

## Lesson A3–14

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# Selecting Applicators and Applying Finishes

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**Unit A.** Mechanical Systems and Technology

**Problem Area 3.** Construction Systems

**Lesson 14.** Selecting Applicators and Applying Finishes

### **New Mexico Content Standard:**

**Pathway Strand:** Power, Structural and Technical Systems

**Standard:** VIII: Plan, implement, manage, and/or provide support services to facility design and construction; equipment design, manufacture, repair, and service; and agricultural technology.

**Benchmark:** VIII-B: Follow architectural and mechanical plans to construct building and facilities.

**Performance Standard:** 1. Identify and select appropriate building materials. 5. Paint or protect with coatings.

**Student Learning Objectives.** Instruction in this lesson should result in students achieving the following objectives:

1. Explain how to assemble painting supplies.
2. Explain how to select and use paint brushes.
3. Explain how to select and use paint rollers, edgers, and paint pads.
4. Explain how to select and use paint sprayers.

**List of Resources.** The following resources may be useful in teaching this lesson:

**Recommended Resources.** One of the following resources should be selected to accompany the lesson:

Burke, Stanley R., and T.J. Wakeman. *Modern Agricultural Mechanics*. Danville, Illinois: Interstate Publishers, Inc., 1992. (Textbook, Chapter 15)

Burkybile, Carl. *Paints and Painting*. University of Illinois: Information Technology & Communications Systems.

Herren, Ray V. and Elmer L. Cooper. *Agricultural Mechanics Fundamentals & Applications*. Albany, New York: Delmar Publishers, 1996. (Textbook, Lab Manual, and Teacher's Manual—Unit 28)

Home Video. *Exterior Painting*. Sponsored by Chevrolet Trucks.

Home Video. *Interior Paint & Wallpaper*. Sponsored by Chevrolet Trucks.

Phipps, Lloyd J., et al. *Introduction to Agricultural Mechanics*, Second Edition. Upper Saddle River, New Jersey: Prentice Hall Interstate, 2004. (Textbook, Chapter 15)

## List of Equipment, Tools, Supplies, and Facilities

Writing surface

Overhead projector

Transparencies from attached masters

Copies of student lab sheet

Assortment of paint brushes, rollers, paint pads, and paint sprayers

**Terms.** The following terms are presented in this lesson (shown in bold italics):

**Airless sprayers**

**Brush keeper**

**Compressed air sprayers**

**Dusting**

**Edgers**

**Flagged bristle**

**Foam brush**

**Natural bristle brush**

**Overspray**

**Paint pads**

**Paint stirring bit**

**Paint stirring paddle**

**Power rollers**

**Sash and trim brush**

**Synthetic bristle brush**

Varnish brush  
Wall brush

**Interest Approach.** Use an interest approach that will prepare the students for the lesson. Teachers often develop approaches for their unique class and student situations. A possible approach is included here.

*Show students some of the applicators (brushes, rollers, pads, and sprayers) that are available. Find out what applicators students have used and the knowledge level they have. Indicate that with this lesson they will learn which applicator to use and how to use it.*

## Summary of Content and Teaching Strategies

**Objective 1:** Explain how to assemble painting supplies.

**Anticipated Problem:** What needs to be gathered together prior to starting to paint?

- I. After planning a painting job, preparing the surface, and selecting the paint, comes assembling the supplies. Regardless of the type of applicator that is to be used, the area needs to be prepared for painting. Protect areas not to be painted by covering them with old newspapers, paint drop cloths, or masking tape.
  - A. Prior to the painting, gather together rubber gloves, a paint can opener, stirring paddle, paint thinner, a paint bucket and paint hook, ladders, plastic wrap or aluminum foil, and a rubber mallet. Clean-up supplies including an empty can, a petroleum based solvent (turpentine, mineral spirits, denatured alcohol, or commercial brush cleaner) for oil based paint, soap and water for latex based paint, hair brush or steel comb, paper towels, and rags should be nearby. To save clean-up time, Vaseline or other protective cream can be rubbed on your hands and arms.
  - B. Before you start painting, check the weather. The temperature should be between 50 and 95°F to get good bonding and drying of the paint. Keep in mind that if the humidity is high, drying time will be extended. In hot weather, paint in shaded areas. Painting in direct sunlight may dry the paint too fast to get good uniform coverage.
  - C. Open the paint can with a paint opener, not a screwdriver. A properly opened can of paint is much easier to reseal when the job is done. To prevent paint from filling the rim and running down the outside of the can, use a drill or nail to punch 3 or 4 holes in the lid groove of the paint can. The holes will allow the paint to drain back into the can making resealing the can much easier. Reseal the paint lid by tapping it into place with a rubber mallet instead of a hammer. Using a sheet of wax paper can help reseal the lid.
  - D. Check the condition of the paint. Lumps and curdling are signs of spoiled paint. Paint that has been previously opened may have a “skin” on the surface. Remove this hardened film. If pieces of the film fall in the paint, use fine window screen to filter them out. If the paint is thickened, follow the directions of the can to thin the paint. New paint

can be machine at the paint store or stirred by the painter. A **paint stirring paddle** is a piece of wood, approximately the size of a wooden ruler, used to stir the paint. A **paint stirring bit** can be used in a drill to rapidly stir a gallon or 5 gallon container of paint. Proper paint viscosity or thickness and proper stirring of paint are essential to achieve a uniform paint job.

*Either of the suggested texts has complete information on this topic. Assign students to read the suggested chapters listed in the recommended resources. Gather together the supplies for painting and paint clean-up or use TM: A3–14A. Discuss the use of these items. Demonstrate the proper opening of a paint can, poking holes in the lid groove, removing paint “skin”, stirring paint, and resealing the lid. TM: A3–14B provides a good illustration of this objective’s major points.*

**Objective 2:** Explain how to select and use paint brushes.

**Anticipated Problem:** How are paint brushes selected and used?

- II. It is impossible to do a quality paint job with a cheap, inferior quality paint brush. Shoddy brushes can leave paint streaked brush marks showing, and loose bristles stuck in the paint surface. In addition, poor-quality brushes will not last as long as good ones.
  - A. Good-quality brushes have “flagged” bristle tips. A **flagged bristle** is a bristle that is split into three to five strands. This flagging helps bristles retain paint and spread it more uniformly. Good brushes contain four or more different bristle lengths, resulting in flexibility and a tapered edge. Bristles should be set solidly in rubber. This means bristles will not fall out when you paint. The brush should feel “full of bristles” when compressed. Gaps between bristles at the end of the brush will result in poor spreading and streaked paint. Check the “bounce” of the brush. Push the brush against your hand. It should feel springy and elastic. Longer bristles tend to be more elastic and spread paint more evenly. When you press the brush gently, but firmly, against a flat surface, the bristles should hang together, not flare out at the end. Lift the brush and it should bounce back into shape.
  - B. The type of paint you select will help determine the best type of bristle to buy. **Natural bristle brushes**, commonly hog or horse hair, are tough, strong, long wearing, spread smoothly, and are used for old base paint. Never clean natural bristle brushes with water or use them with latex paints. The water will curl and weaken the bristles. **Synthetic bristle brushes**, either polyester or nylon, are man-made brushes that offer the advantage of being suitable for use with oil base or latex paints. **Foam brushes**, are a relatively new brush type that can be purchased usually for less than a dollar, used for small jobs, and then thrown away. They do not leave brush marks and work especially well for painting metal.
  - C. After picking the type of bristle, select a brush that is the right size and shape for the job. When you use a small brush to paint a large area you waste time and spread the paint poorly. Large areas should be painted with a square-edged 3 to 6 inches wide **wall brush**. A **varnish brush** (used for clear sealers) is a 2 to 4 inch wide brush with a chisel shaped

end . This shape gives a smooth application with no lap marks. **Sash** and **trim brushes**, 1 to 2 inches wide, may have a flat or beveled edge with an angular or oval end.

- D. When using a brush, use the “dip-and-slap” method. Slowly submerge the brush in the paint to no more than  $\frac{1}{3}$  the length of the bristles. Deeper dipping results in a shorter brush life, a messy paint job (drips and runs), and a brush so loaded that it is difficult to clean. After dipping the brush, tap the brush lightly against the inside of the container above the paint level to remove the excess paint. The common technique of rubbing or scraping the brush against the rim of the container should be avoided because it damages the bristles.
- E. Paint using long parallel strokes with the grain of the wood. Let the paint flow from the brush into corners and cracks. Poking or jabbing the brush into corners and cracks will damage the bristles. If you start your paint stroke a foot or so from the wet edge and paint back towards it, lap marks will be minimized.
- F. Brushes may be kept soft for short periods of time, such as over lunch hour, by wrapping them with aluminum foil or plastic wrap. Brushes that are to be used the next day can be kept overnight in a brush keeper. A **brush keeper** is a can containing a brush cleaning solution that will cover the bristles when a brush can be suspended into it. If the paint job is finished, unload your brush on scrap lumber or pieces of cardboard. Soak the brush in the appropriate cleaner for the type of paint you used. Press the cleaning solution out of the brush, comb out tangled bristles, and wrap the brush in a paper towel to keep the bristles straight. Store the brush suspended by the handle or laying flat.

*Have students read the suggested chapters in the recommended texts to assist them in more fully comprehending the content of this objective. Use TM: A3–14C to emphasize factors to consider in selecting a paint brush. Show students poor and good quality brushes. Identify the differences and talk about the factors involved in brush selection (flagging, bristle length, bounce, setting of bristles, natural vs. synthetic bristles, size and shape of brush, etc.). Demonstrate the “dip-and-slap” method of loading a paint brush and the painting from dry to wet technique to minimize lap marks. Have students use brushes to complete a painting job. Use LS: A3–14A as a guide to clean the paint brush.*

**Objective 3:** Explain how to select and use paint rollers, edgers, and paint pads.

**Anticipated Problem:** How are paint rollers, pads, and edgers selected and used?

- III. Rollers are designed for painting large and relatively flat surfaces quickly. Rollers vary in length from 3 to 18 inches. The 7 and 9 inch rollers are the most common sizes. Special rollers are used for painting pipe, corners, fences, and texturing ceilings.
  - A. After determining the size and type of roller you need, select the fabric and nap length. These decisions are made based on the type of paint used and the roughness of the surface to be painted. Fabric choices are natural or synthetic. Natural fabric rollers, lamb’s wool or mohair, are only suitable for oil and oil-alkyd paints. Water causes them to come apart. Synthetic fabric rollers, Dynel or Dacron, are popular and versatile because they are inexpensive and can be used with all types of paint. Rollers can be purchased as short

nap ( $\frac{1}{8}$ – $\frac{3}{8}$  inch), medium nap ( $\frac{3}{8}$ – $\frac{3}{4}$  inch), or long nap ( $\frac{3}{4}$ – $1\frac{1}{4}$  inch). The rougher the finish the longer the nap should be. Rayon rollers should be avoided because while they are inexpensive, they “mat” or come apart in your painted surface.

- B. When using a roller, start by pouring paint into the tray until approximately  $\frac{2}{3}$  of the corrugated bottom is covered. Dip the roller into the paint in the shallow section of the tray, and roll it back and forth until it is well covered. If the roller drips when you lift it from the tray, it is overloaded. Squeeze out some the paint by pressing the roller against the upper part of the tray above the paint line.
- C. Use a trim brush or corner roller to paint edges first. Follow immediately with the roller to avoid lap marks. With a newly loaded roller, begin by rolling upward. Always roll paint onto the surface, working from the dry area into the just painted area. Cover an area about two feet wide and three feet long using long, even, up-and-down, then back-and-forth strokes. Do not roll too fast, and avoid spinning the roller at the end of the stroke to minimize paint spatter. If you notice thin spots or missed spots, re-coat them. Always feather out final strokes to pick up any excess paint on the surface by rolling with minimal pressure.
- D. **Power rollers** that use electric power to pump the paint to the roller can be purchased. The amount of paint entering the roller from the inside is adjustable. Since the roller is not loaded by dipping it into a paint pan, time is saved. The continuous controlled flow of paint results in a smoother job with less thin spots and drips.
- E. **Paint pads** consist of fabric or filaments attached to a foam or plastic backing which is attached to a plastic applicator handle. They come in various size rectangles. Painting with a roller is faster than painting with a paint pad but pads are less messy. Pads do not spatter and drips are minimized. Pads are used mainly on smooth surfaces. Small paint pad applicators, some with adjustable guide wheels, are called **edgers**. Edgers are commonly used when painting next to the door and window frames or where the walls meet the ceiling.
- F. Clean rollers, pads, and edgers with the cleaner recommended for the type of paint you are using. Remove the roller cover or the painting pad from their holder while cleaning.

*Utilize readings in the suggested textbooks to assist students in understanding this topic. Use TM: A3–14D to summarize the selection of rollers and their use. Show students the types of rollers and demonstrate their proper use. Show students paint pads and edgers. Compare their use to rollers and demonstrate their use. Have students complete a paint job using rollers and edgers.*

**Objective 4:** Explain how to select and use paint sprayers

**Anticipated Problem:** How are paint sprayers selected and used?

- IV. Spraying is a fast, efficient way of applying paint. The aerosol can is the simplest way to spray paint. Simply shake the can well and it is ready to use. Spray cans work well for small jobs, but are a very expensive source of paint for large jobs. Large spraying jobs are done using air or hydraulic pressure.

- A. Using a sprayer takes practice in order to avoid drips and uneven coverage. You cannot control the paint distribution as precisely as you can with a brush, roller, or pad, so the adjoining and nearby surfaces not to be painted must be covered or masked off.
- B. Conventional **compressed air sprayers** use compressed air to spray thinned, strained paint. Professional spray painters who use this technique must know about gun selection (suction feed vs. pressure feed, bleeder-type vs. non-bleeder type), nozzle selection (internal vs. external mix), paint thinning, and adjusting fluid and air pressure. The operator should wear a mask and work in a well-ventilated, well-lighted area. Holding the spray gun 6 to 8 inches from the surface being coated seems to give the best coverage. If the gun is too close, the results are runs and lap lines. If the gun is too far away, the results are more “**overspray**” (paint particles floating in surrounding air) and “**dusting**” (paint drying before it reaches the surface to be painted).
- C. To get an even coverage it is important to hold the gun perpendicular to the surface and move the gun in a straight line. The tendency is to move the gun in an arc, causing light application at both ends of the stroke. Feather out the ends of the stroke by pulling the gun trigger after beginning the stroke and releasing it before the stroke is completed.
- D. **Airless sprayers** use hydraulic pressure created by an electric pump, rather than air pressure, to atomize the paint. Paint is pressurized to about 2500 psi and forced through very small orifices to create the spray. Instead of thinning the paint and making various adjustments, desired spray patterns and coverage rates are achieved by selecting the appropriate tip. While compressed air spraying gives a smoother, more uniform job, airless spraying has less over-spray, gives better coverage, and is easier to learn.
- E. Sprayer clean-up involves disassembling the gun and carefully washing all parts in the cleaning solution recommended for the particular paint that has been used.

*Refer students to readings in the suggested chapters in the recommended textbooks. They both do a good job of presenting basic information on the content of this objective. Show an aerosol paint can, a compressed air sprayer, and an airless sprayer. Compare how they work and when they are used. Use TM: A3–14E to illustrate proper spray gun stroke.*

**Review/Summary.** Review the tools and supplies that need to be assembled for painting and clean-up. Review selection criteria for paint brushes, rollers, paint pads, edgers, and sprayers. Discuss when each type of applicator would be used. Review the techniques for using each applicator. Show the Hometime video *Exterior Painting* and the painting section of *Interior Paint & Wallpaper*.

**Application.** Apply paint using as many of the applicators described in this lesson as possible. Use LS: A3–14A as a guide to clean a paint brush.

**Evaluation.** Take the written test and evaluate the skill level demonstrated by students in actual painting projects.

## Answers to Sample Test:

### Part One: Matching

1 = e, 2 = d, 3 = j, 4 = i, 5 = k, 6 = h, 7 = g, 8 = a, 9 = b, 10 = f, 11 = c

### Part Two: Completion

1. aluminum foil, Saran wrap, brush keeper
2. paint opener, lid groove
3. skin, stirred
4. flagged, 4, bounce
5. longer
6. overspray, Dusting
7. Compressed air, Airless
8. dip-and-slap
9. suspended, flat
10. aerosol can

### Part Three: Short Answer

1. Paint using long parallel strokes going with the grain of the wood. Let the paint flow from the brush into corners and cracks. Poling or jabbing the brush into corners and cracks should be avoided. Start the paint stroke a foot or so from the wet edge and paint back towards it to minimize lap marks.
2. Begin rolling upward. Always roll paint onto the surface, working from the dry area into the just painted area. Cover an area about 2 feet wide and 3 feet long using long, even up-and-down followed by back-and-forth strokes. Do not roll too fast and avoid spinning the roller at the end of the stroke. If you notice thin spots or missed spots, re-coat them. Always feather out final strokes to pick up any excess paint on the surface by rolling with minimal pressure.

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# Test

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## Lesson A3–14: Selecting Applicators and Applying Finish

### Part One: Matching

*Instructions.* Match the term with the correct response. Write the letter of the term by the definition.

- |                           |                          |                            |
|---------------------------|--------------------------|----------------------------|
| a. airless sprayer        | e. natural bristle brush | i. synthetic bristle brush |
| b. compressed air sprayer | f. paint pad             | j. varnish brush           |
| c. edger                  | g. power roller          | k. wall brush              |
| d. foam brush             | h. sash and trim brush   |                            |

- \_\_\_\_\_ 1. Brush used only with oil base paints made of horse or hog hair.
- \_\_\_\_\_ 2. Relatively new inexpensive brush type often used for small jobs and then thrown away.
- \_\_\_\_\_ 3. A brush 2 to 4 inches wide with a chisel shaped end that leaves no lap marks.
- \_\_\_\_\_ 4. A brush type that is suitable for latex or oil based paint.
- \_\_\_\_\_ 5. A square-edged 3 to 6 inches wide brush used to paint large areas.
- \_\_\_\_\_ 6. A brush 1 to 2 inches wide with a flat or beveled edge with an angular or oval end.
- \_\_\_\_\_ 7. Uses an electric motor to pump paint to a round applicator.
- \_\_\_\_\_ 8. Uses an electric motor to create hydraulic pressure forming a paint spray.
- \_\_\_\_\_ 9. Used an air compressor to create air pressure to form a paint spray.
- \_\_\_\_\_ 10. Rectangular applicator with a foam or plastic backing used to spread paint in on walls.
- \_\_\_\_\_ 11. Rectangular applicator, sometimes with guide rollers, used to paint where the wall meets the ceiling.

### Part Two: Completion

*Instructions.* Provide the word or words to complete the following statements.

1. Brushes may be kept soft over lunch by wrapping them in \_\_\_\_\_  
\_\_\_\_\_ or \_\_\_\_\_. Brushes may be held overnight in a  
\_\_\_\_\_.



# **PAINTING AND CLEAN-UP TOOLS AND SUPPLIES**

## **PAINTING**

- 1. Rubber gloves**
- 2. Vaseline or other protective cream**
- 3. Paint can opener**
- 4. Stirring paddle**
- 5. Paint**
- 6. Paint thinner**
- 7. Paint bucket**
- 8. Paint hook**
- 9. Paint strainer**
- 10. Ladders**
- 11. Drop cloths**

- 12. Masking tape**
- 13. Rags**
- 14. Aluminum foil**
- 15. Saran wrap**
- 16. Wax paper**
- 17. Rubber mallet**
- 18. Hammer & nail**
- 19. Paint applicators you plan to use**

## **Clean-up**

- 1. Empty can**
- 2. Petroleum-based solvent**
- 3. Soap & water**
- 4. Hair brush or steel comb**
- 5. Paper towels**
- 6. Rags**

# OPENING, STIRRING, AND SEALING PAINT CANS



Using a paint opener to open the can



Stirring the paint



Using a mallet to reseal paint lid

*(Courtesy, Interstate Publishers, Inc.)*

# SELECTING A PAINT BRUSH

1. **Flagged bristles**  
... three to five strands/bristle
2. **Bristle length**  
...at least 4 different lengths
3. **Bristle type**
  - a. **Natural**  
...oil base paints only
  - b. **Synthetic**  
...oil base or latex paints
4. **Solid bristle setting**  
...prevent stray bristles being left in the paint
5. **Full set of bristles**  
... result in smooth paint coat without thin spots



- 6. Bristle elasticity**  
...check bounce back when pressed down
- 7. Size and Shape**  
...select the size and shape that matches the job
  - a. Wall brush**  
... 3 to 6 inches square-edged brush
  - b. Varnish brush**  
... 2 to 4 inches wide chisel shaped end
  - c. Sash or trim brush**  
... 1 to 2 inches wide flat or beveled edge with an angular or oval end

# PAINT ROLLERS

## SELECTION

### 1. SIZE

... 3 to 18 inches, 7 and 9 inch common sizes

### 2. SHAPE

... for painting flat surfaces, pipes, and corners

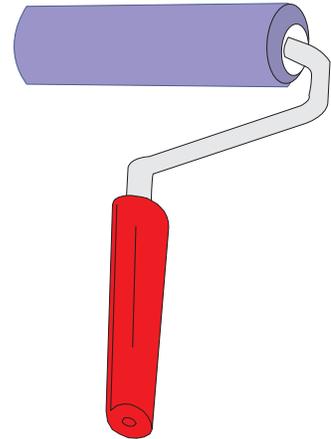
### 3. NAP LENGTH

... short, medium, and long

### 4. FABRIC

... natural (lamb's wool or mohair)

... synthetic (dynel or Dacron)



# **APPLICATION TECHNIQUES**

## **1. LOADING**

**... roll into the paint in the tray**

## **2. DRY TO WET**

**... paint from the dry to the wet edge**

## **3. AREA**

**... cover an area about 2 feet wide and 3 feet long**

## **4. LONG EVEN ROLLER STROKES**

**... up-and-down and then back-and-forth strokes**

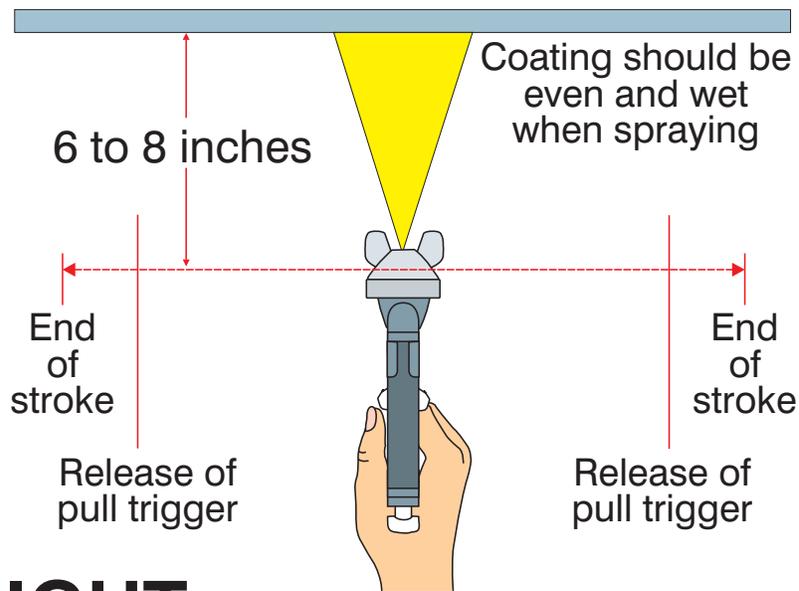
## **5. SPEED**

**... rolling too fast results in thin spots and spatter**

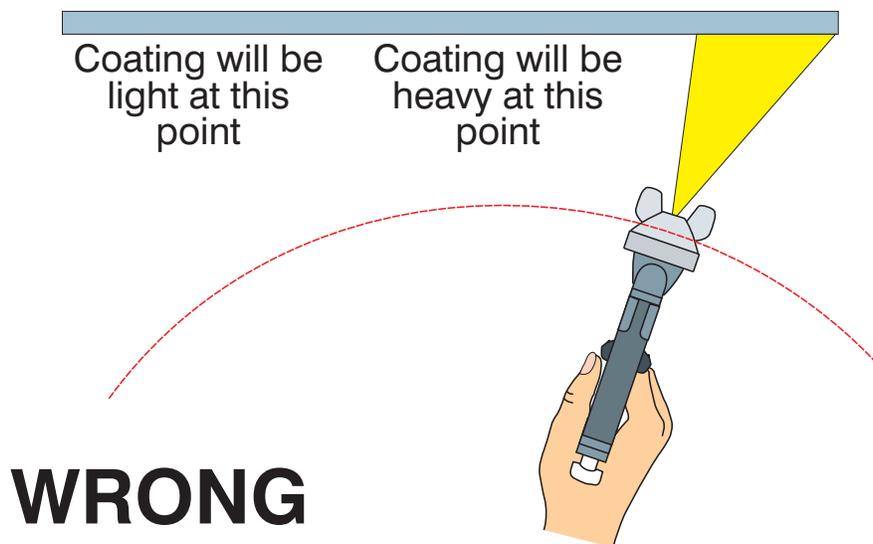
## **6. FINAL ROLL STROKES**

**... feather the edge to pick up any excess paint on the surface by rolling with minimal pressure**

# PROPER SPRAY GUN STROKE



**RIGHT**



*(Courtesy, Interstate Publishers, Inc.)*

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## Lab Sheet

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### Cleaning a Paint Brush

- \_\_\_\_\_ 1. Finish painting.
- \_\_\_\_\_ 2. Unload the paint brush on scrap lumber or cardboard.
- \_\_\_\_\_ 3. Place brush in recommended cleaning solution for the paint you were using.
  - \_\_\_\_\_ a. Petroleum-based solvent for oil based paint
  - \_\_\_\_\_ b. Soap and water for latex based paint
- \_\_\_\_\_ 4. Press the cleaning solution out of the brush with your hand or against a scrap piece of lumber.
- \_\_\_\_\_ 5. Continue dipping the brush in the cleaning solution and pressing the cleaning solution out of the brush until no evidence of paint exists.
- \_\_\_\_\_ 6. Comb out any tangled bristles.
- \_\_\_\_\_ 7. Wiping the brush across a clean paper towel to show the instructor that all the paint has been removed.
- \_\_\_\_\_ 8. Wrap the clean brush in a paper towel to keep bristles straight while the brush dries.
- \_\_\_\_\_ 9. Store the brush in a flat position.