

Painting Your Models

Brass - Sam Parfitt

Plastics and Resin - Paul Alphonse



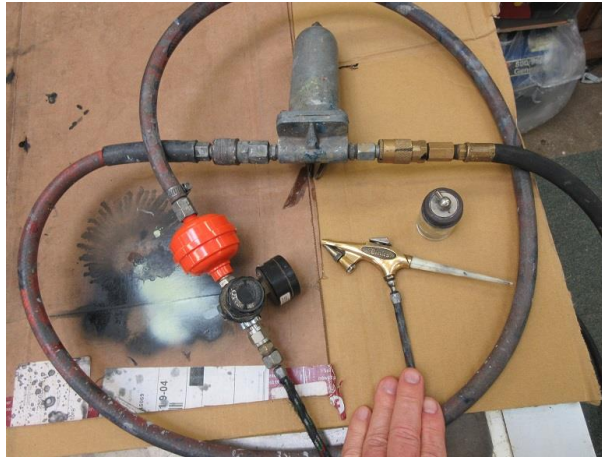
Reasons to Paint:

- What you model isn't mass produced currently.
 - Steam Engines - Most prominent
 - Electric - Also many varieties.
 - Diesels - Good potential a detailed model was made that is not in plastic.
- Different era's of brass manufacturing
 - Pre 1975 - Mostly open-frame motors.
 - 1975 - 1980 More can motors, nicer soldering.
 - Present day - Can motors. Expensive!
- Overall brass is very cost effective.
 - Model to the right was \$160 in 1977. Is \$200 now!
 - Typically Very Nicely Detailed
 - Detail can be easily be added
 - Can use just one type of decoder



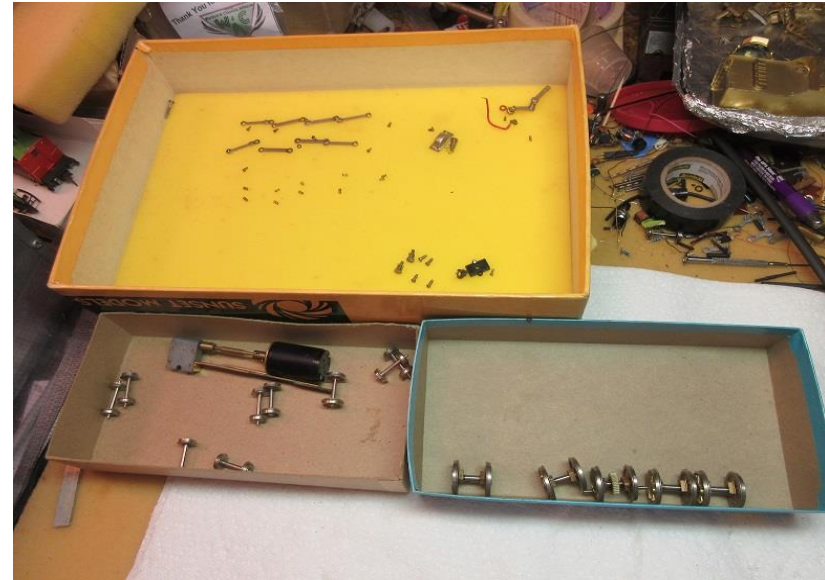
Equipment Needed:

- Airbrush: Single Action Binks “Wren”
- Decent compressor with regulator, preferably with an air tank.
- Toaster oven, 200 degrees for 2 hours for baking metal parts.



Preparation - Disassembly and Sorting:

- Ensure engine runs smoothly before disassembly.
 - Replace open-frame motors with can motors. Can scratch-build brass supports or clear-caulk to secure to frame.
 - Can motors have less current draw than open-frame motors. Important for decoder installs with current limits.
 - If leaving open-frame motor, ensure motor is isolated from frame before installing decoder.
- Engine and tender disassembled. Top photo shows box cover used to “store” parts not being painted. Bottom photo is parts to be painted.
 - Side-rods, springs, etc.



Preparation - Drilling for LED's & Detail Installation

- Drill out for all decoder wires.
- Drill out for all LED's.
 - Marker Lights - 0402 SMD LEDs
 - Head Lights - 0402 or 0603 SMD LEDs
 - Running board lights - 0402 SMD LEDs
 - Cab - 0402 or 0603 SMD LEDs
 - Number boards - 0402 SMD LEDs
 - Firebox - 0402 or 0603 SMD LEDs
- If placing sound in tender, drill holes in floor if not already present.
- Add Backhead detail if desired.
 - 1975 and later usually have it.
 - Ebay, American Scale Models, Etc. for parts
- Gears Rarely need to be replaced. NWSL wheel puller is useful for adjusting gauge and quartering.
- Solder all loose / broken parts. If not brass then CA for tight fits and other adhesives for loose fits.
 - White glue works well for parts which may need to be easily removed.



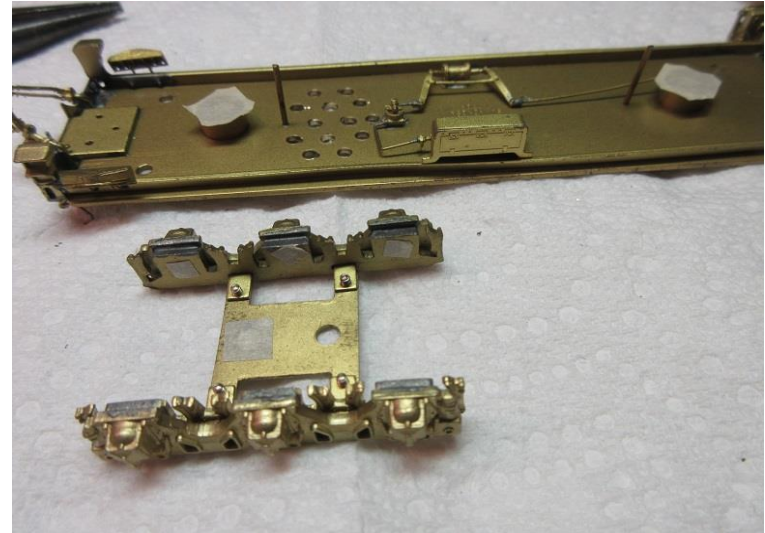
Preparation Continued: Stripping and Cleaning



- Clean model. Vinegar and dish washing soap and toothbrush.
- Stripping: I leave the original coating applied at the factory. Painting a pre-painted model, usually needs to be stripped unless just adding a 2nd color.

Masking:

- Masking Tape, glass, metal, straight edge, tweezers, tooth picks and X-acto knife.
- All wheel treads and electrical contact points, tender truck axle holes, end of axles, etc.
- Engine journals on frame not masked: can scrape away paint with Jeweller's Screw Driver.
- Paint order:
 - Steam: Black first then mask for other colors.
 - Electrics / Diesels: I mask for thin stripes but decals could be used. (Your Choice). Negative of masking may result in bleeding. Negative of decals may not fully cover undercoat



Painting:

- Corners and edges first.
- About a 45 degree angle both ways (sides and top), then horizontally full length of piece.
- Basic black always gets two coats. Bake for 2 hours between the 2 coats at 200 degrees F.
- Bake brass, metal parts.
- 200 degrees F after each coat.
- DO NOT BAKE WHEELS. May dry out insulation and tires could fall off.



Second Color Added:

- Usually at least one more color being added, specifically the smoke box.
- If boiler is to be painted, then mask and do smoke box last. The silver is not as durable as colored paint.
- Masking is removed after airbrush cleanup. Time enough for the paint to set up before putting in toaster oven.
- Overspray may be touched up later with black paint and brush. Water and toothpick will remove small overspray areas if done before cooking.



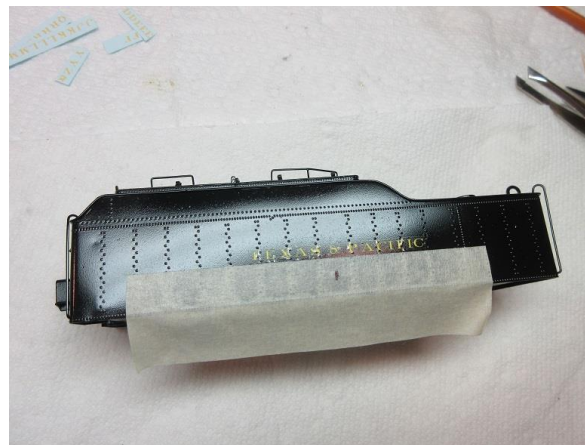
Final Touch Ups

- Final details by hand using brush.
- Piping: Black.
- Cab Detail:
 - Gauges: White
 - Throttle: Brass
 - Valves: Red
- Boiler:
 - Valves: Red
 - Whistle, Poppetsm, etc.: Brass
 - Air hoses: Red



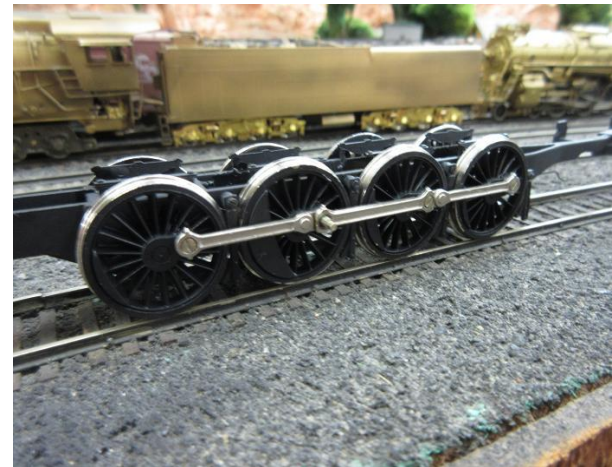
Decals, Top-Coats and Weathering:

- Brands:
 - Microscale
 - Champ
 - Mount Vernon Shops, etc.
- You want a shiny surface to decal over.
- Solvaset, very fine brush and sharp x-acto blade.
- Clear Gloss, Satin, Dull. Do before assembly.
- Weather last or before assembly, your choice.



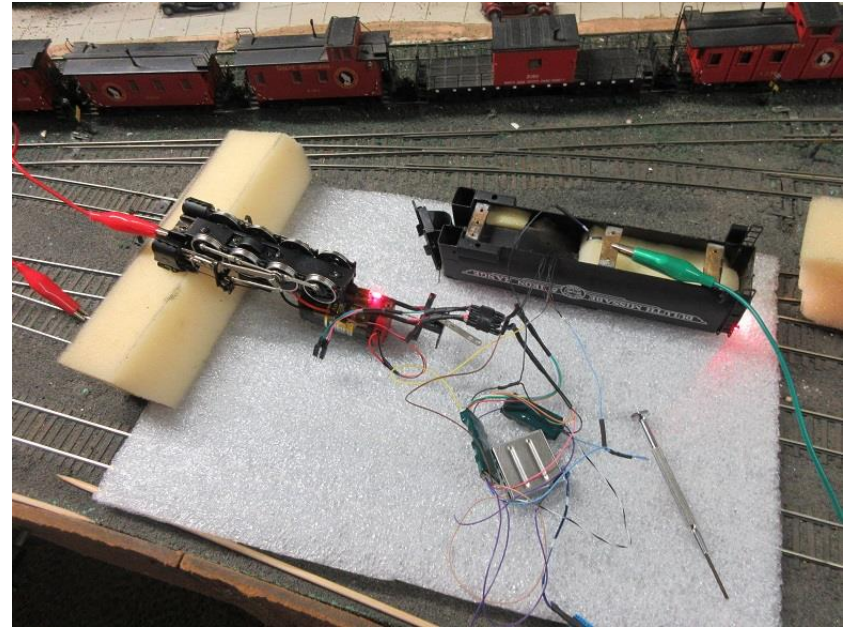
Assembly:

- Drivers: Once attached to frame insure all move smoothly.
- Side Rods: Again, insure mechanism moves smoothly.
- Valve Gear attachment: Insure bind free movement.
- Install motor and insure free running.
- Insulation side of drivers on far side and tender near side when engine upside down and facing to the left.



Decoder Install:

- Best to use just one brand.
- LED's: Insure wires are not contacting metal structure. I use a signal light checker and ground out one side.
- LED's: 0402's on eBay. #45 (0.082") Drill bits from Home Depot.
- Decoder Connectors: Litchfield.
- ALWAYS USE DECODERPRO TO TEST DECODER INSTALL BEFORE PUTTING ON MAINLINE POWER.





Painting Plastics & Resins



PAINT: Some Notes First

- There are a wide variety of hobby paint chemistries.
 - It is impossible for even the experienced modeler to know all the specifics. Chemists and chemical engineers in the audience be kind here!
 - Categories may contain lacquering agents or acrylic resins which improve performance or may be traditional chemistries. This typically changes how that paint is used.
 - Thinning ratios when airbrushed differ greatly as well.
 - So...always TEST! Practice on scrap until you are sufficiently confident in your process.

PAINT: Some Notes Continued...

- **VERY** Basic Categories and their “heat” from greatest to least.
 - **Lacquer** (Acrylic resins with organic solvent lacquering agents). Lacquer thinners typically strip everything. Exceptionally glossy. Mr. Color
 - **Enamel** (Oil-based solvent “mineral spirits” turpenoids, etc) Oil-only thinners typically only strip other oils, but may “smudge” other chemistries marring the finish. ALWAYS TEST! Very glossy. ScaleCoat I & II
 - **Resin-Acrylic** (Non-water based solvents) Often may be thinned with Isopropyl Alcohol in a pinch, but not ideal. Some may even thin with water. Thinners will not attack oils at all, but may lightly attack lacquers. Not the best glossy finish you will get. Great flat colors. Tamiya
 - **Water-Acrylic** (Water-based) Oils will not strip well, but most other thinners most likely will. Traditional paints may thin or strip with Windex. Modern chemistries are essentially automotive paint. Modern chemistries are very glossy. Does not thin well with oil or lacquer thinners, may even clump severely. Clean your brush carefully with these. *Modern:* Tru Color
Traditional: Vallejo

PAINT....specifics

- Oil-solvent based (Enamel):
 - High Gloss, levels well
 - May be traditional oil based paint. Dries in a day, cures in weeks. ScaleCoat II, Testors, Model Masters, Humbrel
 - May also contain acrylic resins. Dries in hours, cures in a day. Alclad II *
 - May contain lacquering agents. Dries in hours, cures in a day. Best gloss in category. ScaleCoat I *
 - Hard!
 - Requires PPE. IMPORTANT! N95 or above, well fitted. Paint outside or in a fume hood.

*This is suspected based on odor and behavior...

PAINT....Continued Specifics

- Acrylic-solvent based (Acrylic resin):
 - Acrylic-Resin with modest lacquering agents included. Modest gloss. Dries in minutes, cures in hours. Brands: Tamiya Acrylics
 - Acrylic-Resin Lacquer. Usually just referred to as “Lacquer”. Exceptionally glossy. Dries in minutes, cures in a day. Brands: Mr. Color, ScaleCoat I
 - Has some ductility.
 - Requires PPE. IMPORTANT! N95 or above, well fitted. Paint outside or in a fume hood.

PAINT....Continued Specifics

- Water based (New and old):
 - Older water-based formulas don't gloss well. Doesn't play well with alcohols or lacquer thinners. Brands: Vallejo, Citadel
 - Newer ones are reasonably good (And can be supplemented with a good glossy top-coat). Brands: Tru-Color
 - Hard!
 - Stick to hobby-specific water-based paints. Artist water-colours lack sufficient pigment concentration to fully saturate your work.
 - Significantly less toxic, but PPE still recommended. Mask or fume hood/outside, but both may be overkill.

Airbrush Types: Single Action Vs. Double Action

- Single Action

- Pushing on the trigger fires air. (green arrow)
- Amount of paint released when air is fired determined by dial. (red arrow)
- Requires less dexterity, but not quick to adjust or makes fading more difficult.



PAASCHE MODEL H

- Double Action

- Pushing down on the trigger fires air. (green arrow)
- Amount of paint released is determined by how far back the trigger is pulled towards back of brush. (red arrow)
- Requires more dexterity, but allows for quick adjustment and can perform fading much easier.



PAASCHE MODEL VL

Airbrush Types: Syphon Fed vs. Gravity Fed

- Gravity fed.
 - Easy to clean.
 - Very well balanced in the hand.
 - Poor paint capacity but efficient.
 - Some may find difficult to see workpiece with.



Iwata NEO CN

- Syphon fed.
 - Large paint capacity but lots of wasted paint.
 - Changing paint is quick with switching jars.
 - Not well balanced. BUT! You can run a syphon tube for long distances.
 - Some may find easier to see workpiece with.



Iwata NEO BCN

Airbrush Types: Needle/Nozzle Size

- Coverage area of the workpiece is defined by the needle size.
 - 0,2 mm “Fine” for detailed applications
 - 0,3 mm “Common” for most applications.
 - Typically what most brushes come with.
 - 0,5 mm “Coarse” for painting large areas quickly.
- Depending on brush (like Paasche models) the appropriately sized nozzle may be needed to accomodate a selected needle size.



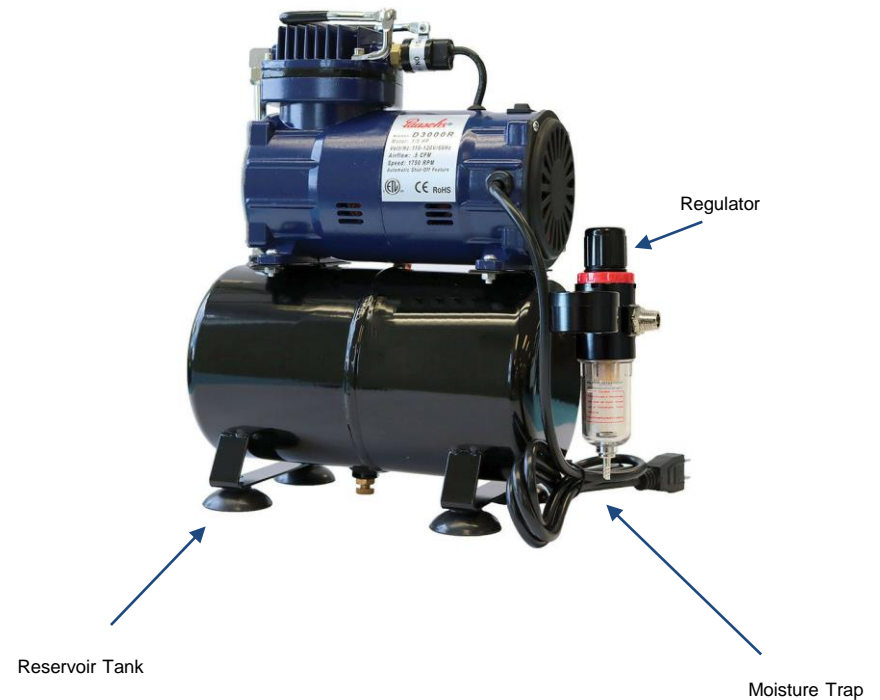
Various brushes with different needle sizes. Photo taken from Blog “Break the Mountain of Gunpla” <http://schizophonic9.blog103.fc2.com/>

Equipment: Compressor

- “Good air” is essential.
- A compressor that provides consistent, dry air at variable pressure is highly recommended.
- Decent results can be had with a limited compressor given environmental considerations like humidity and temperature but PSI adjustment is a necessity.
- Some like using compressed nitrogen. A bit of a pain though!
- An ideal compressor setup includes:
 - air reservoir
 - moisture trap
 - regulator with adjustment down to below 10 PSI.

Airbrush Compressor: Paul's choice.

- Paasche D3000r
 - Quiet. A normal volume conversation is easy with it running next to you.
 - Includes reservoir, moisture trap and regulator.
 - Purge valve to empty when finished.
 - Auto shut-off when full at 60psi. Turns back on at around 40psi.
 - Not cheap, but not expensive. \$140 on eBay.



Lacquers on Plastics?

1. YES! Easy to do. Don't be intimidated.
1. Thin to suit, but the less thinner you can get away with the better. "Thin to skim milk"
1. Apply a light mist 2-3" away from workpiece first. Original pigment being painted over should still show but significantly faded to new color.
1. Wait 20-30 seconds for fully dry.
1. Apply a slightly heavier layer 2-3" away from workpiece second. Very little of the original pigment should show but this is not a "wet" application.
1. Wait 20-30 seconds for some drying.
1. Apply your wet coat for gloss. If doing flat, just apply until no more base color shows.
1. Rest and inspect when cured. Subsequent coats can be wet if necessary.

Example: Westerfield PRR GLa Hopper Resin Kit.

- Kit built closely to instructions. Can be totally assembled before paint. It is wise to consider if this is possible before painting however.
- Tested for proper running and operations first.
- Resin uncoupler levers and stirrups were replaced with stronger metal ones from Yarmouth Model Works.
- Flat surfaces sanded to remove imperfections and any metal wire grab-irons protruding into bay sanded smooth and puttied with filler if necessary.
- Trucks removed and wheels set aside for painting.
- Alligator clips on skewers secure parts. Useful for final application of paint after detailed areas are finished.



Paint and PPE.

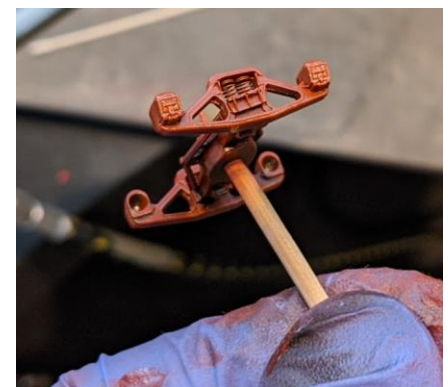
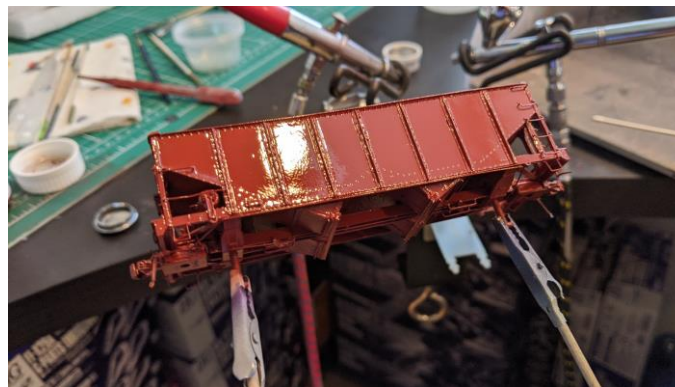
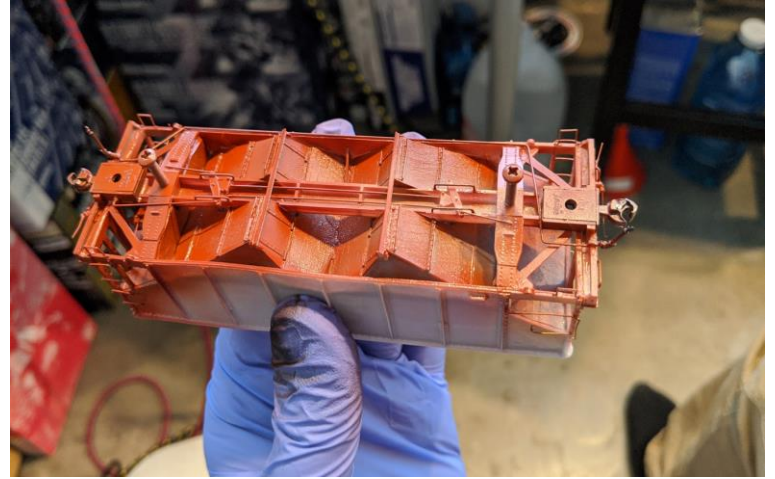
- Painting model with ScaleCoat II.
 - 50/50 mix of Oxide Red & PRR Freight Car Red for this model.
 - Thinned to “skim milk”. Roughly $\frac{2}{3}$ paint to $\frac{1}{3}$ ScaleCoat thinner.
 - Compressor regulator set to ~15psi.
- Use Nitrile gloves. Grasping the model with your hands in unpainted areas may be necessary and is okay but humans are greasy. Gloves keep that grease off.
- Wear a respirator, N95 or above. Protect your lungs.
- Safety glasses are highly recommended.
- In the photo to the right, paint can easily blow back into my mouth, nose and eyes while painting hopper bay. PPE IS IMPORTANT HERE.



The Process.

- Clean model first! Small drop of dish soap in a pot of water, agitate or lightly scrub with toothbrush. Allow to dry.
- Painting order:
 - STEP 1: Paint inward to outwards. Do internal details like brake cylinders, valves, first shown to the top left.
 - STEP 2: Paint corners, small details on outside and underside next.
 - STEP 3: Paint inside bay of car next on shown middle left.
 - STEP 4: Finally, place on alligator skewers and paint broadsides.
- Technique for doing so:
 - Steps 1 - 3: paint slowly with minimal paint flow. Build up color over time to prevent runs on exterior details which are in front of interior details being painted. True gloss isn't necessary in these areas as they aren't decaled or scrutinized as much. Rotate model frequently to cover all surfaces, details and angles.
 - Step 4: Paint typically. Light first layer, wait 20-30 seconds, heavier second layer until fully coated with color, wait 20-30 seconds, then heavy true glossy layer finally until fully saturated but not runny. Interior details will also get a mostly glossy finish from this pass as well. Practice!

Steps in Photos: Westerfield PRR GLa Hopper Resin Kit



Next steps. Curing and Decaling

- Unfortunately baking isn't too easy with plastics and resins. CA glue typically weakens under heat, resin becomes malleable and plastic may volitize. Patience is best.
- Many acrylics and acrylic lacquers take only hours to cure.
- Oils/Enamels like ScaleCoat should be safe to handle in 8 hours, but take a couple days to cure. Decal after cured to prevent bubbles under decals.



Next steps. Curing and Decaling Cont.

- Because we used glossy, decals can be applied directly on paint.
 - If flat was used, gloss coat using the same techniques as applying base coat and wait for curing.
- Fresh sharp X-acto blade and a quality pair of scissors (like Tamiya decal scissors) for cutting out decals. Soft q-tips for soaking in fluid and smoothing decals gently on model. Harder precise q-tips for moving decals around.
- Reference the prototype or plan which ones you intend to use. It sucks to mess up!
- Plan your application. Work in a deliberate direction to prevent you from touching applied decals.
 - I like to do decals on one side of the car, then apply setting solution like Micro-sol. Micro-Set is unnecessary. Once finished move to next side of car. Prevents missing decals with solution or straight up forgetting to apply.



Final Steps: Top Coat and Weathering.

- Finally topcoat.
 - Clean model with compressed air before applying. Don't get debris on your hard work!
 - Glossy for a "new" appearance
 - Semi-gloss or flat for various "used" appearances.
 - Apply just like the base-coat, but thoroughness isn't as important.
- Allow to cure;
- Weathering.
 - For the Westerfield PRR GLa Hopper car, I simply used some flat ScaleCoat Grime 2 and Tamiya Flat Nato Black to lightly gunk up car, leaving a glossy topcoat exposed on most surfaces for a "newer" look.
 - Apply airbrushed weathering first.
 - Oils for washes or rust streaking if desired. May require an appropriate glossy coat to protect your work.
 - Flat coat afterwards for powder applications if desired.
 - Final application of grease weathering like fuel streaks, oil, etc.

