

# Railway Passenger Car Painting and Varnishing.

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The history of paints and varnishes dates back to the dark ages. Even the old Egyptian mummies were wrapped in canvas and sealed with specially prepared gums or varnishes to protect them from the atmosphere; and just as today paints and varnishes are used to protect wood and metal surfaces, they also perform two functions, protecting from weather and beautifying the article they are applied to. In dealing with paints and varnishes, it would be folly on my part to undertake to go into the questions fully, as there can be a great many papers written on the subject, with no end of discussion in connection with them. For instance, there is the chemical end, which treats of the manufacturing of chemical colors and the analysis of the various kinds of paints and varnishes. Then there is the manufacturing grinding and toning of the colors, and, last, but not least, the application of them and the many ways in which they are used and the various articles they are used on. So I will only try to give some idea of how they are used in connection with passenger car painting, and even then it will only be in a very limited way, as it would otherwise take up altogether too much time.

I have had a number of years of experience in the application and use of paints and varnishes, and each day I find something entirely new or different in the working qualities and application of them, as there are so many new methods and conditions changing as time rolls on. The average person seems to have but a vague idea of the trouble experienced in connection with the painting and finishing of any article, as the majority of people think paint is only paint and anyone can apply it. Many are not familiar with the ordinary trade names, as was the case of a hardware clerk, when a painter went into a hardware store and asked him if he had any drop black ground in Japan, and after looking over his stock, he said: "Well, we have not any ground in Japan, but we have some ground in Montreal by the Canadian Paint Co." It may be true that anyone can apply paint or varnish, but the point is to have it applied so as to give a satisfactory finish both in appearance and wear. When I say a satisfactory finish they are big words, as there are so many different opinions as to what constitutes a finish. I will venture to say that if you were to ask the average manufacturer of autos, carriages, or railway cars, etc., whose product requires a high grade finish, what part of the factory caused him the greatest trouble and annoyance, he will invariably say the painting and finishing. It is a well known fact that paints and varnishes are very much like the human system, they are affected by the weather conditions, such as heat, cold, dampness, drafts, etc., and our climate during our shopping season is subject to changes and extreme conditions, any one of which may cause endless trouble to the painter.

Paints and varnishes are used very extensively on practically every article you can think of, from the steamship that plies the ocean, the railway train that covers the land, down to the bed you sleep on. Of course, they are used in some lines of manufacture more than in others. For instance, the electric manufacturers use them in quantities for insulating and impregnating of coils, armatures, transformers, tapes, and wires, and the carri-

age manufacturers in various ways for the finishing of their product. The railways use them for all their equipment and for various other purposes. My experience has taught me that each manufacturer has a special way of treating his particular goods, therefore it would be poor policy to employ the same methods to finish a carriage as you would a house, and you can readily understand why there is such a great variety of classes of painting.

Now that steel is becoming more extensively used two different systems of exterior car painting are necessary, one for the wood car and one for the steel; this principally applies to the preparation of the foundation and priming of first coats. One of the most essential principles in the finishing of wood cars is to see that the wood is properly seasoned, kiln dried and painted on the under side with a good oil paint, as the least particle of dampness will cause more or less trouble. After this has been done, the succeeding coats are simply a question of skill, the main point is to see that each coat is properly treated, until the car is finally completed. In the case of a steel car it is necessary to see that all grease smut and rust is sandblasted off the surface of the steel before applying the primer. After this is done, it is carried to completion in very much the same manner as the wood car, except that, if the steel is smooth, it does not require the same number of coats of paint, as the absorption is not as great as in the case of wood.

As every part of a coach is finished by various processes we will start with the top or roof. Before the application of a new canvas roof, it should be covered on the under side with a specially prepared canvas paint. This should be composed of raw oil, zinc, oxide, carbon black and dryers. The canvas should be applied while the undercoating is wet and allowed to dry on the car. The outside of the roof is handled in the same manner. The roof should have at least three coats, allowing 24 hours between each coat. When the exterior of the car has been prepared for painting, and after the priming coat has been applied, it is followed up with three or more coats of surfacer, which is very finely ground in Japan or varnish. The car is then decorated, after which two or more coats of wearing or finishing varnish are applied. The theory of the best experts is, that you must keep each coat, from the priming to the finishing varnish, as elastic as possible, so as to ensure durability, because elasticity means durability. This is especially true in painting steel coaches, as the metal contracts and expands according to weather conditions. The trucks and underframing of a car should be thoroughly cleaned and free from rust and grease, before the priming coat, after which the underframing is painted to prevent deterioration, the trucks are given one coat of enamel and one coat of finishing varnish. This constitutes in a very rough way the regular treatment of the exterior of a coach.

The interior finishing of a car varies, as there are many different kinds of wood used and each is usually treated according to its own peculiar nature. For instance, a different method is followed for maple than for oak, but the general method applies to all, such as the staining, filling and varnishing, rubbing and polish-

ing. Some very interesting discussions can be had on the question of using a flat varnish for interior finish. Personally, I have had splendid results from the use of a varnish of this kind. Its wearing qualities are the same as high grade finishing varnishes and much time is saved by eliminating rubbing and polishing.

As the methods employed in car painting have changed considerably in the past 20 years, a comparison at that time with the present will no doubt prove interesting. Twenty years ago all passenger equipment was constructed of wood and the exterior painting was handled as follows: The 1st coat was known as the primer coat, which consumed four or five days in drying. This was composed of 75% white lead, 25% of pure raw linseed oil, and was prepared in paint shop. The 2nd coat was called oil lead coat, and dried in 24 hours, composed of 60% white lead, 15% raw linseed oil, 5% lamp black, 20% Japan dryers. The 3rd coat, known as flat lead coat, dried in 24 hours, and was composed of 75% white lead, 20% Japan dryer, 5% lamp black. We then glazed and puttied on this coat. Oil putty was used for nail holes only, and glaze used on sunken, uneven and bruised parts. This glaze was made from 75% white lead, 20% Japan dryers, 5% lamp black. This coat was then roughly sandpapered, after which followed four coats of rough stuff, applying two coats a day, the rough stuff was made from renofillers or mineral compositions mixed with oil, to give the best wearing qualities. Japan dryers were used for drying, and rubbing varnish was used as the fourth ingredient, which furnished a good rubbing surface. The next operation was known as the guide coat, made from 75% yellow ochre, 15% Japan dryers, 18% of benzine as a reducer. This coat dried in two hours. The next operation was the rubbing. This was done with black pumice stone and water, time allowed for rubbing from 12 to 18 hours, after which the car was sandpapered with very fine paper and allowed to dry for 24 hours. This constituted the preparing of the car for the color and varnish.

The 4th coat of color was ground in Japan and thinned with turpentine, with a small proportion of rubbing varnish, allowing 24 hours to dry. The 2nd coat was the same as the 1st coat. For the 3rd coat the color used was the same shade as used on the two first coats and mixed with rubbing varnish. For the 4th coat, the same color mixed with rubbing varnish, more varnish than color. This color and varnish body was then rubbed with pumice stone and water, thoroughly drenched off with clean water and wiped with a chamois. Car was then lettered and decorated and finished with one or two coats of wearing body varnish. This practice of painting kept a car in shops from 20 to 24 days. This gives a fair idea of the system practiced in previous years.

The practice, in vogue at present for exterior painting, both wood and steel, is about the same, except that a different mixture is used for the priming coat. The primer for wood should have more oil. The primer for steel should have more varnish. The following is the number of coats and time consumed in drying: First operation is known as the priming coat and dries in 48 hours. Second operation is known as surfacer or rough stuff and