How to Paint Your Own Airplane

You Can Do It! I'll Show You How!

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Chapter 1 –

Can I Roll It On?

One of the most important steps applicable to building or restoring an airplane is spraying on the final paint. Whether it is metal, fabric, or fiberglass, preparing the surfaces and spraying on the final colors determine how the airplane will look. You can attend to every small detail during the building or restoration process only to end up with second-class results if the exterior does not have a pleasing appearance.

Seldom will the paint job have any bearing upon the safety of the airplane, but it will certainly affect how others judge the quality of workmanship that has gone into the project. With this in mind, most builders and restorers want to ensure that this step is done properly.

If the painting is so critical to ensuring a successful project, should you consider doing it yourself? Many people have the mistaken opinion that spraying paint onto a surface presents an insurmountable task for their level of skills. This is simply not true. A large number of builders and restorers have painted their own airplanes with professional results. Few of them had any previous experience. They simply took the time to *prepare* themselves and their airplanes before beginning the actual painting process. By painting their airplanes themselves they saved large sums of money in addition to concentrating on the small details that are sometimes overlooked in a local paint shop. **Preparation** of the surface and **practice** by the painter are two main areas that need lots of attention. Preparing the surface to receive the paint comprises about 80 to 90% of the time involved in painting an airplane. Perfecting your spraying techniques on practice panels before undertaking the painting of your surfaces is equally as important.

After reviewing the information that will be presented in this book, you will be in a position to make the decision concerning whether or not you want to undertake this final building step. We will take a detailed look at the equipment needed, where to spray, preparation of different types of surfaces, spraying techniques, etc. Hopefully, the mystery that surrounds spray painting will be dispelled. In traveling around the country, I continually hear concerns voiced about this important step. Most amateur aircraft builders and restorers have a real fear of picking up a spray gun and aiming it at their precious project. Understand that many before you have fired their spray guns with success, and you can do the same if you so choose.

To begin our discussion let's look at why paint even needs to be **sprayed** onto a surface. Many people ask, "Why not roll or brush the paint on like I do on the walls of my house?" Wouldn't that make it much easier? Yes, it certainly would be much easier to do and would save us a lot of work. We have builders who have actually rolled paint onto their airplanes with some degree of success. However, before you get excited about this possibility, let's take a closer look. After the facts are presented, you should be convinced that you need to learn the proper procedures of spray painting, as they will be presented over the next several chapters.

Rolling Paint vs Spraying Paint

Paints are **specifically formulated** for either rolling or spraying. Household paints are formulated for rolling. Aircraft and automotive paints are formulated for spraying. If you use the wrong type of application, the results are almost always unsatisfactory. Paint chemists have certain specifications they adhere to when formulating their products. This fact may be compared to an engineer designing an airplane around certain parameters. When a paint chemist formulates a recipe for aircraft paint, the selection of ingredients is crucial. The resins, solvents, fillers, and pigments are selected based on the durability and gloss desired in addition to the desired application process. The formula of the paint determines how it should be applied. The short answer is very simple – do not roll on a paint that is designed to be sprayed, and don't spray a paint that is designed to be rolled onto a surface.

Rolling on paint always leaves some sort of pattern that will be visible in the dried paint. Think about painting the walls in your house. Remember the patterns that you tried to eliminate by rolling on another coat or two? To cover peaks and valleys found in rolled-on paint you must roll on more. The result – a thicker, heavier film that works fine on your bedroom wall but not on your airplane. House paints tend to be flat or semi-gloss, helping to hide the defects in the final finish. High-gloss paint will telegraph imperfections such as brush marks, roller patterns, and other defects. The glossy finish desired by most aircraft builders will not be achieved through brushing or rolling – only by spraying. A comparison is the motor sports industry. Have you ever seen an Indy or NASCAR racer with a rolled- or brushed-on finish?

Another problem encountered with rolling has to do with bubbles. Rolling on a paint that's been formulated for spraying almost always results in bubbles. To remove the bubbles you have to make a second pass with the roller or with a brush to "tip" or gently pop the bubbles. If the paint is drying while you are doing this you can get severe patterning. Paint designed for rolling has special "de-foamers" added to prevent bubbles. Paint designed for spraying does not require these additives.

Spraying on paint almost always provides a thinner, more consistent film with the best appearance. Although it is a more complicated procedure for an amateur to use a spray gun, the results are worth the extra effort. Paint is a simple product that

consists of solid materials and liquids. The solid material is delivered to the surface using the liquid. The liquids (usually in the form of a solvent) will begin to evaporate from the sprayed on paint, leaving the solid materials that then remain as the final coating. The final texture and appearance of the coating will depend upon how the liquid film was applied in addition to how well it flowed into a smooth surface before it finally dried. Paint chemists give a lot of attention to their formulas concerning how they want the final coating to dry. Those paints designed for rolling or brushing have specific additives that allow the roller or brush marks to flow together before drying. Paints formulated for spraying do not need these additives.

Weight is another factor that must be considered when painting. We obviously want our final painting results to be a glossy, durable finish. In addition, we want the minimum amount of weight added to our airplane by these coatings. Aviation paints are formulated for spraying with the objective of the best performance (weathering, gloss, and smoothness) and the very least amount of weight. Spraying allows you to thin the paint more than rolling and brushing. This results in less dried film weight. By comparison, latex (emulsion) house paints are formulated for rolling and have additives that make them adhere to a vertical wall, flow together and dry quickly with a total disregard for the resulting weight.

What about fabric-covered airplanes? I've heard some kit manufacturers recommend latex house paint be used as a final finish on fabric. Can this present a problem? Definitely. Fabric-covered airplanes must have specially formulated coatings that are designed for flexibility. These coatings are designed to be sprayed onto the surface. If you substitute paint that is not designed for fabric or is designed to be rolled onto a surface, you will ultimately have problems with flexibility. Fabric moves and flexes on an airplane surface when the airplane is flying. When the fabric flexes, so does the coating that has been applied to the fabric. This will usually result in cracking problems that drastically reduce the service life of the fabric.

Having made a case for spraying, you should be aware that some builders are happy with rolled- or brushed- on paint jobs. Many builders of WW I replicas like to reproduce the rough finishes found on aircraft manufactured during this time period. By comparison, they look pretty rough when sitting beside a more modern airplane. (Don't forget the problem that occurs with fabric-covered airplanes, discussed earlier). Others who tout rolling or brushing paint are those who are satisfied with a paint job that looks good from 20+ feet. We have all seen that type paint job. As you approach the airplane it looks good but as you get really close the appearance takes on a whole new look. A question we should ask is "Why don't aircraft paint manufacturers recommend rolling or brushing on their coatings?" The answer is simple – 95% or more of their customers would be unhappy with the results.

With this in mind, let's take a look at what is really required to paint your own airplane in a manner that will be pleasing in appearance and provide durability with a long life for the coating.