allow more than one person on a ladder at a time.
- When working with tools on a ladder, always use a tool hanger or holder.
- Don't carry tools while climbing a ladder; use a rope to hoist them.
- Always face the ladder when climbing it.
- Always keep at least one hand on the ladder when working.
- Do not step on the top two steps of a stepladder.
- Do not step on the top four steps of a single or extension ladder.
- Wear shoes with non-skid soles.

SECTION K LEAD-BASED PAINT ABATEMENT AND MANAGEMENT

Compliance with the Lead-Based Paint Poisoning Prevention Act of 1968 is regulated at 24 CFR Parts 35, 905, and 965. Lead-based paint abatement and management should be guided by the Guidelines for the Evaluation and Control of Lead-Based Paint Hazards in Housing, issued by HUD.

In addition, the congressional mandates of Title X—Lead-Based Paint Hazard Reduction Act of 1992, which was signed into law on October 28, 1992, must be heeded. In federally funded housing, this requires inspection, evaluation, and reduction of lead-based paint. It provides for notification to occupants, potential residents, and purchasers when lead-based paint is present, and explanation of the risks associated with it. The act also requires the development of guidelines for the conduct of federally funded work involving risk-assessment, inspection, interim controls, and abatement.

Special notice should be taken of these requirements:

- All buildings constructed before 1978 should be tested for lead;
- Only properly qualified and trained personnel may work on or with any surface or item which potentially contains lead or lead compounds;
- All workers who may potentially come into contact with lead-based paint must be tested for the presence of lead in their blood. Actions which must be taken in response to certain blood-lead levels are stipulated by the Environmental Protection Agency, the Occupational Safety and Health Act, and HUD, and are also addressed in several federal, state, and local regulations.
- The testing of Blood Lead Levels (BLL) in children, at various ages or school-grade levels, is covered in various laws and regulations which include actions to be taken in their housing or day-care facilities

MAINTENANCE GUIDEBOOK VI - PAINTING MAINTENANCE

CHAPTER TWO - SURFACE PREPARATION

SECTION A PURPOSE OF SURFACE PREPARATION

Surface preparation includes making repairs, and treatment and cleaning of surfaces before painting. Its purpose is to ensure a clean and sound base for the paint, so that it will perform as expected.

CAUTION! THE CAUSE OF AN UNSOUND SUBSTRATE OR UNCLEAR SURFACE SHOULD BE DETERMINED AND ADDRESSED BEFORE ANY SURFACE PREPARATION OR PAINTING IS DONE.

For instance, if a wall is soft, yielding, or covered in mildew, the cause should first be determined—a leaky roof, termite-damaged studs, condensation, or any other malady—and corrected before surface preparation or painting is begun.

SECTION B SUBSTRATES

The substrate is the surface upon which the first coat of paint or coating is applied. It is the foundation which receives the initial primer, sealer, filler, or first coat. The surface preparation of a substrate is addressed in new construction, and when repair, remodeling, rehabilitation, or a certain type of abatement produces an uncoated surface. All substrates should be clean and free of surface contaminants. Preparation of major substrates should be as follows:

- Gypsum board/dry wall surfaces should be free of excess joint compound, tool marks, and ridges, and smoothed (wet-sanding preferred) without raising the grain of the paper facing.
- Plastered surfaces should not be sanded because sanding a smooth limecoat trowelled polish can easily cause scratches.
- Wood should be sanded smooth, in the direction of the grain. Do not putty or otherwise fill nail holes until after a primer or sealer has been applied.
- Concrete surfaces should be free of form oils, curing compounds, and laitances, and bug (air) holes opened up.
- Concrete Block (CMU) should be made free of excess mortar by rubbing with the flat side of a broken piece of concrete block.
- Ferrous Metal surfaces should be free of corrosion, mill scale, weld spatter, fins, and other sharp edges. Corrosion should be removed down to the bare metal by hand or power wire-brushing, and the metal coated with a rust-inhibitive primer.
- Non-Ferrous Metal surfaces may require etching before primer application, if required by the primer manufacturer.

The assumption underlying these requirements is that the finished surface will be smooth. If a textured

finish is required, appropriate adjustments should be made. For example, if a textured wood finish were specified, such as Texture 111, the requirement for surface preparation of a wood surface by sanding smooth would be waived. Similar accommodations would be made for all other substrates.

SECTION C SURFACE PREPARATION MATERIALS AND METHODS

"Surface preparation" is done after repair, rehabilitation, remodeling, and abatement work, and before painting. A sound surface may not always be ready for repainting. For instance, a high-gloss extra-hard finish designed to repel grease, oil, and other contaminants will also repel subsequent coats of paint or coatings. So vigorous surface preparation is required to avoid subsequent paint-delamination failures.

When using surface preparatory materials such as detergents, surface conditioners, or patching compounds, special attention should be paid to the manufacturers' recommendations. **ANY SURFACE PREPARATORY WORK THAT GENERATES DUST OR FUMES MUST UTILIZE DUST- AND FUME-CONTROL EQUIPMENT. THIS COULD INCLUDE, BUT IS NOT LIMITED TO, PROPER RESPIRATORY PROTECTION, PROTECTIVE CLOTHING, ON-SITE PROPERLY EQUIPPED SHOWERS, ENCLOSURE MATERIALS, HEPA FILTER-EQUIPPED VENTILATORS, HEPA VACUUMS, AND DUST MONITORS.**

Although most interior housing surface-preparatory work is done with hand tools, power tools and equipment are more effective and are usually safer to use. The following materials and methods are generally used in surface preparation.

1. WASHING

If properly done, washing can substitute for repainting. Most washing utilizes some kind of cleaning solution. However, there are several compounds, such as trisodium phosphate, which are banned in parts of the country as contributors to pollution, since the infusion of phosphates compromises some wastewater treatments. It is recommended that the local EPA or the authority in charge of sewers or wastewater be asked about the acceptability of chemicals proposed for this use. There are regulation-compliant commercially available products on the market that do an excellent job.

Washing solutions that "keep the surface shine," should be suspected of containing small amounts of wax or oil, which might interfere with the adhesion of subsequent coats of paint. It is best that all washing solutions be rinsed off with clean water.

The method of washing depends on the surface to be washed. The following methods involve washing by hand; power-washing equipment is covered under Blasting. Use appropriate and recommended safety equipment such as gloves and safety goggles.

a. Smooth Surfaces to be Painted or Coated

Equipment required for washing smooth surfaces to be painted or coated include:

- Two wash buckets (could be 5-gallon plastic);
- Cleaning solution;
- Two large natural sponges (Be sure that the cleaning solution is not harmful to the natural sponges. Thoroughly rinse them clean after use.);
- Two artificial sponges (could be pole-mounted);
- Abrasive (scouring) pads;
- Drop Cloths (plastic is slippery when wet; canvas is better).

b. Smooth Gloss Surfaces Not to Be Painted

Equipment required for work on smooth gloss surfaces not to be painted include:

- All equipment listed above, except that a cleanser should be substituted for abrasive pads;
- Towel (to remove water drops).

c. Rough Surfaces Such as Brick and Masonry

Equipment required for rough surfaces such as brick and masonry include:

- Two wash buckets (could be 5-gallon plastic);
- Scrub brushes (available in a wide variety of sizes, configurations, and bristle types to meet the needs of the job).

2. SCRAPING

Scraping is done to remove built-up, loose, or failing paints or coatings, and bumps. It can also remove excessive joint compound from dry wall and waste mortar from masonry. Although it is a simple method, it is often improperly done because of incorrect selection of tools. Typical scraping tools are stiff, and should be kept sharp. They include:

- Hand or draw-scrapers (available in various sizes and configurations);
- Putty or broad knife (typically rigid, bent, sharp, and a maximum of 3 inches wide);
- Multiple-use scrapers (sometimes referred to as a 4-in-1, or 5-in-1) effective for scraping off paint with their sharp, stiff, 2-1/2-inch wide blades.

3. SANDING BY HAND OR POWER TOOL

Sanding can also remove bumps and loose and failing paint, but it does so by abrading the surface. It is also used to smooth rough surfaces and dull shiny ones. Most sanding is done with sandpaper, although there are other media available, such as abrasive blocks. The abrasive in sandpaper comes in a variety of grit or abrasive sizes. Sandpaper is also available in a waterproof form, which lends itself well to use when low, or no, airborne dust is desired, as when a hazardous material like lead might be encountered. Now available are open-weave, abrasive-coated, waterproof cloth sheets that are exceptional for this use.

To control dust, wet sanding is recommended. Materials required include:

- Waterproof silicone-carbide sandpaper (available in a wide variety of grits or coarseness from very coarse 12 grit to very fine 600 grit);
- Sanding blocks (to hold the sandpaper) greatly enhance productivity and the effectiveness of the abrasive);
- Artificial sponge (used to "wet sand" dry-wall joint compound).

4. ABRADING BY HAND OR POWER TOOL

The following abrading tools are used for smoothing or removing protruding materials, and completing the work in a low-dust or dust-free manner.

- Steel wool (in both pads and roll form):
Steel wool is available in various degrees of coarseness from Number 5, which is very coarse, to Number 5/0, the finest. It is most often used with a cleaning solution to scrub off the residue left after stripping paints and coatings from a surface. Steel "splinters" should be carefully removed before painting to avoid their rusting in place.
- Abrasive pads (available in a wide variety of sizes and shapes):
Some have built-in handles for easier, more effective handling. Most are nonwoven synthetic fibers with an abrasive either adhered to, or impregnated in, the fibers. They are available in a wide range of coarseness, but are not graded as are sandpaper and steel wool. Unlike steel wool, they don't cause rusting problems. Some have built-in or attached artificial sponges for convenience, but these are usually small for maintenance work. Maintenance supply houses usually have larger pads, more appropriate for this kind of work.
- Steel brushes (also referred to as wire brushes):
These are most often used to remove failing paint and rust from metal surfaces. They are available in a wide variety of sizes and shapes. Also available are wire brushes with built-in scrapers. Some of the more popular include the long-handle, the shoe-handle, and the flat-back brushes. Stainless-steel wire brushes are recommended, since other types tend to leave metallic

residue that can rust. For heavy-duty corrosion removal, steel brushes made for power tools are recommended.

5. BLASTING

Blasting involves directing air or water under pressure, with or without abrasive or detergent additives, at the surface to be cleaned. The various methods include:

- Low-pressure water washing using water pressures under 5,000 PSI;
- High-pressure water cleaning at pressures from 5,000 to 10,000 PSI;
- High-pressure water jetting at water pressures from 10,000 to 25,000 PSI;
- Ultra-high water jetting at pressures above 25,000 PSI;
- Abrasive blasting, which uses air to propel a variety of abrasives, such as sand or slag;
- Wet-abrasive blasting, which propels an abrasive at a surface using water, with or without air under pressure, as the propellant.

Abrasive blasting and high-pressure water blasting require highly sophisticated equipment and are most often used in an industrial setting. Low-pressure water washing (under 5,000 PSI) requires a pump capable of converting tap-water pressures to up to 5,000 PSI, although typical pressures are in the 2,000 to 4,000 PSI range. These pumps are also called power washers, spray cleaners, high-pressure washers, and water blasters. When equipped with a chemical injector, they can be used to apply cleaning agents, mildewcides, and rust inhibitors. Dispersive nozzles and heads include:

- Fan nozzle (used for general cleaning);
- Round nozzle (which uses a straight, solid stream for maximum impact);
- Rotary head (utilizes spinning pulsating water jets to remove paint and foreign material aggressively);
- Extension handles (a minimum of three feet long, for comfortable work at higher levels);
- Adjacent-area protection (extremely important to avoid damage to adjacent areas). This could include:
 - Duct tape,
 - Plywood,
 - Rubber matting,
 - Corrugated fiberglass,
 - Canvas tarps,
 - Plastic sheeting 4 to 6 mils thick.

6. STRIPPING

Stripping, also referred to as removing, is most often done to remove deteriorated or unwanted paints or coatings. The methods used include:

- Dry-scraping or abrading using scrapers or abrasive to wear away or chip off unwanted material;
- Chemical stripping using both solvents and solutions (most often caustics) which dissolve or soften paints and coatings for subsequent removal with scrapers or steel brushes;
- Heat-aided stripping which applies heat to the material to be removed.

The use of stripping or removing tools, equipment, and materials is affected by regulations on handling hazardous materials. Many old procedures and tools (such as use of the blow torch) are not used today due to environmental concerns.

CAUTION! OPEN-FLAME BURNING TO REMOVE PAINTS AND COATINGS IS EXTREMELY HAZARDOUS AND SHOULD NOT BE ALLOWED ON HA PROPERTY. Electric heat guns should be used to soften paint or coatings for removal with a scraper only with great care. Hazards of this method are not only the heat (about 1200 degrees F, close to the ignition point of some building materials), but also the fumes emitted during the process.

a. Dry Scraping or Abrading

For completing such work, the following equipment, materials, and tools are used.

Hand-Scraping:

- Hook-type or draw-scraper (also called a paint or varnish scraper) that workers pull toward themselves. They are typically stronger than putty knives and often have a bend for better handling. Some have long handles to protect the worker when heat is used in this process. Quality blades are made of high-carbon steel, which can be sharpened with a file.
- File (to sharpen draw-scraper).
- Water spray device (to settle airborne dust).
- Water bucket and sponge (in lieu of water spray to control dust).
- Metal container or bucket (to gather the paint chips and debris).

Hand-Sanding:

- Waterproof abrasive (sand) paper, as described in sanding section;
- Abrasive pads, as described in abrading section;
- Sanding block (to hold the abrasive);
- Water bucket and sponge.

b. Chemical Stripping

CAUTION! PAINT AND VARNISH REMOVERS MUST BE HANDLED WITH GREAT CARE SINCE THEY CAN BURN SKIN AND CLOTHING, AND CAN DAMAGE OTHER SURFACES WITH WHICH THEY COME IN CONTACT. THE MANUFACTURER'S INSTRUCTIONS AND CAUTIONS MUST BE FOLLOWED CAREFULLY.

Strippers require the following:

- Chemical-resistant gloves;
- Applicator for the chemical remover, per manufacturer's recommendations;
- Scrapers, to remove softened coatings;
- Waste bucket, appropriate for the type of remover used;
- Wash buckets;
- Wash abrasives, sponges, or rags appropriate for the type of remover used;
- Sand (abrasive) paper or abrasive pads.

Additional tools or materials may be needed, as recommended by the manufacturer. The stripping chemicals are available in various forms and classifications, such as liquid, semi-paste, or heavy-bodied paste form. They are also classified as fast- or slow-drying (the slower drying is the more effective) and flammable or nonflammable.

c. Heat-Aided Stripping

The following tools and materials are required:

- Heavy gauntlet-style gloves;
- Electric heat gun;
- HEPA respirator;
- Long-handled scraper;
- Heat-tolerant floor cover;
- Metal bucket to collect removed materials;
- Abrasive paper or pad;
- Fire extinguisher.

7. PATCHING

Patching is usually done to repair cracks and holes in substrates, but is also used to fill in areas of failed or delaminated paint to level the surface. The type of substrate usually determines the type of filler to be used. Plaster walls should be patched with plaster or spackling compound. Small holes in wood should be patched with putty. Cracks between dissimilar substrates such as wood and plaster, should be corrected with caulking. Small holes in gypsum board may be patched with joint

compound, but larger holes will probably require gypsum-board backing or some other method of filling the hole. Joint compound should not be used as a general patching material because most are very water sensitive, have poor adhesion, and do not hold up well except when applied to the paper face of bare gypsum board.

a. Gypsum Board (Dry Wall)

Bare Substrate (Unpainted): Patching small flaws in this substrate is best done with joint compound, which is designed to adhere well to gypsum-board paper and itself. Unlike plaster or spackle, it easily redissolves in water, making it easy to avoid forming dry lumps while working with it. Joint compound comes in different forms for different tasks, such as bedding and topping. It is also graded by its hardness and drying time.

A hole fist-size requires either a gypsum-board patch or a backing-and-mud patch. If a stud is exposed, a gypsum-board patch can be screwed to it; if not, it is fastened to the adjacent gypsum board with adhesive or glue. There are also commercially available products, most in kit form, which use stainless-steel mesh or fiberglass screening to bridge the hole when no stud is exposed. These kits supply the bridging, the "mud" compound to cover it, instructions, and the required tools and fasteners. Patch larger holes with gypsum board for strength and durability.

Patching tools required for unpainted gypsum-board substrate include:

- Taping knife, to apply joint compound;
- Joint compound appropriate for repair;
- Joint-compound pan (used to hold and mix the compound) and a straight edge on which to clean off taping knife;
- Utility knife to cut gypsum board;
- Drywall or keyhole saw to cut gypsum board;
- Joint tape;
- Gypsum board for backing;
- Glue to attach backing;
- Screws to attach backing;
- Water bucket and flat sponge for wet sanding;
- Pole sander to sand joint compound.

Painted or Coated: Patching is usually done with a spackling or patching compound. Unlike joint compounds, these materials are designed to adhere well to painted or coated surfaces. Their drying and hardening characteristics vary considerably from product to product. Some harden in a few minutes and are ideal for patching larger holes, in preference to joint compounds, which

would have to be built up in layers. Others are slower to harden and are best suited for smaller holes. Patching compounds also vary in their adhesive strength.

Spackling compounds usually have better adhesion, and would be the product of choice for leveling a surface with missing paint or indentations which require a shallow and well-adhered repair. These products are available in a wide variety of generic types—from simple latex, gypsum, and casein to exotic epoxies—and come in both interior and exterior grades. Some are ready-mixed, while others require mixing. It is always best to use these products in the areas and for the purposes recommended on their labels.

Tools and equipment used to patch nail-size holes and damage to painted surfaces are:

- Spackling compound to make small and shallow repairs;
- Plastic mixing container for compound;
- Broad knife for applying and smoothing the spackling compound;
- Utility scraper to remove loose paint and material;
- Screwdriver, hammer, and nailset to reset screws and nails that have popped above the drywall surface;
- Water bucket and sponge, both to wet hole or repaired area prior to patching for better adhesion to the surface and to clean up tools after use;
- Pole sander.

b. Plaster

Bare Substrate (Unpainted): Patching of unpainted plaster is usually done with plaster of paris (fast-hardening), dental plaster (less shrinkage and harder), or patching plaster (longer working time and better sanding properties). Plaster containing wood fibers or some other fibrous reinforcement material is also used when large and deep repairs are made. Spackling compound can be used for smaller holes and cracks because it has better adhesion to the substrate and allows longer working time for the applicator before hardening.

For patching and repairs to holes and cracks in plaster where there is no paint or coating, use the following tools:

- Trowel or broad knife;
- Patching plaster appropriate for the job;
- Hatchet or chipping hammer to remove loose plaster;
- Utility knife and scraper to open cracks and remove loose plaster;
- Water bucket, sponge, and fiber brush to wet and clean work area and tools.

Painted or Coated Substrate: Larger holes usually require plaster to build up the area to the level of the plaster substrate. Where only paint has peeled, spackling compound should be considered to bring the surface level, because of its superior adhesion to painted or coated surfaces. Joint compounds generally should not be used for this purpose because they have poorer adhesion and less moisture- and humidity-tolerance, though they are easier to work.

Where cracks recur, fiberglass membranes can be used to bridge and reinforce the work area. These bridging systems are commercially available and should be used only in accordance with the manufacturers' instructions.

Because the patching material needs to adhere to both plaster and a coated surface, a spackling compound should be used. Tools needed for this procedure include:

- Broad knife to apply and smooth spackling material;
- Spackling compound;
- Utility scraper to remove loose paint and plaster;
- Water bucket and sponge to wet and clean the work area and tools;
- Pry-bar and screwdriver to remove unwanted nails and screws;
- Sand (abrasive) paper or abrasive pad to clean and smooth surface.

c. Wood

Painted: Consolidation or replacement should be considered for damaged painted wood surfaces, as indicated below. Loose, peeling, or delaminating paint should be scraped to a sound surface and sanded smooth. Shallow cracks in wood are caulked with a caulk suited to the particular application. Some are not paintable, and some can't be used outdoors.

The following is a list of tools and materials needed to repair or patch nail and screw holes, cracks, separations, failing paint, putty, or caulk.

- Utility scraper to remove loose material;
- Hammer and nail set;
- Screwdriver;
- Putty knife and putty or glazing compound to fill holes or replace missing glazing putty;
- Caulking gun and caulk;
- Sanding block and sand (abrasive) paper or abrasive pad to clean and smooth surface;
- Pole sander;
- Water bucket and sponge;
- Duster to sweep dust out of corners and edges;
- Rags and appropriate solvent to wipe off excess caulk or putty.

Clear-Coated Wood (Varnished, Lacquered, and Stained): Because it is difficult to match a patched area with an adjacent clear-coated surface, component replacement should be considered. Nail and screw holes are best patched with colored putty or putty sticks, matching the color of the adjacent wood.

The following tools and materials are required:

- Colored putty sticks and putty knife;
- Colored caulk and caulking gun;
- Rags and appropriate solvent, to remove excess putty or caulk.

d. Trowelled Concrete

Painted: These surfaces are usually floors and stair treads. Patching materials range from latex to epoxy-fortified cement/concrete patching compounds which are trowelled in place. There are commercially available epoxy and epoxy-fortified cement/concrete self-leveling patching compounds which are pourable and require a minimum amount of trowelling.

Clear-Coated: Clear-coated trowelled concrete floors are also patched with fortified cement/concrete patching materials. These must be fully cured before clear recoating.

The following tools, equipment, and materials are used for the repair of these surfaces:

- Chipping hammer,
- Ice scraper,
- Utility scraper,
- Duster or compressed air,
- Appropriate patching material,
- Concrete pre-treatment, per manufacturer's instructions,
- Metal straight-edge for leveling,
- Wire brush,
- Trowel.

e. Precast or Poured Concrete

Bare Substrate (Uncoated): Patching is usually done with cement/concrete patching compound. It may be necessary to use a form to hold the patch in place while it is curing.

Painted or Coated: Holes and cracks can be patched with a concrete patch or mortar. If the original coating system included a block filler, reapply one to match the original texture.

Materials for surface preparation include:

- Chipping hammer,
- Wire brush,
- Duster or compressed air,
- Concrete patch or mortar,
- Water bucket and sponge to wet area (as directed by patch manufacturer) and to clean tools.

f. Concrete Block

Bare Substrate: Holes and cracks are generally patched with mortar.

Painted or Coated: Holes and cracks can be patched with concrete patch or mortar. It may be necessary to reapply block filler in order to duplicate the original finish.

Surface preparation requires the following tools:

- Chipping hammer,
- Utility scraper,
- Duster or compressed air,
- Mortar,
- Water bucket and sponge to wet area to be patched,
- Spray device to wet area to be patched,
- Block filler (if used previously) to duplicate existing texture,
- Brush, roller, or broad knife to duplicate original texture.

g. Ferrous Metal

Painted or Coated: Holes and rusted-away metal can be patched prior to painting with epoxy caulk or auto-body filler. It is important to follow the manufacturer's recommendations.

Materials required include:

- Epoxy caulk or auto-body filler,
- Utility scraper,
- Abrasive paper/cloth or pad,
- Steel brush,
- Abrasive blaster, (if warranted by job size),
- Plastic (polypropylene) scraper to apply and smooth patching material.

h. Non-Ferrous Metal

Painted or Coated: Patch holes with the appropriate metal and thoroughly clean the entire surface by hand or solvent cleaning. Caulk joints. The following materials are required:

- For hand cleaning: scraper, wire brush, or steel wool;
- For solvent cleaning: rags and appropriate solvent;
- Appropriate caulk and caulking gun.

8. CONSOLIDATING

Consolidating is a high-tech replacement method used for impregnating deteriorated wood with wood fiber, which not only replaces lost material but also penetrates and stiffens any fibrous material to which it is applied. Once consolidated wood is cured, it can be sanded, sawn, or chiselled, and primed and finished as is the original wood. Most consolidating is done on exterior surfaces where deteriorating wood is difficult to patch and replacement of the member is impractical or costly.

Consolidation requires the following tools and materials:

- Wood consolidant material;
- Buckets for mixing;
- Utility scraper;
- Chisel to remove deteriorated wood;
- Polyester brush to spread consolidant;
- Hammer;
- Putty knife and broad knife;
- Duster brush;
- Rasp;
- Abrasive paper;
- Disinfectant;
- Mildew retarder.

9. REPLACEMENT

Despite the desirability of retaining certain architectural building components, it is sometimes necessary to replace some of them, such as doors and windows, especially during lead-based paint abatement procedures. Such decisions however, should be based on cost-effectiveness. The total costs to be considered include:

- Dismantling the component;
- Disposing of (possibly hazardous) old components;

- Retrofitting existing support framing;
- Procuring, fitting, and installing replacement components;
- The value of architecturally desirable components.

a. Wood

The following tools are required for replacement of architectural elements prior to painting:

- Pry-bar, claw hammer, utility scraper;
- Screwdriver, saw, nail set and nails, screws;
- Replacement architectural elements;
- Primer, for back-priming;
- Abrasive paper and block;
- Rasp, plane, chisel;
- Glue;
- Caulk and caulking gun;
- Replacement or refurbished hardware;
- Tape measure, level, square, utility knife;
- Putty and putty knife, wood filler;
- Solvents appropriate to materials used;
- Bucket and rags.

b. Gypsum Board/Dry Wall

Tools for the replacement of walls or full sheets of gypsum board are covered here, as opposed to patching, as previously described.

- Pry-bar, crow bar, claw hammer, nippers;
- Utility knife, square, straight edge;
- Key-hole or plasterboard saw;
- Screwdriver and dry-wall screws;
- Panel adhesive and applicator;
- Gypsum board, joint compound, joint tape, and corner beads appropriate to job;
- Taping knife or trowel;
- Water bucket and dry-wall sponge.

END OF CHAPTER TWO

MAINTENANCE GUIDEBOOK VI - PAINTING MAINTENANCE

CHAPTER THREE - PAINTS AND COATINGS

SECTION A THE COMPOSITION OF PAINTS

Most paints consist of binder, pigment, and solvent. The binder is the holding agent of the paint. A higher proportion of binder ensures better adhesion, a glossier finish, and more washable and weather-resistant paint.

The pigment is a powdery substance, which, when mixed with the binder and solvent, determines both the color and the paint's hiding power. A coating can be either pigmented (opaque or semi-transparent) or clear (no hiding pigments). Paint is always pigmented, by definition. Pigments protect the substrate from degradation due to sun and weather. Certain pigments also protect against corrosion. Some pigments can even give protection from fire by setting up a heat-resistant barrier.

Pigments can be subdivided into prime and filler pigments. Prime pigments are generally costly and something intrinsic to the mixture—for example, titanium dioxide (TiO₂), which is an excellent white hiding pigment. An example of a filler pigment would be calcium carbonate (caulk), which is inexpensive but adds only body to the paint.

The solvent keeps the paint liquid; when the solvent evaporates, the paint becomes thick, firm, and finally solid—a paint film is formed. If water is used as a solvent, the paint is called a "water-based paint." Another paint solvent is used in "oil-based paint." Neither of these terms is technically correct, but they differentiate between basic paint types, and give a clue to what solvent to use for thinning and clean-up. Paint thinners are sometime referred to as Volatile Organic Compounds (VOC), the amount of which is regulated by the EPA. Although the EPA's regulation concerns the manufacturer rather than the user, the applicator should avoid adding solvents to paints so as not to add to pollution.

The combination of resin and solvent is referred to as the vehicle. This is the liquid part of the paint, which is normally clear or transparent. In some forms, depending on the resin used, it is called varnish. The vehicle becomes paint when pigment is added.

The combination of resin and pigments is called the solids or total solids. It is the part of the paint that ends up on the surface being painted. The rest, the solvent, evaporates into the air. The amount of total solids in paint is generally expressed as a percentage. A paint has 50% solids if 50% of the paint remains on the surface and the other 50% evaporates. In general, water-based paints have lower total solids than their solvented counterparts, but generally less film build-up is required.

The terms "water-based paint" and "latex paint" are used interchangeably, although this is not technically correct. Even though the major solvent in latex paint is water, most of these products also contain VOCs, which as co-solvents are necessary parts of most water-based paints.

It is the resin that determines the product type and how it cures, while the solvent determines how the product dries. Curing and drying are not always related. Although a product may dry in a short time, it may not cure (reach its maximum hardness, toughness, and chemical resistance) for a much longer time. For example, many latexes dry (to the touch) in a few hours, but they take weeks to cure. During this curing time, the coating can be severely damaged by premature washing.

SECTION B GENERIC DESCRIPTIONS OF PAINTS AND COATINGS

The major classifications of cure types used in maintenance are:

- Oxidative—examples are alkyds and oils. They cure when oxygen from the air causes a chemical reaction called cross-linking. Generally this type of product needs a day to dry and a month to cure.
- Coalescent—examples are typical latexes, such as acrylics and PVAs. These cure when the water evaporates and the gelatinous beads that are left behind flow together and adhere to one another to form a film. These dry in a few hours and take several weeks to cure.
- Chemical Cure—examples are two-component epoxies, which cure by chemical reaction. Typically, two chemicals are mixed and cause an exothermic (heat-generating) reaction, which causes cross-linking of the resin molecules to form a solid film. These dry in several hours and cure in several weeks.
- Evaporative—examples are lacquers and shellac, which cure strictly by evaporation. When the solvent evaporates it leaves behind long strands of microscopic filaments which form a continuous film. Once the evaporating solvent leaves the film, it is fully cured. Only evaporative-curing coatings can be redissolved in their own solvent.

SECTION C TYPES AND USES OF PAINTS AND COATINGS

1. PRIMERS

The primer is the first coating applied directly to the substrate. It can be either oil-based or latex. There are many specialty primers on the market, often shellac-based or water-borne alkyds and acrylic-hybrid products, most often pigmented. They provide the bite (adhesion) into the substrate, and are designed for the penetration and sealing of it. Good painting procedure mandates that all wood be back-primed prior to installation. This is the application of primer to all sides and edges—including those which will not be exposed to view and will not receive a finish coat—to seal the wood and

reduce its shrinking and swelling due to humidity changes.

Ferrous-metal building components are usually factory-primed. A corrosion-resistant primer should be applied, after proper surface preparation, any time bare metal is exposed and rust or corrosion has formed.

A primer should be used, whenever a painted substrate is exposed, to spot-prime the substrate before repainting. Primers that have remained unfinished for an extended time should be reprimed before finishing.

2. SEALERS

Sealers can be latex, oil, water-borne, or one of the hybrids, clear or pigmented. If they incorporate the features of a primer, they are referred to as primer-sealers, as are most dry-wall primer-sealers. Most sealers, including those used for wood and masonry, are clear. Wood sealers prevent the drawing out of resins from the finish and into the substrate, leaving the wood unprotected.

Clear masonry sealers are sometimes used as a finish, but this is best limited to masonry used on the interior of a building. Masonry exposed to weather needs to be able to "breathe," or allow the small amount of water vapor it absorbs evaporate through its pores. If the water is kept inside the masonry by a sealer, it can expand during freezing weather, causing spalling of the masonry and subsequent water-penetration problems. Any sealer, including graffiti-resistant sealers, applied to masonry should be 90-95% permeable to water vapor to avoid this problem.

3. UNDERCOATERS

An undercoater is a foundation coat for enamels. It is generally oil-based because of oil's excellent penetration and adhesion capabilities. It may also contain strong solvents for better adhesion to previous coatings, and may be formulated for ease of sanding and smoothing.

4. MASONRY FILLERS

Masonry fillers have higher concentrations of pigmentation and are specifically formulated to fill pores and small voids in masonry. The binders range from small amounts of inexpensive binder to relatively high concentrations of catalyzed binders intended for use under high-performance coatings.

5. WOOD FILLERS

Wood fillers are used to fill the pores of open-grain wood. They are usually highly pigmented and can be either neutral (translucent) in color or colored to bring out the grain of wood. They are available in a wide variety of binders to be compatible with subsequent finish coats.

6. FINISH COATS

Finish coats are the final paint products applied over primers, sealers, or undercoaters. They should be durable, cleanable, safe, and aesthetically pleasing. Such paints are available in oil or latex, and in both interior and exterior grades. Use of a paint in a way or a location for which it was not intended can have unexpected consequences. For instance, paints for exterior use could contain built-in mildewcides which can be injurious to indoor house plants.

The following are generalizations about three basic classifications of finish coats.

a. Flat Finish

A flat finish is usually the easiest to apply and is the least affected by marginal surface preparation. Because it has good hiding ability, it can hide minor imperfections. It also has good reflectivity. A flat finish is the least durable of the finishes, is relatively easily damaged, and is difficult to maintain and keep clean.

b. Semi-gloss

A semi-gloss finish is generally used for painting kitchen and bathroom walls because it has good washability and stain resistance. There are numerous sheen levels available, depending on the manufacturer. Since semi-gloss paint amplifies surface imperfections, it requires more meticulous surface preparation than a flat finish.

c. Gloss

A gloss finish is the most durable, washable, and stain-resistant, and is therefore best for high-use areas. Although it has the best moisture tolerance and the most abrasion resistance, it is least tolerant of surface imperfections, amplifying them because of its gloss. Although it is often referred to as enamel, that term is not accurate.

7. FLOOR PAINTS

Floor paints available for use on wood, concrete, or metal are generally gloss, except for latexes, which are usually semi-gloss. Oil-based floor paints are frequently more durable than their latex counterparts. Because floors highlight surface flaws, proper surface preparation is extremely important. In areas subject to high abrasion or chemical exposure, such as in a boiler or maintenance room, two-component epoxies are recommended.

8. VARNISH

Varnish is a clear protective coating available in flat, semi-gloss, and gloss, and in a range of hardness and toughness. Its most common non-furniture use is for finishing and sealing interior unstained woodwork. Although it is available with ultraviolet-blocking agents, which offer some protection from the sun, its use is not recommended outdoors, where clear finishes break down more rapidly than stains and paints. Polyurethane fortification increases a varnish's durability.

9. STAINS

Stains are available in a wide variety of vehicles, solvents, resins, pigments, and dyes, both organic and inorganic. They can be transparent, semi-transparent, and opaque. There are interior and exterior formulations and some which are applicable to both exposures.

Exterior finishing stains, recommended for siding and other large flat areas, are available in both latex and oil formulations. Both the opaque and the semi-transparent are popular. They are brush-, pad-, or spray-applied, with little or no wiping and no additional finish coats. When two coats are used, the finish becomes opaque.

Interior stains, used to enhance the appearance of wood, are available in an even wider variety of generic types and colors, each with its advantages and disadvantages. The most popular are solvent-based wiping stains, transparent or semi-transparent, which require a finish. They are called wiping stains because excess material must be wiped off after application of the stain.

Wise users select a complete system from one manufacturer to be sure of the compatibility of all the elements of the system.

10. TEXTURE COATINGS

Texture coatings are usually latex and generally applied to surfaces with a hopper gun. These coatings cannot be washed, but can be repainted with latex applied with spray equipment or a long-nap roller.

SECTION D INTERIOR PAINTS AND COATINGS

Although manufacturers explain the intended uses of their products on the label, their use of painting-related terms is not consistent. For instance, the words "paints" and "coatings" are used interchangeably, although they don't mean the same thing. Likewise, the words "enamel" and "glossy finish" mean "flat wall enamels." Major interior paint and coating categories include:

- Acrylic Latex Flat Wall Paint;
- Alkyd Flat Wall Paint;
- Interior Semi-Gloss Latex Enamel;
- Wall and Trim Semi-Gloss Enamel;
- Alkyd Floor and Deck Enamel;
- Alkyd Gloss Wall and Trim Enamel;
- Polyester Epoxy;
- Acrylic Epoxy.

SECTION E EXTERIOR PAINTS AND COATINGS

Manufacturers' product designations are as follows:

- Oil-Based House Paint;
- Flat Latex House Paint;
- Alkyd Enamel Trim Colors;
- Semi-Gloss Latex House and Trim Paint;
- Gloss Oil Floor-and-Deck Enamel;
- Oil-Based Universal Primer;
- Hardboard Primer/Sealer;
- Ranch, Barn, and Roof Paint.

END OF CHAPTER THREE

MAINTENANCE GUIDEBOOK VI - PAINTING MAINTENANCE

CHAPTER FOUR - APPLICATION PROCEDURES

SECTION A APPLICATION PROCEDURES FOR EXTERIORS

1. GENERAL

All paint applications should be done in conformance with the paint manufacturer's instructions to achieve maximum benefits from the coating and any guarantees offered. Instructions are normally given for surface preparation, mixing, spread rates, and drying times in addition to recommended application tools and methods.

2. PAINTING ERRORS TO AVOID

Painting under the following conditions will produce unsatisfactory results:

- When the temperature is under 50 degrees F;
- When there are sudden drops in temperature;
- Immediately after rain;
- When wood is not thoroughly dry;
- Before the morning dew has dried;
- In direct sunlight, which can cause blistering;
- In strong wind, which may collect dust or flying insects on the fresh paint;
- In a strong hot wind, which can cause the paint to skin over and wrinkle.

3. PROTECTION OF ADJACENT SURFACES

Drop cloths or plastic sheets should be used to protect the work area, in particular under buckets and pails, in case they are toppled. Plastic sheets should be at least 4 mils thick, since lightweight plastic (less than 4 mils thick) has a tendency to bellow up and tangle in the workers' feet. All plastic sheeting used outside should be weighted at the edges to keep wind from bellowing it.

Plastic drop cloths should not be used to cover plants and other foliage, since sunlight passing through the plastic can "cook" the plants. Cloth drop cloths and tarps should be adequately supported by something other than the plants, which can be matted down or have branches broken by their weight. Where practicable, lightweight corrugated fiberglass sheets can be leaned against or attached to buildings to protect vegetation without undue sun stress or weight on the plants.

When working on a sloped roof, use carpet padding to protect the roof from paint drops and spills. The padding also provides a comfortable surface to work on. Masking tape and paper is one means to protect adjacent surfaces, but it is time-consuming to apply and remove. In addition, unless the tape is tightly affixed, paint has a tendency to seep under it, making clean-up even more difficult. Use of a top-quality brush reduces the chance of dripping paint where it is not wanted.

4. APPLICATION TOOLS

a. Brushes

Brushes are usually made of natural, nylon, or polyester bristles.

- **Natural bristle** brushes usually use hog bristles, and are best for applying oil-based paints, alkyd enamels, and varnishes. This type of bristle is superior in its ability to deposit a smooth film where it is wanted.
- **Nylon bristle** brushes are best used with water-based paints, although they may lose some of their spring after long exposure to water-based paints in hot temperatures. The nylon bristle does not stand up well to the strong solvents in many high-performance coatings, such as two-component solvent-based epoxies.
- **Polyester bristle** brushes are best suited for water-based coatings because they retain their stiffness even when subjected to high heat and humidity. In addition they have good resistance to strong solvents and acids.

All of these bristles are available in a wide variety of brush styles and sizes, each designed for a special job. The three most useful and popular styles are sash-and-trim brushes, flat wall brushes, and varnish brushes. Varnish brushes are also known as enamel brushes, and should more properly be called panel brushes.

- **Sash and trim brushes** come in two basic styles and in sizes from 1-inch to 3-inches wide. Bristle length ranges from 2 to 4-1/2 inches long with tapered sides. The flat sash brush is square-edged, like most conventional brushes, and is used for narrow flat areas such as baseboards, moldings, eaves, window trim, sashes, and shutters. The most popular size is 2 inches wide. Angular brushes have the brush edge set at an angle to make edging more accurate since the fine trim line is at the point of the brush. This brush is most useful for edging walls before rolling, or for trimming windows, woodwork, and doors. The most popular size for edging walls is 2-1/2 inches, for painting a sash, 2-inches.
- **Flat wall brushes** are used for painting large flat areas such as walls, siding, ceilings, floors decks, and roofs. Wall brushes are available in widths ranging from 3 to 6 inches. The most popular size is 4 inches wide, with a 4-inch long bristle, and about 1-inch thick.

- **Enamel and varnish brushes (panel brushes)** are made in sizes from 2 to 4 inches. Most are chisel-shaped, which means that the bristles come to a sharp edge, like a chisel. The most popular size is the 3 inch, used mostly for cabinets, baseboards, moldings, trim, and doors.

b. Rollers

Rollers come in styles and widths ranging from 3 to 36 inches. Most used by professionals is the nine-inch width because it is available in a wider variety of configurations and roller-cover fabrics. It is easy and comfortable to handle even when working overhead. Its paint-holding capacity allows painting with a minimum of stops for refilling. Roller parts include the following:

- **Handles (Frames):**

Cost-effective handles have the following features:

- Strong, long, sturdy, and rust-resistant;
- Strong, comfortable, solvent- and water-resistant;
- Threaded to accept an extension pole;
- Extension lip on handle to permit hanging roller in a five-gallon bucket without immersing the cover;
- Strong, rust-resistant cage;
- Nylon end caps and bearings. (A drop of oil applied to each of the bearings after cleaning will prevent residue hardening.)

- **Covers:**

Covers consist of pile fabrics of synthetic or natural fibers bonded to a core. A polyester pile bonded to a baked phenolic fiberboard core with epoxy adhesive is the most popular, because it does a good job and is cost-effective. The length of the pile nap determines the amount of paint the cover will hold, as well as the stipple or finish of the application. The nap fibers range in length from 1/8 inch to 1-1/2 inches. A 3/8-inch nap is recommended for smooth surfaces, although a 1/2-inch nap is often used because it holds and transfers more paint. Longer naps generally spatter more, requiring greater protection of surrounding areas.

- **Pans and Grids:**

Roller pans are available in widths to match the rollers, and in varying depths. Deeper pans hold more paint and result in greater productivity and safety, since they are less prone to spillage. Many professionals prefer to use a five-gallon bucket fitted with a grid for painting with both a roller and a brush.

c. **Spray-Painting**

There is no faster way of painting or producing a fine finish than by spray-painting. The two most widely used spray-painting systems for maintenance painting are conventional (air), and airless spraying.

Conventional: Conventional (air) spray-painting generally produces a finer finish than that produced by an airless application. Two basic types of conventional (air) spray are used in maintenance painting: pressure and siphon feed. Pressure feed is preferred in the construction industry. Even though its spray cannot be fine-tuned as well as a siphon-feed spray, the resultant finish is more than adequate. Most paint manufacturers supply recommendations for spraying their products, including paint-mixing instructions and recommendations for appropriate spray equipment.

The major disadvantage of all types of spraying, particularly when done outside, is overspray. Paint overspray can be carried as much as a quarter mile by wind, causing expensive damage to other finishes and plants. Therefore, all the previously mentioned precautions must be taken to protect adjacent areas, and the painter must be constantly alert to the direction of the wind and where overspray might be deposited. Overspray can blow around corners, over rooftops, into open or screened windows, and may even be drawn into ventilating systems.

Airless: Airless spraying atomizes paint by pumping it at very high pressure (over 1,000 psi) through a very small tungsten-carbide orifice. It is faster than conventional (air) spray painting, and since overspray is reduced less paint is wasted. Many paint manufacturers formulate paints specifically for spray application. Some of these products are known as dry-fall or dry-fog products. Because of the high pressures involved, many of these paints are readily atomized and do not require thinning. As with conventional spraying, most paint manufacturers publish mixing instructions for their materials and equipment recommendations, including operating pressures, gun, tip and tip-size recommendations for major spray equipment manufacturers.

Many professional prefer to use a five-foot pole gun in lieu of a conventional hand gun. These are safe and comfortable to work with, and increase the painter's reach by several feet. In spite of all of these product and equipment advantages, the painter must always be on alert so that paint is only deposited where intended.

SECTION B APPLICATION PROCEDURES FOR INTERIORS

As indicated above, all painting should be in conformance with the paint manufacturer's instructions. Failure to follow them nullifies any claim the user might have against the manufacturer for material nonperformance.

For interior painting the need for protection of adjacent areas during painting is even greater, because of the close proximity to installed equipment, furnishings, and personal property.

The painter is in care, custody, and control of the property being painted, and is therefore responsible for any damage to it during painting. The painter's Golden Rule is: "If it is not to be painted, move it or cover it."

For interior work, the following precautions are necessary:

- Removal of window shades, drapes, pictures, and paintings, as well as hardware not to be painted, such as switch plates, receptacle plates, window handles and locks, and easily removed interior doors.
- Masking of toggle switches, outlets, and not-to-be-painted registers and vent covers;
- Covering of floors and furniture not removable (after moving furniture away from walls to be painted);
- Bagging pendant light fixtures;
- Shielding carpeting adjacent to baseboards, and baseboards themselves unless they are to be painted.

END OF CHAPTER FOUR

MAINTENANCE GUIDEBOOK VI - PAINTING MAINTENANCE

CHAPTER FIVE - POST-PAINTING PROCEDURES

SECTION A CLEAN-UP PROCEDURES

Cleaning up the job site after painting is the painter's responsibility. This includes removing all drop cloths, tarps, plastic sheeting, masking paper, tape, bags, and painting-generated debris. Job-site clean-up may include vacuuming, dusting, sweeping, and the removal of all traces of masking tape, paint drops, and smears. Furniture, hardware, fixtures, drapes, shades, pictures, and anything else that was removed, should be reinstalled or repositioned.

SECTION B WASTE REMOVAL

Proper and safe disposal of used paint buckets, paint pots, masking paper and tape, plastic sheeting and bags, disposable tools such as razor blades, and other paint-job debris is the responsibility of the painter. Proper disposal of hazardous materials which were on the job site before the start of the job, such as lead-based paint chips, is the responsibility of the owner. Even if the painter agrees to dispose of the hazardous waste, the owner is still considered a co-generator, and is legally responsible for its safe disposal. Therefore, the owner should make sure that any hazardous waste is properly and legally disposed.

END OF CHAPTER FIVE

MAINTENANCE GUIDEBOOK VI - PAINTING MAINTENANCE

CHAPTER SIX - PAINT PROBLEM-SOLVING

SECTION A GENERALIZED PAINT FAILURES

It has been estimated that over 80% of paint failures can be attributed to poor, improper, or no surface preparation, which may result in peeling, chalking, discoloration, blistering, and cracking of the paint film. In general, when such problems appear throughout the structure, they can best be corrected by the complete removal of the failed paint, proper surface preparation, and repainting.

SECTION B LOCALIZED PAINT FAILURES

Most localized failures can be attributed to moisture penetration, the source of which must be discovered and corrected before the surface can be prepared and repainted. Moisture may enter a structure as a result of faulty flashing, roof leaks, inadequate or missing caulking, leaking or overflowing gutters and downspouts, roof-edge ice dams, piled snow, inadequate grading and drainage at the foundation, and cracked or ruptured paint film.

Water or moisture from interior sources can cause both interior and exterior paint failures. Often these localized paint failures are found adjacent to the moisture source—perhaps on the opposite side of the ceiling or wall. Sources of itinerant interior water and moisture may include leaky plumbing fixtures, water or sewage backup, water overflowing or chronically spilling from plumbing fixtures, condensation, inadequate ventilation, and excessive humidification.

SECTION C SURFACE PROBLEMS

Some problems frequently identified with paint are actually problems with the surfaces painted rather than paint failures. Examples are mildew, surfactant exudation (sometimes called surfactant leaching), and efflorescence on concrete, stone, masonry, stucco, or plaster.

1. MILDEW

Mildew is a fungus which can grow on virtually any surface, usually in a dark and moist location with limited air movement. It can be removed by washing with a solution of one or two cups of household bleach per gallon of warm water, and allowing the solution to do its work (generally ten or fifteen minutes) before rinsing thoroughly with clean water. After the surface has thoroughly dried, it may be painted in the customary fashion. The recurring presence of mildew is usually a

sign of a chronic water problem—a leak, overflowing water, condensation, etc.—which will need to be discovered and remedied before the mildew problem can be permanently solved. Painting a mildewed surface, even with a paint containing a mildewcide, will not by itself solve a mildew problem.

2. SURFACTANT EXUDATION OR LEACHING

Surfactant exudation or leaching is the development of shiny spots on surfaces newly painted with latex paint, occurring when a constituent of the latex solvent is deposited on the surface as the latex dries. This does no harm to the surface and will either wash away in time or can be washed off using a mild detergent in warm water, followed by a clean water rinse.

3. EFFLORESCENCE

Efflorescence is crystallized salts, usually white and powdery, deposited on the surface of stone, concrete, masonry, and sometimes plaster or stucco walls. The problem generally occurs either on newly built concrete, stone, or masonry walls, or on older surfaces experiencing water penetration.

a. Causes

Efflorescence is formed when soluble salts contained in mortar, plaster, or cement are dissolved by water and carried to the surface, where they are deposited and crystallize as the water evaporates. Although efflorescence is unsightly, it is generally harmless to the surface it forms on, and quite often, especially on newly built walls, is washed away by rain. Even though efflorescence is harmless, it should not be painted over, since it will prevent a proper bond between the paint and its substrate, causing subsequent paint failure.

Proper preparation of a surface experiencing efflorescence involves locating and correcting the source of the problem before attempting to remove the efflorescence itself. On newly constructed walls the problem is usually a temporary one, caused by the wetting of a wall under construction. Once the salts have been brought to the surface and the wall has dried out, the problem disappears, and the efflorescence is washed off the wall by rain.

Occasionally the materials used to build a wall are contaminated with sodium chloride or other salts, and the wall will continue to effloresce for a year or more, until it has deposited all the contaminating salts.

Faulty or failed construction is usually the cause of efflorescence in older structures, and should be remedied before the surface is painted. A thorough inspection of the wall will reveal

a source of water penetration—broken coping, deteriorated or penetrated flashing, faulty waterstops, or hydrostatic pressure against an inadequately waterproofed wall—which will need to be repaired before surface preparation can proceed.

b. Surface Preparation

Efforts to remove efflorescence should begin with the mildest remedies and proceed to the stronger ones only as necessary. Most efflorescence can be removed by dry-brushing with a stiff-bristled brush, followed by flushing with clean water. If the brushing is not effective, light sandblasting followed by flushing with clean water is usually sufficient. Sandblasting is not recommended for plaster or stucco, since it can pit the surface.

In the most extreme cases, it may be necessary to apply a dilute solution of muriatic acid (5 to 10 percent, or 2 percent for integrally colored concrete or plaster). Since the acid solution can be drawn deeply into the wall and cause damage there, the wall should always be dampened before application so the acid will stay on the surface. Other dangers posed by muriatic acid include changes to the surface texture and color. **ALWAYS TEST AN ACID SOLUTION ON AN INCONSPICUOUS PORTION OF THE WALL BEFORE GENERAL APPLICATION.** Begin testing the weakest dilution likely to have the desired effect (2 to 5 percent) and work up to the strongest solution (10%). Since acid solutions may cause slight changes in the color of the wall, the entire wall may have to be treated.

Apply the solution to not more than 4 square feet at a time, working from the top down, and systematically from one side of the wall to the other. Allow the solution to remain on the wall about five minutes before brushing off the efflorescence with a stiff-bristled brush, and flush the area immediately with clean water to remove all acid. Areas to be painted should be neutralized first by washing with a 10 percent solution of ammonia or potassium hydroxide, or allowed to weather for at least a month. Flush the surface with water immediately after applying the neutralizing agent. **CAUTION! ALWAYS WEAR PROTECTIVE CLOTHING, RUBBER GLOVES, AND SAFETY GOGGLES WHEN USING MURIATIC ACID OR A NEUTRALIZING AGENT.**

SECTION D PROBLEM-SOLVING RESOURCES

Many paint problems and failures can be identified and resolved with the help of a manual called "Paint Problem Solver," available from the Painting and Decorating Contractors of America. Chapters are devoted to major paint-problem types, including descriptions and photographs, and there are recommendations for their correction. Included are chapters on adhesion, application, discoloration, peeling, and miscellaneous problems. This manual is available from:

Painting and Decorating Contractors of America
3919 Old Lee Highway, Suite 33B
Fairfax, VA 22030
1-800-332-7322.

END OF CHAPTER SIX

MAINTENANCE GUIDEBOOK VI - PAINTING MAINTENANCE BIBLIOGRAPHY

For a complete list of publications and standards relating to paint and painting, with sections on technical issues (standards, estimating guides, problem-solving, etc.), training, reference, and health and safety, a "Resource Guide" is available by calling 1/800/332-7322.

END OF BIBLIOGRAPHY

MAINTENANCE GUIDEBOOK VI - PAINTING MAINTENANCE GLOSSARY

This glossary contains only terms and references used in this Guidebook. Additional terms used in the paint industry can be found in the "Standard Terminology Relating to Paint, Varnish, Lacquer, and Related Products," document number D16-93a, published by the American Society for Testing and Materials (ASTM). This is part of the "Annual Book of ASTM Standards," Section 6, Paints, Related Coatings, and Aromatics, available by calling 215/299-5400.

A comprehensive document called the "Master Painter's Glossary" is also available from the Painting and Decorating Contractors of America. To order, call 1/800/332-7322.

ABATEMENT, LEAD—The reduction of the possibility that persons will come into contact with lead, through removal, encapsulation, or other forms of isolation.

ABRADING—To wear away by friction.

ACRYLIC—A paint having an acrylic-resin vehicle, which is usually water-based.

ADA—The Americans with Disabilities Act, a federal law which sets standards for handicapped accessibility to public facilities.

ADHESION—The act or condition of adhering or sticking.

AESTHETIC—Relating to that which is pleasing to the eye, beautiful.

ALKYD—A synthetic ester resin used as a alternative to linseed oil.

APPLICATION—A method of applying or using.

AREA—A specific surface or space.

BAGGING—The use of a bag, either paper or plastic, to wrap or enclose an item to protect it from unintentional painting.

BLASTING—The cleaning or roughening of a surface by the use of air and/or water under pressure with or without an abrasive.

BLOCK FILLER—A heavily pigmented coating used to fill void spaces in concrete blocks prior to the application of a top coat.

CEMENT—A mixture of alumina, silica, lime, iron oxide, and magnesia, which has adhesive and cohesive properties, and hardens in place, firmly binding one or more materials.

CHEMICAL CURE—The reaction of at least two chemicals to cause a heat-generating reaction which cross links to form a strong, resistant material or coating.

CHIPPING HAMMER—A hammer-like tool with a chisel-like head, used to chip off paint and other unwanted substances.

CLEAN—Free of contaminants.

CLEAR—Coatings that are free of sight-obscuring matter.

COALESCENT—A material that causes the formation of a resinous material in a water-based solution so that it forms a continuous film of adjacent latex particles when the water evaporates.

COATING—A liquid, liquefiable, or mastic composition that is converted to a solid protective, decorative, or functional adherent film after application as a thin layer.

CONCRETE—A hard strong building material made by mixing cement and an aggregate such as sand or gravel with sufficient water to cause the cement to set and bind the entire mass.

CONSOLIDANT—A material used for replacing missing or deteriorated wood.

CORRECTION—The repair of a failure or damage.

COVERAGE—Spreading rate expressed in square feet per gallon. When used in relation to a pigmented coating, it is the rate of application required to hide the surface under it.

DAMAGE—Injury or loss of value.

DEGRADATION—Change in characteristics of a substance through chemical breakdown or physical wear.

DETERGENT—A non-soap, synthetic cleaning agent.

EFFLORESCENCE—A deposit of water-soluble salts on the surface of a stone, masonry, concrete, stucco, or plaster wall.

ENCAPSULANT—A sealant.

EPA—Environmental Protection Agency.

EPOXY—A thermosetting resin used in the manufacture of coatings.

ETCHING—The act of wearing away or roughening a surface.

EVAPORATIVE CURE—A total cure due to evaporation with little or no additional chemical action.

FAILURE—In painting, a painted surface that has not met reasonable expectations.

FILLER—A pigmented composition used to fill fine cracks and open pores to obtain a smooth even surface prior to painting.

FLAT—Having a low sheen; a paint with a very low sheen.

FUNGUS—A microscopic plant growth of the mushroom, mold, and yeast family.

GLOBULE—A small round particle or drop.

GLOSS—Having a high sheen; a paint with a high sheen.

GRAFFITI—Unwanted signs and drawings on walls and other areas in public places.

GYPSUM BOARD—Construction material in sheet form, made of gypsum plaster covered with paper and fastened to interior wall studs to form finished partitions.

HEAT GUN—A heat-generating device with a built-in blower for directing the flow of hot air at a surface.

HEPA—High Efficiency Particulate Accumulator, used to filter dust particles as small as .03 microns in size with 99.97% efficiency.

HIDING—The degree of opacity or ability to remove from sight the under lying surface.

HOPPER GUN—A spray gun designed to apply coarse-textured coatings.

ICE SCRAPER—A long-handled sturdy scraper.

LATEX—An emulsion of plastic globules in water used as a binder in making paint.

LEAD—A metallic element, compounds of which were used in the past as pigments for paint; considered a hazardous material because it can cause physical injury when inhaled or ingested.

LINE MARKING—A paint formulated specifically for use as a traffic or zone-marking paint.

MASKING—The protection of surfaces from unintentional painting by covering them with easy-to-remove tape and paper.

MILDEW—Microscopic plant growth of the fungus family which can feed on and discolor paint films.

MORTAR—A mixture of cement or lime with sand and water, used in construction to bind together building materials such as brick, stone, and concrete masonry units.

OIL—Any mineral, vegetable, animal, or synthetic substances used as binders in making paint.

OIL-BASED—Any paint that contains a solvent rather than water as part of its vehicle.

OPAQUE—Impervious to light; a surface through which one cannot see. For example, a properly spread paint is opaque, while a stain allows one to see through to the surface on which it is applied.

OXIDATIVE—A coating that cures by absorbing oxygen from the air.

PAINT—A coating with pigment to add color and protection to the surface to which it is applied.

PAINTING—The process of applying paints.

PARTIAL PAINTING—Painting only a part of a surface or unit; for example, painting one wall in a room.

PATCHING—A repair of surface damage.

PEELING—Separation of sheets or areas of a coating from surfaces, due to loss of adhesion.

PIGMENT—A powdery substance which gives paint color, hiding ability, body, and protection.

PILE NAP—Nap is the length of the fiber (or pile) on a paint-roller sleeve.

PLASTER—A mixture of lime and gypsum, usually applied to walls in thin layers that harden into a durable surface.

POLE GUN—An airless spray gun with its nozzle at the end of a long pressurized pole, used to allow the operator to reach high areas.

POLE SANDER—A long-handled sanding device used to extend the reach of the worker.

POLYESTER BRUSH—A synthetic bristle brush that is very resistant to chemicals, solvents, and heat.

PRIMER—A paint product designed to be the first coat applied to a substrate.

PROTUBERANCE—Anything which protrudes, bulges, or swells out from a surface.

PSI—Pounds per square inch.

PUTTY—A heavy paste composed of pigment and linseed oil used to fill nail holes and seal the perimeter of glazing.

RECOAT—The application of additional coats.

REMOVING—In painting, the stripping of an existing coating or coatings from a substrate.

REPELLENT—Resistant to some substances.

RESISTANT—Opposing intrusion.

RESPIRATOR—A device worn over the mouth and/or nose to protect the respiratory tract from air-borne contaminants.

ROOM—A space in a building enclosed by walls or partitions and a ceiling.

SANDPAPER—A paper coated with an abrasive material.

SANDING BLOCK—A device used to secure sand (abrasive) paper for more effective use.

SANDING—The action of using sandpaper as an abrasive.

SCRAPER—A tool used to remove loose paint and protuberances.

SCRAPING—The push-and-pull action involved in using a scraper.

SEALER—A paint product used to limit the porosity of a substrate.

SEMI-TRANSPARENT—Partially opaque.

SEMI-GLOSS—A moderate amount of sheen; a paint with such a sheen.

SHEEN—The degree of luster of a dried paint film.

SHIELDING—The protection of certain areas by the use of barriers.

SOLIDS—The paint material remaining after the solvents have evaporated.

SOLVENTS—The liquid carrier of a coating, most of which evaporates during the drying process.

SPACKLING—A material used as a crack-filler for preparing surfaces for painting.

SPONGE, ARTIFICIAL—A synthetic substitute for a natural sponge.

SPONGE, NATURAL—The skeletal remains of a sea creature which is yielding, cellular, and very absorbent, and is excellent for washing.

STAIN—A material designed to color without opaqueness.

SURFACTANT EXUDATION/LEACHING—A detergent-like material (surfactant) which comes out of (leaches) and builds up on a latex-painted surface.

STEEL WOOL—An abrasive material made of steel shavings.

STRIPPING, CHEMICAL—The use of strong solvents or caustics to soften and remove coatings.

STRIPPING—The removal of coatings.

SUBSTRATE—The base material to which a coating is applied.

SURFACE—The top layer or boundary of an object.

TEXTURE—Having a surface with a three dimensional configuration; to generate such a surface.

TEXTURE 111—A generic plywood product made to look like rough-sawn board and batten.

TOUCH-UP—The preparation and repainting of mars, scratches, or small areas of painted surface to restore the coating to match the rest of the painted surface.

UNDERCOATER—An intermediate or base coat.

UNIT—An apartment.

UTILITY SCRAPER—A special scraper that can be used in a number of different ways.

UTILITY KNIFE—A special knife with replaceable blades used for a number of tasks.

VARNISH—A liquid material which cures to a transparent solid film after application as a thin layer.

VOC—Volatile Organic Compound; solvent.

WASHING—The process for removing soil and other contaminants from a surface, usually by use of an aqueous (water) solution.

WATER-BASED—A common phrase used to describe paints that use water as a reducer/solvent.

END OF GLOSSARY