Coloring Flexible Full Width Diaphragms Rev 3
By D. Clow

INTRO
For over a decade I have read about and discussed with modelers on how to color Coach Yard HO flexible full width diaphragms. I don't know what that curtain material is made of, but nothing seems to stick to it except CA glue and ink. The CA glue dries hard, and ink does not cover. Fred Hill of CY as correctly pointed out that applying red ink on their yellow FWD produces orange. Oil based paints dry hard, crack and flake off. Acrylics don't stick. Oils and acrylics look OK, and are fine for a model that just sits there.

In my quest for a thin flexible covering where I can mix and match any color, will cover any color, and that will stand up under normal model train operations, I have found a specialized paint made for semi porous (dull) latex. On latex this paint is virtually permanent. It won't rub off with fingers, and it takes considerable force with a scribe to scratch it. There are 13 colors available, and they can be mixed to get any color. With some prep it will adhere to the CY material satisfactorily for normal operations, but will peel off if rubbed or scraped hard enough. I get roughly the same result, maybe a little better the CY material on synthetic vinyl and nitrile.

John Fiscella has an excellent method and how-to-do for scratch building FWDs using latex. I want to thank him for his input on latex materials, how to cut the thin latex into strips and glue them on the plates.

PRODUCTS
1) Monster Makers latex mask paint. https://www.monstermakers.com/monster-makers-latex-mask-paint-single-colors/ Superior covering, adhesion and durability on latex.
2) Zap canopy glue formula 560.

COLOR
Whatever MM colors you use, you will also need the white to lighten and thicken. Any of the colors dry form ½ to a full shade darker than the liquid, except the white and black. As an example, I mixed 7 ml of the MM gray and 2 ml of the MM white to get a harbor mist gray match for most of my cars.

MIXTURE
Methods for thickening the MM paint for hand brushing vary from color to color. The following describes the Monster Makers paints that I have worked with.
WHITE: Brushes on satisfactorily right out of the bottle. A small amount cures fast while using it, and requires a drop of water regularly to keep it flowing. Brushes require often and frequent cleaning to remove buildup of dried paint. When fully cured, white leaves the thickest film. The monster white makes a good thickener for other colors.

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GRAY: The gray requires thickening for hand brushing, which can be done by letting 5-10ml set out in the open without a lid for 12-24 hours, or by adding a drop or 2 of good grade water based acrylic artist paint, and/or white, red or green.
RED: Red brushes on satisfactorily right out of the bottle. Thin with water as desired for flow.
GREEN: Green is much like the red.
YELLOW: The yellow is impossible to brush on out of the bottle, and way to light when dried for Armour yellow. Does not thicken when left out in the open… well, maybe if I waited a month. To thicken the yellow, I began with a drop or 2 of Burnt Umber acrylic paint in 10 lm to darken it a shade darker than the Armour yellow I am trying to match. I use Americana acrylic paint. If the acrylic paint is too thick, the drops will sink to the bottom of the jar, and sit there. A brush should be used to wipe the bottom and mix the paints well. Then I added white to bring the shade close to the Armour yellow I wanted. Toned with red and green, a little more white to lighten, maybe some yellow, and so on. My Armour yellow mix was flowing good after a day's use. The second day, I actually had to add a drop of water to bring back the flow. I always put down a film of the monster white to paint the yellow on, otherwise, it takes too many coats and too long to get the yellow color desired on the diaphragm.

How long each paint takes to cure depends on how thick/deep the paint is and what color. Thin edges shortly turn dark first, and the thickest portion takes longer.

APPLICATION

I work with just a 1 ml or less pool of the MM paint in a 30cc plastic paint cup. I use a #0 and #1 spotting brushes, and paint the diaphragms after they are installed on the car. It can take 3 or 4 thin coats per color to completely cover a diaphragm, and I wait at least 2 minutes between coats, or until the color turns. Gentle as she goes. One ml of the paint will be more than enough for 1 color on 2 diaphragms at a time. MM warns not to thin their paint out with too much water, although I don't know why anyone would need it thinner than it is in the bottle. If I find I need a little more time, and the little pool of paint is getting too thick, I clean off my brush, dip it in distilled water and mix it in the pool. Of course the surface being covered must be oil and dust/dirt free. I use PPG SX330 wax and grease cleaner, but a high percent isopropyl will probably work just fine. The object is to layer the paint on with coats as thin as possible. The paint should be stirred regularly while using, and the brushes kept clean and free of dried debris. If dried paint builds up in the brush hairs, tiny pimples will start showing up in the layer.

After the FWD is finished, it needs to dry for a day or so, or until it is not sticky to the touch. The fresh paint will be shiny, but will turn more dull as time goes by.

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TESTING

I did 2 stock yellow CY diaphragms covered with my harbor mist gray mix. They are mounted in opposition on coupled and operating cars.

There are 2 ongoing tests on these painted CY FWDs:

TEST1: On 1 of those diaphragms, and using my forefinger and thumb to grasp it by the sides, I compress 1 side, release, compress the other side, release. Repeat.

TEST2: roll the attached cars and operating diaphragms back and forth around a 30" curve.

Results (8/4/20): I have done Test1 150 times. I have done TEST2 20 times. No signs of wear or peeling yet.

There's no need to run these tests on diaphragms made of latex. I use Thearband extra light latex exercise bands when making my own FWDs. That paint is not going anywhere on latex.

THE FUTURE

Presently I use a very thin film of DAP Alex Plus caulk as a prep on the CY material. The Alex Plus must be thinned with water to flow correctly, and needs to cure at least 24 hrs. before painting. Then I follow that with a thin coat of monster white. It has improved adherence of the MM paint to the CY diaphragm material significantly. I will certainly continue my efforts to further improve that bond.

I will be developing a how-to-do for building FWDs using CY plates and latex for the curtains.

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CONCLUSION

As always, experimentation is recommended. There's no problem experimenting with the paint on your stock CY FWDs. The paint will peel off cleanly with some moderate rubbing, once you get an edge up. Paint away. Since my streamline model is mainly for display, the paint's adherence to the prepped CY material is more than satisfactory for that model. All I need to do is move it 6 ft forwards or backwards around 30" curves.

I have rubbed my painted latex as hard as I can with my fingers. I have scraped and picked at this monster stuff with a scribe. I have ripped the latex trying. My wife has been working it out on her PT exercise bands that I painted - daily. I find the mask making technology and art amazing. The true test for RR modeling will be the test of time, but this looks more than promising to me. I love just what the MM harbor mist gray on CY yellow did to streamlining my coupled COSF models. It was a "Wow" moment for my wife when she walked in. Good enough for me.

REFERENCES

New Concepts for Improvement of Passenger Train Modeling by John M. Fiscella, PSR–NMRA Regional Convention 2002

The Monster Makers, https://www.monstermakers.com

REVISIONS

8/16/20: Revised second paragraph of the MIXTURE section to update thickening of the Monster Makers paint.
8/21/20: Revised/updated MIXTURE, APPLICATION, the last sentence of TESTING, and the FUTURE section.