Exterior House Painting
Michigan State University
Cooperative Extension Service
June 1974
8 pages

COOPERATIVE EXTENSION SERVICE
Departments of
Human Environment and Design
Agricultural Engineering
Urban Planning and Landscape Architecture
MICHIGAN STATE UNIVERSITY

Extension Bulletin E-815

EXTERIOR HOUSE PAINTING

More than eight of every ten houses are made of wood. They are durable, economical, easily insulated, and possess beauty and charm. Many wood houses depend on paint to add color and beauty and protect the surface.

TYPES OF PAINT

Several types of paint are available. The ideal paint should not be affected by moisture. It should be resistant to staining by rust and other residues of metal corrosion. It should be resistant to mildew and not discolor. It should wear away uniformily leaving a good surface for the next coat.

Latex Paint

Vinyl -- Excellent adhesion to properly prepared surface, non-fading, good alkali resistance and blister resistant.

Acrylic -- Excellent water resistance, gives elastic film, good for exterior use. Has a tendency to bubble with a roller, has shorter wet-edge time and has a tendency to pick up dirt. Less fade resistant than vinyl.

Butodiene-styrene (rubber) -- Less sheen uniformity than vinyl or acrylic and required 30 days to develop hardness and washability. Usually used for porch and floor paints because it has good water and alkali resistance.

All latex paints are easy to apply, are quick drying, are self-priming on all sound painted surfaces and give a durable flat finish. They are porous, allowing moisture to escape, reducing the likelihood of blisters. They can be cleaned off of tools, hands, floors, windows, et cetera, with warm soapy water. They can be applied in humid weather or on surfaces that may not be completely dry. Be sure not to apply latex paints on iron or steel as the water causes steel to rust. Put a primer coat of rust inhibiting paint on the metal and then the latex paint.

Alkyd Paints

These paints have oil vehicles usually linseed oil so do not mix with water but give tough long-lasting surfaces.

Recommended for doors and trim because it is easier to wash and maintain the glossy surface. They are easy to apply, have good hiding power, and have good coverage. White paint is chalking which keeps it white; however, colors are non-chalking which prevents discoloring white walls when used as trim.

- - - - - - - - - - - - - - - -

James S. Boyd, Professor, Agricultural Engineering Department, June, 1974

Alkyd paints must be put on clean and dry surfaces. Clean up must be with mineral spirits and disposal of the used liquid may be a problem in cities because it should not be poured in the drain.

How Much Paint?

It is unnecessary to guess the amount of paint needed to paint or repaint any house. Finish coats of house paint normally can be applied to about 500 square feet of surface per gallon. The primer can be applied to about 450 square feet per gallon. With these figures and the house dimensions, the approximate number of gallons of paint required is easily determined by the following procedure:

1. Average height of house = distance from foundation to eaves for flat roof types; add 2 feet for pitched roofs.
2. Average height x distance around foundation = surface area in square feet.
3. $\frac{\text{Surface area}}{450}$ = number of gallons of primer required.
4. $\frac{\text{Surface area}}{500}$ = number of gallons of finish paint required for each coat.

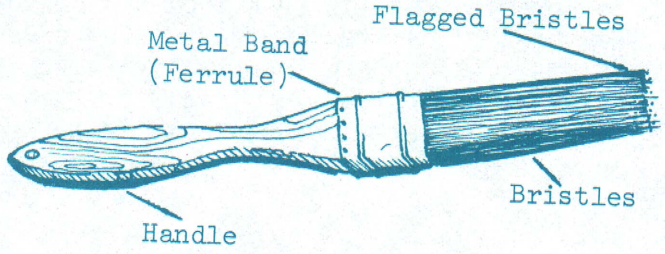
SELECTING BRUSHES AND ROLLERS

Which Size Brush? - Most paint jobs around the house can be accomplished with one of the following brushes:

- A 4-inch brush for large, flat surfaces such as floors, walls, and exterior siding.
- An angled, sash brush for windows, frames, moldings, and other narrow surfaces.
- A 2-inch brush with chiseled edge for enamel and varnish.
- A 1 to 1-1/2 inch brush for small jobs, toys, furniture and hard to reach places.

Natural Bristles or Synthetic Bristles?

When deciding between a natural or nylon bristle brush, remember that natural bristle is used primarily for applying varnish or alkyd or oil-base paints. Never use natural bristle brushes for latex or water-thinned paints because the bristles absorb water and become limp.



Synthetic bristles usually are made of nylon fiber and are used to apply latex, alkyd or oil-base paints. They generally are superior to natural bristle brushes in wear-ability. Although synthetic bristle brushes are used for almost any paint project, they do not give the best results with varnishes.

Choose A Quality Brush

There is a marked difference between good quality brushes and rollers and less expensive "economy" brushes and rollers. The home handyman buys good quality brushes because he wants a faster, better and neater appearing paint job. Here are some things to consider when selecting a paint brush.

- Fullness of bristles. Squeeze bristles gently; they should feel full and spongy. Poke your fingers into the bristles on the innermost part to determine fullness. A full bristle brush holds more paint for a faster job.

- Flagged bristles. Look closely at the bristle ends. They should have a number of fine, branchlike ends. These split ends signify a quality brush that will hold a good amount of paint and cover the surface in fewer passes.

- Bristle length. See if the bristle length is varied. Variance in bristle length permits a larger brush load than when all ends are cut even. Also, as the tip of the brush wears out, new bristle tips replace the worn ones.

- Tapered bristles. See if the base end of the bristles fastened by the metal bank is somewhat thicker than the tip end. You'll get a more satisfactory paint job if the bristles taper in toward the tip.

Choose The Right Roller

Paint rollers are great timesavers and aid in achieving a uniform finished appearance. Although rollers are used primarily for interior walls and ceilings, their use outdoors for lap and vertical siding is increasing. Rollers also are ideal for smooth masonry.

You'll want to consider the following points when selecting a roller.

- Two popular sizes (7-inch and 9-inch) of paint rollers are available. Special-application trim rollers (usually 3 inches wide) and corner rollers also are available. Most paint trays are designed for a roller up to 9 inches wide. Roller frames either have a compression-type cage or have the roller cover attached with an end cap held by a wing nut. Compression frames permit easier and faster roller-cover mounting or removal. The roller-cover core should be constructed of plastic-impregnated cardboard to resist softening and warping. If you apply floor or ceiling paint with a roller, be sure the frame handle has a threaded end permitting an extension pole to be added.

  Roller covers, like brushes, also are available with either natural or synthetic fibers.

  Natural fiber covers, made with wool or mohair, usually are recommended for oil-base paints, varnish and stains or similar finishes.

Roller-Cover Pile	Application
Standard - 1/4"	Most ceiling, wall or floor work
High - 3/4" or 1-1/4"	Exceptionally rough surfaces such as stucco, masonry, brick and wire fences
Stipple	For a stipple-textured finish or for rolling on mastic materials

Care of a Brush or Roller

Clean a brush or roller immediately for use. If this is impossible, soak it in water if you used water-base paint. Use turpentine for oil-base paint. A brush or roller is more easily cleaned and better preserved if cleaned .

If you used an oil-base paint:

- Roll or brush out excess paint from the brush or roller
- Remove the roller from its handle and wash in the correct solvent. Wash until no more paint comes out. Wash a brush the same way. Save the solvent. The paint will go to the bottom, and you can use the top layer for washing other brushes or rollers.
- Wring out excess liquid from the roller by squeezing the fibers between your fingers. Remove excess from the brush by using painting motions on newspapers.
- Clean with powdered soap, liquid detergent or cleaning powder rubbed into the bristles. Rinse in warm water until all soap or detergent is removed.
- Allow the brush or roller to dry. Then wrap the brush in foil and store it on its side or hang it. Hang the roller; do not lay it on its end or nap.

If you used a water-base paint:

- Roll or brush out excess paint from the brush or roller.
- Wash by rubbing powdered soap, liquid detergent or cleaning powder into the pad or bristles. Rinse in warm water until all soap or detergent is removed.
- Rinse a second time in warm water.
- Allow the brush or roller to dry. Then wrap brush in foil and store it on its side or hang. Hang the roller; do not lay it on its end or nap.

If the brush or roller must be left for a time while you are painting, cover it tightly with aluminum foil.

A GOOD BRUSH AND ROLLER ARE WORTH CARING FOR!

PREPARING THE SURFACE

Preparing the Surface for Painting -- New Work

The condition of the surface on which paint is applied is of great importance to the durability of the paint. Wood siding and trim, properly dried, provide the best possible surface for painting. In the lumber yard and on the job site, siding

and trim should be protected from the weather until they are applied. They should be primed immediately after installation. Structural defects, which may permit water to get into the wood behind the paint coating, should be corrected before painting, because water beneath a paint film can harm the best paint coating. Excessive moisture in wood is the most common cause of paint blistering and peeling; the cure is to eliminate the source of the moisture.

Excessive moisture might also cause bleeding of the water-soluble extractives in durable woods such as redwood and western red cedar. For this reason, water-thinned paints are not generally recommended as primers for these species.

Whether the house is to be painted for the first time, or repainted, a more durable paint job will result if the surface to be painted is free of dust and dirt. New wood should be brushed to remove all dust immediately before applying the primer. All open joints should then be sealed with caulking compound. Wood siding which contains resinous knots is not recommended. If knots are present, they should be treated to prevent knot discoloration of the paint. Resin spots and resin at knots should be removed with turpentine and a good knot-sealer (such as WP-578 or WP-578P - pigmented) should be applied before priming. A list of manufacturers of knot sealers of this type may be obtained from the Western Wood Products Association, Yeon Building, Portland, OR 97204. The knot sealer seals-in oily extractives and prevents staining and cracking of the paint in the knot area.

Nail heads should be checked to make sure that they have been set below the surface of the wood and puttied. Non-rusting siding nails are often set flush with the surface of the wood so that puttying is unnecessary. Non-rusting nails should be used, regardless of whether nailheads are to be set or left exposed.

All iron or steel must be primed with a rust inhibitive primer. Any topcoat can then be used.

Preparing the Surface for Repainting

If the old paint is just faded, dirty and chalking, the only preparatory work needed is to dust the surface before painting. If the surface is extremely dirty, a good practice is to wash it with a mild synthetic detergent and rinse thoroughly with water. Allow the surface to dry thoroughly before painting. Remove rust marks around nail heads with sandpaper or steel wool, then set, prime and putty. Seal all open joints with caulking compounds.

Remove loose, flaking or blistering paint with a wire brush and scraper. Where blistering, cracking or alligatoring of old paint is extensive, the old film should be removed to the bare wood for considerable distance, and the edges of the sound paint smoothed with medium sandpaper before priming and repainting. For advice on removal of paint, consult your local paint supplier. Primer exposed wood with house paint primer before applying the finish coat.

APPLYING HOUSE PAINTS

When to Paint

For best results, paint should be applied in clear, dry weather with temperatures above 40° F. Wait until morning dew has evaporated. If siding has been thoroughly wet by rain, let it dry several days before applying paint. When using latex paint, some moisture can be left on the wood. New, dry woodwork should be painted as soon as possible after installation. If the outside temperature is high, best results may be obtained by painting those surfaces that have already been exposed to sunlight, using the "follow the sun around the house" method.

How Many Coats?

A three-coat job is best for new work -- one coat of primer and two finish coats. However, don't make the serious error of assuming that if three coats are desirable, more coats provide better protection. When repainting a surface in good condition, one coat is often sufficient. However, when the old paint is very thin or an excessively long interval before repainting has elapsed, two coats should be applied.

Painting Tips

1. After stirring thoroughly, apply the primer according to the manufacturer's recommendation.
2. Start painting at a high point of the house and work down.
3. Finish coats of paint should be applied generously then brushed out.
4. Always paint with the grain of the wood, keeping an even pressure on the brush. Try to work across, as much as possible, to avoid lap marks in the paint. Always apply paint to an unpainted area and work into the wet edge of the previously painted portion.
5. The paint job should be completed promptly after the primer has thoroughly dried. Label directions will indicate proper drying time for both primer and finish coats.

PAINT PROBLEMS -- HOW TO CORRECT THEM

Paint, like all other products, may occasionally provide unsatisfactory service. Usually, neither the paint nor the wood surface are the direct cause of the trouble. Generally, the source of difficulty is in one or more of the following factors:

1. Poor painting techniques, or failure to follow label instruction for mixing, priming, and application.
2. Lack of proper protection of exterior walls against moisture.
3. Use of the wrong type of paint for the surface conditions encountered.
4. Use of paints of inferior quality.
5. Excessive interval between repaintings.
6. Too frequent repaintings.

Corrective suggestions for specific problems which may result from the foregoing conditions are as follows:

1. BLISTERING AND PEELING: Excessive moisture in walls, either from the interior or from the entrance of outside water may cause blistering and peeling. Most cases of unsatisfactory performance of exterior house paint can be traced to water in back of the paint film.

   To correct:

   a. Check basement or crawl space for evidence of dampness of condensation. Cover crawl space with 55-pound roll-roofing or heavy polyethylene sheet if required. Open crawl space vents to accelerate removal of moisture from ground.

b. Use kitchen and attic exhaust fans, if house if so equipped.

c. Vent automatic clothes dryer to the outside.

d. Wall cavities and roof overhang at eaves may be ventilated by installing small screened vents, manufactured for this purpose.

e. Check flashing and all outside caulking, especially if peeling occurs around windows, doors or corner boards. If entrance of rainwater is around windows and doors, apply a generous bead of caulking compound about 3/8" deep.

f. Lower grade line if earth is closer than six inches to bottom course of siding, and trim shrubs which grow against siding.

g. Before repainting, generously apply a paintable water-repellent under edges and at end joints of siding boards.

2. EXCESSIVE CHALKING: Quality paints wear gradually, so that excessive chalk does not form. Where a paint film has degraded rapidly as a result of excessive chalking:

a. The previous paint job was improperly applied, or

b. An inferior product was used.

To correct: Brush, to remove chalk, andapply two coats of quality oil paint according to label instructions. If latex paint is used, a suitable primer is recommended as a first coat to absorb the excessive chalk.

3. WRINKLING: Wrinkling may occur when paint is applied too generously, especially in the hot sun, or if too much oil has been added in mixing. Painting at low temperatures may also tend to produce this condition.

To correct: Sand the wrinkled surface smooth. Paint when temperature is well above 40° F., and brush the paint out well.

4. CROSS-GRAIN CRACKING: Paint, applied too frequently, can build up an excessively thick, brittle coat and fail by cracking and peeling across the grain of the wood.

To correct: Remove all paint to the bare wood. Complete removal of paint need never be required if paint is permitted to weather for a normal length of time before repainting.

5. MILDEW: In areas where continuous warm and damp conditions prevail, discoloration by mildew may be lessened by paint containing a mildew inhibitor. Many paints, offered by paint manufacturers in those areas, contain mildewcides or fungicides which minimize the mildew problem. Others can be made mildew resistant by adding proprietary compounds available from paint dealers. Where mildew has collected, wash with the following solution: 2/3 cup of trisodium phosphate (like Soilax); 1/4 cup of detergent (like Tide); 1 quart household bleach (like Clorox); Warm water to make 1 gallon.

CAUTION - - - Rubber gloves should be used when handling trisodium phosphate and mildew preventive. Protect shrubbery from the wash solution. Where mildew is heavy, repeated washing may be necessary.

6. PAINT WEATHERING SOONER IN ONE LOCATION THAN ANOTHER: With some exceptions it is natural for the paint on your home to weather away earlier on the southern and western exposures. Likewise, it is natural for paint to weather slightly faster on horizontal surfaces such as steps and uncovered porch floors, and on roofs, and other sloping surfaces, such as hand rails on steps, and window sills, than it does on vertical surfaces. The time to repaint is determined by that part of your home on which most of the old paint film thickness has weathered away.

JSB/jp
6/74

Issued in furtherance of cooperative extension work in agriculture and home economics, acts of May 8 and June 30, 1914, in cooperation with the U.S. Department of Agriculture. Gordon E. Guyer, Director, Cooperative Extension Service, Michigan State University, E. Lansing, Mich. 48824. 15M74