High Quality Brush Painting

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Many years ago I cut the tracks of a German gentleman who had apprenticed to a paint shop before WWII in the boat building firm of Abeking & Rasmussen of Lemwerder, Germany. These were guild positions before Hitler and he started his training at about 14 to 15 years of age sweeping and cleaning. Within a year he was operating a pug mill making pigments and fillers and spending evenings in the loft cutting and making tack rags. Eventually he learned to care for and use fine brushes and mix and tint paints for the various big yachts under construction. Hitler soon put an end to his future at this yard but he was able to eventually work his way out of Germany and into Canada via Iceland on a Norwegian herring boat. Many years and several shipyards later he landed in California where he set up shop painting fine yachts for movie stars and wealthy industrialists. His work was unsurpassed.

I shamelessly pursued and dogged this man for his knowledge and eventually worked my way into his confidence and a learning circle. After a number of years working with him daily I too learned to use a brush and evolved to the level where I could provide my customers with high quality high gloss enamel and varnish finishes far superior to anything that was sprayed at the time. The finished product was as smooth and deeper than a spray job and lasted much longer. Brush work of this caliber is so alien to people today that most just pass it off as impossible. But in fact many of today’s mega-yachts are brushed in the better yards of Europe and it’s certainly not because they can’t afford spray equipment.

I would like to share a small portion of these brush painting techniques with this group while I can. Many of you have beautiful iron machinery but no realistic way to paint the stuff. Serious spray equipment is generally too costly and requires space and ancillary fixtures and equipment necessary to pull it off correctly and safely. Spray or rattle cans will work to a degree but are costly, extremely dirty with overspray and seldom apply enough or the right material to provide a serious long lasting coating. It is very important to understand the need to make the paint go where you want it to and in so doing you are finding out how much surface a brush load of paint will cover. After you have established how much area you can cover you must then continue with the same dip level and work the same amount of surface all the way through the job. This is metering. Push the paint around with the brush and make it fill your space evenly. Remember you are dipping the same amount and working the same real estate so if there is too much here there must be too little somewhere else. The entire process is not much different than spreading concrete or grading and leveling a road.

Good enamels will only flow and achieve the sprayed-like smooth look if it is applied at the same thickness throughout and properly conditioned for the job. Once those two parts of the equation are fulfilled any good quality paint will take care of itself unless the cure environment changes radically. When the paint is the right viscosity and applied heavy enough it flows into itself and settles down into one big continuous smooth surface free of brush marks, holidays and runs. The combination of surface tension and bonding with the substrate surface allows this to happen and keeps the material from sliding off. Too little paint and the surface will fail to flow while too much results in runs or curtains. The trick is to put enough paint down so that you are just almost to the run or curtain stage — no more or no less. Heat and wind are your biggest impediments to a paint settling in and flowing properly. On some outdoor jobs with changing wind, surface characteristics and heat the job of maintaining your paint viscosity can be challenging and at times can be more that a painter can handle. Obviously controlling your environment or painting indoors is a big advantage and the smart way to control the quality of the job.

TWO MOST IMPORTANT PRINCIPLES OF BRUSH PAINTING

The two most important things to understanding a proper brush application is learning to condition the paint for the job and being able to meter your brush. The object of conditioning the paint is to adjust the viscosity of the paint for the temperature and conditions around you with thinners/reducers and extenders. Normally a properly thinned or conditioned paint will flow or run off the stirring stick and not break into droplets with the stick about six (6”) inches above the surface. If the paint breaks into droplets coming off the stick or halfway down then it is generally too thin for brush work. If the paint has a hard time running down the stick and then breaks off into big globs the viscosity it much too heavy and unsuitable. Rarely, but occasionally you find a batch of paint ready to use right out of the can. In all my years of painting this has happened about a dozen times.

Metering the brush is simply the technique of dipping and filling the brush to the same level each time and knowing how much surface it will cover consistently. For non-pros or those getting started never dip the brush more than one third to half (1/3—1/2) and never wipe the brush over the rim of the can or bucket. Always tap it several times lightly until it stops dripping. The brush bristles will hold the paint but only as much as the brush is designed to hold. With your brush loaded approach the surface and start brushing both vertically and horizontally so that you are pushing and dragging the paint around and spreading it until it easily covers a given area with no galloping runs or holidays or bare spots. The name of the game is getting even distribution throughout your paint zone. If you see an area with too little find the area with too much and push or pull the paint until it’s spread evenly. Soon you will get a feel for how much a 1 1/2” to 3” brush will cover and can work in stages or zones equal to that amount of paint.

As a guide only let me say that a 2” brush dipped 50% can normally work an area or zone approximately 12 to 14 inches square depending on the porosity of the surface and other conditions. This is a good starting point and will give you some idea of what to expect starting off. Of course after a few minutes you should have a pretty good idea of how much real estate a brush load will cover and if you want to play it safe practice on a panel of similar material.

It is very important to understand the need to make the paint go where you want it to and in so doing you are finding out how much surface a brush load of paint will cover. After you have established how much area you can cover you must then continue with the same dip level and work the same amount of surface all the way through the job. This is metering. Push the paint around with the brush and make it fill your space evenly. Remember you are dipping the same amount and working the same real estate so if there is too much here there must be too little somewhere else. The entire process is not much different than spreading concrete or grading and leveling a road.

BRUSHING MECHANICS
If you are right handed then work from your right to your left and of course opposite if you are left handed. This will take advantage of the natural feathering action of your arm as it swings from in front of you out to the right or left. This motion naturally arcs away from the surface leaving a feathered edge. Of course this technique is used for horizontal brushing only and depending on the orientation of the piece you are coating you may be working vertically such as a bandsaw frame or horizontally all depending. When brushing vertically you will almost always have better success if you are brushing vertically on your back stroke to take advantage of the arms feathering arc but every job will dictate what works and does not. Working top to bottom is always the rule except for those strange pieces that make it too difficult.

Vertical brushing strokes reduce the chance of runs or curtains and are favored by many painters however the technique can impede or reduce the paint flow and result in some vertical brush strokes if not done carefully. Horizontal strokes are a bit more demanding but more paint can be applied faster due to the mechanics of the body and flow is almost guaranteed thanks to gravity. Of course runs and curtain are more likely using the horizontal approach but once mastered it is the preferred method of many top notch brush applicators.

Teaching the feel and mechanics of swinging a paint brush with words may be analogous to reading up on how to swing a baseball bat. Either are best taught hands on. Brush painting can be improved dramatically by understanding the fundamentals but the really good brush painters seem to have a feel for it and they are the ones who can carry large areas or tricky unusual shapes. Luckily most of the OWWM’s have less demanding shapes and provide ample breaks or places to stop and re-group if necessary.

The brushing stroke can be practiced and worked on until it becomes natural and not an action requiring thought. After the brush is dipped and tapped lightly on the side of the can or bucket it is then applied to the center of the metered work area which may be one or two square foot or whatever depending on the size of the brush and amount of paint you are comfortable with. Once you have spread or laid off the paint in this section evenly then it is time to tip it off or turn all the strokes in the direction you are working.

The brush stroke consists of two motions. One sweep in toward your chest and then one out or away from you. For the right hander the brush is pulled into your body, and your body if possible should be facing the work surface pretty much straight on. Pulling the brush in will drag paint along and you should feel the resistance. You will stop this pull or in-stroke about mid chest and then immediately return along the same line in a back stroke. The back stroke is the feathering stroke. This is done with minimal pressure on the surface but by keeping the brush and your hand light and letting the arc of your arm gradually lift the brush up and away from the surface to create a feathering action back onto your last wet paint edge. Pull in hard and back stroke easy, in hard-back easy, in hard-back easy and after a while this will become natural and all that is necessary is to watch the paint and apply more or less pressure to level and smooth the surface. This back and forth pull and feather is known as tipping off the paint but really all you are doing is trowling and blending one work area into the previous one. The brush is your trowel.

It is always imperative that you keep moving and never let the paint in the previous section lose it’s wet edge. This wet edge is the state when the paint is still fluid and not tacky. With practice this can be done almost blindfolded and you will be able to feel too much paint or the brush dragging over a holiday or bare spot. Well conditioned paint almost acts as a lubricant for the brush and when it’s right you will feel the ease of spreading and laying off a nice coat of paint. When the brush drags and fights you either have paint that is too thick or perhaps wind and heat are hitting your surface and stealing your wet edge.

If you lose your wet edge you still must keep moving. You cannot go back and try to correct it by additional brush work since the more you brush the worse it will get. Like Bondo or resins once they start to kick stay away or you will have a real mess. However if you have a can of retarder/slow thinner or Penetrol now is the time for an oz. or two to add some ball bearings to the paint and hope for a break or place to stop. The paint break is discussed below and can be a life saver on some jobs.

When brushing up to edges or hard corners remember to always brush out toward the edge and never drag the brush back over the edge. Wiping a brush over an edge almost always forces or squeezes too much paint out of the brush and creates runs or curtains much like wiping your brush on the lip of the can. Sometimes this is desirable and a good way to treat a narrow edge like a table. Instead of trying to dip your brush for such a small area you can wipe you brush on the edge to force paint out of the brush and then spread it. I will do this periodically just to keep too much paint from working it’s way up in the heel of my brush. Edges can be useful tools for controlling a flooded or overly full and drippy brush especially if your stuck working overhead. This is the one time when wiping a brush hard over the rim is acceptable.

**THE APPROACH**

Before you start a job walk or lay out the job in your mind so you know exactly where you are starting and finishing. You need to know is the job done standing or kneeling or both? Does the machine have to be rotated or do you work around it. Is the light consistent at all working angles? Are there any obstacles to watch out for or something that can knock over your paint bucket. If you have a drop cloth down do you know how to move around on it without it bunching up or dumping your paint bucket. As said before if you are right handed work from the right side to your left and always from top to bottom if possible. You don’t need any surprises while you have a wet brush and a bucket of paint. Soft rubber or gum type shoe soles create problems moving atop drop cloths.

If you ever watch a good professional painter closely watch how he looks at his surface. A good brush painter works the angles and ambient light to his or her advantage. They know that the only way to see flaws or the condition of the work is from an angle and not head on. The reflective light angle reveals more about the surface and is something you need to practice and get a feel for in order to really see how you are doing.

When looking for natural paint breaks what you are doing is looking for some seam or surface feature that will let you stop the paint edge without a feathered or overlap look afterwards. On a table saw if may be a removable cover or seam where cast iron plates make up. On other machines it may be the joint between the base and machine itself like a small shaper or sander. If no break is evident and you don’t feel like you can carry the whole surface try this:

Find a vertical or horizontal portion of the machine where when normally standing or looking at the machine this area would be somewhat concealed from light or view. Tape this off creating a good vertical, horizontal or even diagonal break then continue with the tape by applying more to essentially cover about 2-3” beyond or behind the working edge. When during your brushing you come to this edge continue as you are onto the
backup tape. This will create a clean break when you pull the tape. I have broken up large 6 –8’ panels or yacht hulls using this technique with horizontal breaks and within a few weeks of shrinkage and weather the joint was barely visible. If a small ridge is left you can usually come in after the paint cures with Bon Ami or a light abrasive and rub it out and then Crocus cloth ( 800-1200 grit ) and Penetrol the area to restore any gloss damage if necessary. Most of the time this joint will never be noticed and is not worth further consideration.

Handling & Mixing the Paint

Never apply warm paint to a cold metal surface. This both shocks the paint and creates problems with flow out. It can also generate some surface condensation under the coating due to the temperature differential of the two materials. In worst case scenarios these will become moisture bubbles that come to the surface and many times you will have areas where the coating will partially release and fail.

If the temperature is well below 50° then you need to think about pre-heating the surface and the paint you are working with. I don’t mean a lot of heat but enough to warm the iron to room temperature or above and try to keep the paint indoors overnight so it is warm but not certainly not hot around 65-75° is fine. Cast iron unlike sheet metal will hold the temperature for quite a while so take advantage of this. Of course remember warm paint is thinner paint and conditioning may or may not be necessary to start off but as the paint cools it will stiffen or thicken up quickly so have a reducer on hand.

Thinners. Most alkyd enamels respond very well to slow and fast thinners but try to keep their use to a minimum. The more thinner or vehicle you add the less solids or paint is going on and the less coverage and more surface shrinkage occurs. A good brush job with 5-10% thinner or additive such as Penetrol can provide 4-5 mils or more of material on each coat cured without any problem. A spray job with 30-40% reduction can at most apply 1-3 mils and after drying you end up with 1-2 mils depending on the material. Sometimes less.

Paint shrinkage due to solvent loss creates stresses between the paint and the substrate or surface you are coating. The faster the paint flashes or tacks off and more thinner in the mix the more likely you are to have shrinkage problems. As the solvents flash off and leave the mix the paint begins to shrink causing stress at the surface and substrate levels. With enamels in particular these stresses can in many cases affect the bond and result in premature paint release and failure not to mention loss of hide and color retention. So minimizing shrinkage is a good thing. The only advantage to a lot of shrinkage is the eventual disappearance of runs and curtains as the skin is pulled tight on the surface. But shrinkage is inevitable and the best we can do is try to control it. This is one area where the brush job naturally avoids the pitfalls that accompany thinned down spray work. Of course some of the better airless pumps offer a good compromise but the cost of good reliable equipment may be too steep for the part time hobbyist machine restorer.

THE TOOLS

Brushes are the best way to apply good enamel paints in my opinion but sometimes a combination of a roller and brush can be the used to advantage. You apply or spread the paint with the roller to the work zone and tip off with the brush. On larger surfaces a two or three person crew of roller and brushes can work some very impressive footage,

I like and maintain very high quality oxhair, and china bristle brushes most of which were made by the Purdy brush company of Oregon. I take good care of my brushes and they have been with me for over forty years and continue to give me good service. For varnishes and clear coatings I use badger or oxhair blend brushes and have a few Grumbacher sable blends. Varnish brushes are normally chisel cut and do not have overly long bristles but fine hair that is set up closely for a good flow and spreadability. You don’t work and push varnish and clears around like enamels so moderately stiff fine tipped brushes are the remedy. My varnish brushes never see paint or the wash baskets that paint brushes touch. They are cleaned and oiled regularly and can lay down 5-6 mils of varnish without breaking a sweat. With chilled varnish I have been able to lay off 7-8 mils on a vertical mast.

There are still a number or good brush makers in this country and in Europe so finding quality brushes is not too difficult. For enamel work it’s hard to beat a black china bristle brush with long bristles. The hog hair or china bristle is flagged or split at the tips and like barbs can retain and hold a lot of paint. Good brushes have a nickel band at the base called a ferrule and the bristles are set in a good hard Vulcanized filler block. Quality brushes have lots of bristle but not so much that the brush is too stiff. You should be able to take a brush and run it across a surface and feel good spring/bounce and life in the bristles.

I like what is called an over square brush or one that is longer than wide. A 2” brush with 2 3/4” to 3” bristles is about right for me. This type of brush will hold lots of material toward the tip, has enough reach to force the bristle tips into corners and nooks and enough sweep and bounce to feather nicely . A good bristle brush will hold the paint until you brush or work it off. The good brush responds to your commands unlike cheaper or most synthetic brushes where you feel you are trying to rush to keep the paint from getting away. You can test this by dipping a brush and let it hang for a while. A good china bristle with let go of only the excess paint but a cheap nylon or plastic brush lets most of the paint run out the bottom. The thinner the paint the worse the problem. Chinex or better quality synthetic brushes have simulated flagged ends but they are still light years from the natural china bristle in my opinion.

At one time there was a line of brushes called Auto-enameler’s and were made specifically for brush coating early car fenders. Back then you could get a car in black or black. The paint was really nothing more than lamp black copal gum varnishes and the brushes were cut to the shape of the fenders or part being painted. These brushes remained for sale for quite a few years and were exceptionally high quality and had extremely long oxhair blend bristle. Until a few years ago Purdy Brush Company still offered a variation called the “ Auto-Enameler” with a straight cut chisel long end. Very nice well balanced brushes with round easy to spin handles and certainly worth looking for since I suspect some still may be hanging in paint shop displays to this day. ( yellow wrapper round handles )

I know a lot of painters today using sponge applicators ( they are not brushes ) and have reasonably good success with some types of coatings such as varnishes, clear urethanes and Danish oil systems. If used in a team with a good practiced roller applicator two spongers can tip off a wall or boat in reasonably good fashion. However a sponge applicator will not, or cannot, push and spread heavy enamels around and force them into the surface profile like a brush. At the end of the day the sponger drops his applicator in the trash and goes home for a cold one while I am cleaning my..
brushes an hour or so later. The sponger has no three wash bucket system or spinners to deal with and never worries if his applicators are well oiled and wrapped flat. Though the sponger’s work falls short of a good brush man he appears to be happy and enjoying his free time.

Paint is mixed and transferred to a can, bucket or pail which is your working container. You will need a container that is large enough for the brush to enter and exit without catching the edges with your bristle tips. There is really nothing more irritating and cumbersome than trying to paint using a 2 1/2” brush from a 3” soup can. You have enough to do without having to worry about clearance between your brush and container. I like and still use plastic or paper paint buckets 6” and wider depending on the brush size and amount of material I will need to get the job done. I want a container large enough to be able to tap the sides with my brush as explained earlier after dipping.

To those using small deep cans I must assume the brushes are being wiped on the edge and not properly tapped which most of the time yields a brush that is not full and is hard to meter. Wiping the brush on the rim yields a mess on the side of the can which soon becomes a mess on the handle and ferrule of the brush which in turn becomes a mess on you and your body. Beside a bigger pail is less likely to tip over and easier to use all the way around.

My favorite paint containers were those I salvaged from second hand stores with kitchen supplies. I can almost always find some nice metal smooth sided steady vessel that I can solder a side handle too like the old aluminum measuring cups and bingo my preferred paint bucket. My habit of eating lots of pork and beans when I was younger may have made me a good brush man he appears to be happy and enjoying his free time.

I mentioned plastic paint buckets earlier and a note of caution is in order here. Not all plastics are suitable for paints and paint thinners or reducers which can readily dissolve the container. If in doubt take a sample wipe on the container with some thinner or acetone to make sure. Another warning about plastic is it’s propensity for brittleness with age and exposure to UV light. Though I still use these buckets I will throw them out after a while just from fear of having one crack and leak all over everything. — again!

**CLEAN UP**

Cleaning your brushes is a necessary evil. I am not going to address the various health risks associated with thinners and coating systems since I am assuming we are all, or should be, cognizant that precautions are necessary when working with these products. However I prefer good gum turpentine for day to day working solvent or hold-over buckets. If your job will take a few days or sessions then there really is no need to clean the brushes each day. Merely fill a small can or container with enough turps to hit the ferrule of your brushes and leave them in the solvent upright. Be advised to keep them vertical or hang them on a wipe on the container with some thinner or acetone to make sure. Another warning about plastic is it’s propensity for brittleness with age and exposure to UV light. Though I still use these buckets I will throw them out after a while just from fear of having one crack and leak all over everything. — again!

When it’s time to use the brush again I take my spinner and a five gallon bucket and give a couple or hearty swirls of paint you and I are convinced the brush is clean it should be preserved with some sort of oil. I use a mixture of automotive non-detergent oil and kerosene, but others use straight kero or diesel. It all works. Wrap the brush in a wrapper made from a brown paper bag and store flat. If you have a hanging brush storer that is even better.

Disregard the advice on new brush wrappers telling you to use soap and hot water for cleaning. Anyone who has done this immediately learns that the nice black bristles become unruly and difficult to train again. Water and bristle or hair brushes do not play well together and if you want your brushes to keep their shape avoid this mix. Same goes with latex or waterborne paints both of which will feaze a good natural bristle brush.

( Feaze is to fray or make ragged the end of a rope )

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**TAPING OFF**

Taping off is a necessary skill for clean edges and a nice look with color breaks. However taping is another skill and one that is easily learned if you understand the rudiments. I will not go into the various aspects of taping off or the tapes available to the painter today but touch on one facet that can ruin or save your job. There are as many types of specialized tapes as there are jobs and a topic for another day.

After the tape is down you need to strike the working edge — that is to say the edge exposed to the paint. The tape is down but not paint creep proof. Unlike spraying where a tack coat is normally applied the act of brushing forces the paint under the tape edge. Take a popsicle stick or soft wood stick and firmly strike or work this along this edge of the tape. You are basically pressing down and sealing the edge to make sure the paint will not creep underneath and leave a fuzzy edge. This little step makes all the difference on surfaces that are not uniform or perfectly smooth and the difference between a decent job and a professional looking job. Of course with rough cast iron this may be difficult if not impossible but try nonetheless. The best alternative of course it to look and find seams or breaks in the machine surfaces and utilize these instead of tape. If you are stripping then it behooves you to insure all tape surfaces are glazed and smooth to hold a good tape edge. You have to wonder why brushing can force paint under the working edge of tape while most sprayed jobs don’t. Once you figure this out you come to realize why most brushes job stick and last longer or rough or profiled surfaces.
Misc. Notes

From time to time you will need to get up and walk away from the job to either take a breather or perhaps mix more paint. The wet brush must not be allowed to dry or stiffen up resulting in the bristles being clumped up and unable to work individually. The best way to keep the brush wet and workable is to wrap it in aluminum foil or Saran wrap. This keeps the air away from the bristles and will keep a brush reasonably fresh for hours and even a day or more depending. If your brushing catalytic two part coatings such as epoxies you can do the same but put the brush in the refrigerator to retard the cure. About six to eight hours is the safe limit here. Your wife is your problem.

If after completing the job and coming back to scope out your work you see some runs or curtains don’t be overly alarmed. In my book too much paint is always better than not enough and there are ways to correct or finesse these problems provided they are not too large. When the paint surface is actually tack free but far from being cured you can take a wet finger and lightly smooth out small runs and curtains. Most of us used to spit on our fingers for this but obviously for health reasons a drop or two of freshwater will do. Make sure your finger tip is clean or you will smear your work. Don’t over rub and make sure the paint and you finger tip do not drag or stick — this will destroy the gloss. I have rubbed out some pretty big curtains in my day and nobody was ever the wiser. Many times the shrinkage and cure process will pull small runs out over time and one will never see them again. Holidays or skips are a different matter and cannot be blended or corrected as easily — a second coat is the answer unless the area is a low visibility location where a spot will not be highly visible then you can go it and lightly scuff with 320-440 grit or Bon-Ami and touch up with a fine brush.

THE CHECK LIST

Finally remember these simple rules and aids for Painting

1. Don’t swing too big a brush you always better off 1/2” smaller than 1/2” to big.
2. Always brush toward the edges.
3. Keep brush down like gun and away from your feet.
4. Look for natural breaks or joints where you can stop and control the job.
5. Pull and stretch your tape a little bit before landing.
6. Always strike off working edge of tape to and prevent creep.
7. To remove pull tape down at 30-45° and toward direction you are pulling.
8. A wet finger tip will rub out a run once paint has tacked off.
9. Never clean or wipe your surface with paint thinner or mineral spirits these solvents leave an oily residue.
10. Always tack off with a tack rag or lint free cloth.
11. Punch holes in rim of new paint can when first opened to allow drainage.
12. Stored paint must be turned at least three times a year.
13. Work right to left natural arc of arm.
14. Work top to bottom.
15. If you need to stop keep brush wet & usable by wrapping in Saran wrap/alum foil.
16. Turps will keep brushes for long periods without settled paint.
17. Don’t use junk paint or brushes — 80% labor 20% paint.
18. Try not to work out of the paint can pour off into bucket or can.
19. Consistent paint thickness flow don’t overwork the paint.
20. You can tint your undercoat with topcoat color to enhance coverage.
21. Glosses have better hide than flats and last much longer.
22. The higher the gloss the more flaws you will see.
23. Yellows and reds fade fastest.
24. Grays usually dry a half shade darker than out of the can.
25. Whites and light colors accentuate height and size, darker colors pull it down.
26. Don’t pick bugs or crud from surface until dry otherwise you will leave a mess.
27. If you don’t like latex gloves wash hands with ivory then don’t rinse let soap dry on skin, wash up after the job and everything comes off.
28. Don’t wear linty sweaters or clothes that are dirty when painting.
29. Soft rubber soled shoes with soft toes drag and grab drop cloths.
30. If possible leave a heat lamp going near a freshly painted machine overnight.
31. Put all your rags and cloths in a Zip Lock bag when you are done to prevent fire.