Assembly Instructions for the N Scale V&T Ore Car
3-pack Kit
4/2009

This kit was designed to follow the general dimensions and drawings of the 1869-designed Ricon ore cars used on the Virginia & Truckee railroad between Virginia City and Carson City, NV. These cars were used for hauling silver-bearing ore between the various mines in the Comstock Lode and the stamping ore reduction mills along the Carson River. While individual variances between car orders and manufacturers existed, they were generally identical in size and structure.

General capacity seems to have been about seven yards. The cars also had a light weight of about seven tons, with an iron body and fittings over a heavy wood frame. All were equipped with link and pin couplers. Although the cars were used through the 1880's and not disposed of until WWI, there is no evidence that the original hand brakes were ever converted to any kind of air brakes, modernized with knuckle couplers, or rebuilt with steel parts. The cars were not interchanged with any other railroad, and only were identified with a car number stenciled on the hopper side. V&T had approximately 100 of these cars, 90 of which survived until 1917.

There are several unique features of these cars, other than the four-wheel nature of them. This was one of the first precious metals booms in the US, so a typical 36' coal-hauling flatcar or gondola would exceed axle and cart limits. As air brakes didn't yet exist, numerous brakemen show in photos of the cars riding them downhill behind V&T's collection of 2-6-0's in 'unit trains' of 30 cars or more, without a caboose. The cars were originally designed without the side footboards – an added necessity to safely access the handbrakes of multiple cars while in motion. The V&T had a predominantly downgrade operation of about 2% from the mines to the mills, so loaded trains do appear abnormally long with large crews onboard the trains for braking.

As there is no center sill, the other addition was the metal reinforcement bars alongside the wood sill and bolted into the ends. Unloading was accomplished by a worm-gear crank rachet onto a center shaft through the car, that wound up chains attached to the two bottom doors, which were hinged.

Several of these cars were later sold to narrow-gauge railroads for their use. Typical modification for narrow gauge cars was to move the unloading mechanism down to side-sill level and remove the side walkways. There was still no evidence of anything but handbrakes.

These small cars go well with my 13-ton and 18-ton Climax models, as such lightweight locomotives had similarly small cars in mining applications.

None of these cars survive today, and historians have noted that surviving drawings do not exactly agree with surviving photos in many issues. The model was developed from 'estimated' drawings developed with the Nevada State Railroad Museum.

TOOLS YOU WILL NEED:	**FOR:**
N scale ruler (Flint Supply or others)	All measuring and straightedge
X-acto knife and SHARP #2 blades, or similar	All cutting and trimming
Flat file – larger	Truing edges of castings
Tweezers – regular and self-closing (really!!!)	Parts handling and removal, wire bending
Needle files - various	Truing edgings of parts
Sewing scissors (high quality)	Cutting etched parts, flash, wire
Pin vise	Drilling small holes
Drill bits; #80 (.012), .020 .025	Drilling for wire details and coupler screws
Adhesives:	
Conventional 'super glue'	General assembly
Jewelers Screwdriver	00-90 screws for Z couplers
Soldering iron and solder	Soldering coupler links
Straight pins	Locating holes for drilling

Paint: Acrylics recommended; conventional Floquil works OK. PollyScale, Badger, etc. work fine.

YOU ALSO MIGHT WANT:	
Flush cutters (Xuron, Lambert)	Trimming trucks and parts
Micrometer	Verifying drill sizes and dimensions
Couplers – your choice (MT Z recommended)	
Band-aids	handy, don't laugh. Blood does stain resin.
Magnifying glass / optivisor	
Squadron model putty, green preferred	Filling small bubble holes in resin

PROTOTYPE INFORMATION
BOOKS AND PUBLICATIONS

Virginia & Truckee, The Bonanza Road Mallory Hope Ferrell 1999 Hundman Publishing

Car photos on ages 26, 36, 48-49 (exceptional), 50, 55, 88, 105 (narrow-gauge conversion)

Car roster page 267 details:
1-17 Risdon Iron Works, San Francisco (wood)
1-25 Risdon Iron Works, San Francisco 1869 (iron body)
44-58, 59-98 V&T built Risdon Iron bodies, 1869-1871
99-123 V&T built: Risdon Iron, Pacific Mills, McAfee Spiers, Union Iron (1870-1884)

By 1900 110 cars were rostered (1-110); all scrapped by 1916-1917.

The Silver Short Line, A history of the Virginia & Truckee Railroad Ted Wurm, Harre Demoro. Published by V&T Railroad, 1983

Car photos on pages 46, 48, 49, 59

Virginia City and the Silver Region of the Comstock Lode Douglas Mcdonald
Published by Stanley Paher, 1982

Car photos on page 36, 92-93

Sagebrush Headlight, Vol 14, no 2, 59th edition Newsletter of the Nevada State Railroad Museum Spring 1993 pp. 5-7 "Iron Ore Cars of the Virginia & Truckee" by Kyle Wyatt.

PACKING LIST OF PARTS – 3 pack kit

Qty.	Description	Notes
	Cast Resin parts (white in photos)	
3	Frame casting	
3	Hopper casting	
6	Dummy knuckle coupler	Poly bag 1
6	Link and pin coupler pocket	Poly bag 1
24	Brackets (12 needed)	Poly bag 1
	Purchased Parts	
12	Micro-Trains low-profile wheelsets	Poly bag 2
3	Brake Wheels	Poly bag 2
	Misc. parts	
3	Stripwood for running board (4" per car)	
3	.020 brass wire 2 ¼ long per car	
3	.010 brass wire 3" long per car	

Have Courage and Have Fun!

Remember a couple things about this kit and process…..

1) I do have extra parts and if you have trouble, loose a part or accidentally ruin one, it's not like a brass Overland car here and we can deal with it as needed. You won't even be the first!
2) Don't let these instructions scare you. I'm just a documentation junkie. EVERY STEP is photographed to help you through it. Yeah, it seems like a long process but it goes fast.

A word about resin parts in general……

Frankly, I've never loved resin kits myself. I've tried some shells, and bought some shells, with limited success. Most shells are too thick, and lack sufficient detail, to be seriously considered as competition with injection molding. Current high-strength rubber molds, combined with higher-strength resin, narrow this gap with a little luck and planning.

Resin, by its nature, has limitations. I was told by a veteran model railroad manufacturer to 'relax', and remember that 'casting resin parts isn't a science, it is an art'. Basically I've taken that to mean that no substance how hard you try, you're probably going to have at least some inexplicable variations between parts when using resin from rubber molds.

Why not an etched body?

The prototype had nice rivet lines and I really hoped to get a photoetched body together and get artwork finished. They would require extensive bending, folding and precise glue work to assemble. After several months of experimentation, I finally decided that the resin bodies made up for precise and square assembly for what they lost in rivet details. That decision is still subject to change!

You will likely find flash, 'thick parts', and various bubbles in various places.

I do a rough-trim of flash, and sometimes a detail trim of flash to make sure that the part is structurally sound. Not all parts are trimmed off identically in all kits. The reason some parts are well trimmed and some parts are not is because sometimes I really can't tell that a part is OK unless I do that.

While CR600 resin is durable, it's not unbreakable. Repairs of any broken part is best done with ACC.

If the bubble can't be seen on the outside of the finished model, if it can be trimmed off without damage, and if the bubble doesn't compromise the structural integrity of the finished kit, it's possibly still there. I inspect each and every part myself before shipping. If you find something that you really can't work with due to internal bubble defects (which may only be discovered when you are trimming and fitting parts), drop me a line and I'll try to get you a new part. If you can, give me a clear description of size, location, etc. as I'm continuously trying to improve the molds and the process.

If you want to patch bubbles, here's how to do it:

I've tried a wide variety of approaches and materials. Some work better than others, and some were complete failures.

In general, ACC works great to fix any broken parts anywhere, but is particularly bad for filling holes. Don't waste your time, it won't work.

Squadron putty works very well for filling bubbles, and can be sanded and carved to the point where you really can't see it. Green is thinner, smoother, and harder, Squadron White looks less objectionable, but it is softer and less structural and doesn't sand well. For this kit, I recommend the Green, unless you're painting the shell a light color that will be difficult to cover the color contrast. Testors white putty is more coarse, but more widely available and is white. It's OK. The finished putty can get a finish drop of thin ACC, which soaks into the putty

and REALLY solidifies it for sanding, to the point where the finished repair is invisible. That seems to work the very best.

5-minute epoxy works well for big fixes, but takes forever to harden, and has a poor surface finish. You can try it, but I don't recommend it. Conventional model cement doesn't work at all with resin, don't try it.

If I discover bubbles in parts, cutting them and re-filling them with a tiny drop of CR600 was the ultimate fix, and in any 'structural' bubble was the fix. If you can't tell on any parts that I did this, that's how good it is!

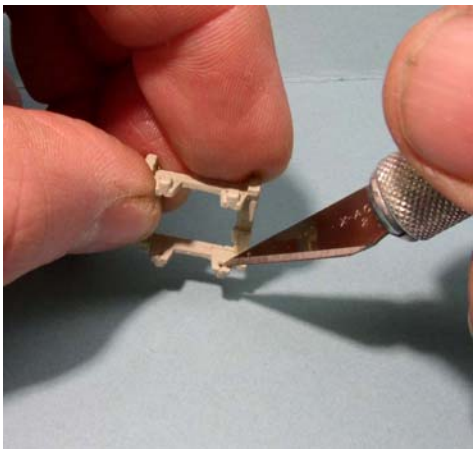
Weights?

As can be imagined, this is a super-light car when finished. I was surprised how well it tracked though, and since it tracked OK, I decided to make weights optional. CR600 is surprisingly heat resistant – it softens but does not melt. Micro-Mark Type 160 is a low-temperature casting metal that could be dripped right into the bottom of the hopper for a little extra weight on 'empty' cars. Needless to say, if you're adding a gravel or mineral ore load, the cars will be plenty heavy just with that material. Another suggestion is metal wheelsets on empty cars – but that looked to significantly increase kit price.

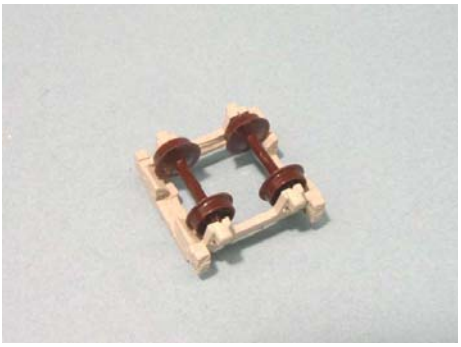
NOTE: Assembly instructions show photos of parts that are GRAY. These were spray-painted first so that they show up better in the instruction photos than the raw white resin.

PART 1: Basic body assembly :

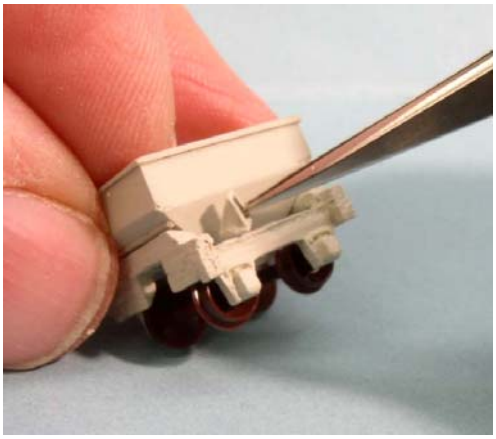
TRUCK FRAME



1. Examine the truck frame for flash and remove with a sharp Xacto knife. Set the truck on a flat surface and check for flatness on the journals; the resin may be gently twisted if one truck side is high. Test fit the MT low-profile wheelsets in the journals. Remove any 'bubbles' in the journal box ends with the point of a sharp Xacto #2 blade. Retest the axle fit – journal box can be moved in or out gently with tweezers bending the frame. Also carefully check the flange clearance between the bottom frame edge and the wheelset, trim frame if necessary to clear. Frame with wheelset in it should roll easily.

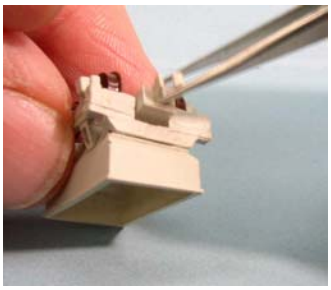


2. Remove remaining edges and flash across the top of the ‘hopper' casting. Run a flat mill file across the top to flatten and smooth the top surface. Prototype thickness was 1x2 angle iron on the top edge.
3. Test fit the hopper body on the frame. Fit the hopper body on the frame both ways, and note which way appears flatter and squarer than the other with respect to the frame. Also note how tight the wheel clearances are to the hopper body – it has to be attached just right to not interfere with the wheels.
4. When you’re satisfied with the hopper to frame fit, cement in place with thin ACC.
5. Each car kit has approximately eight reinforcement brackets supplied. These were devilish to cast and rather than throw out repeated runs with one bad bracket, I doubled the number of supplied brackets per kit –you’ll have at least four good ones per car. Pick the best looking four you have. If there are interior bubbles, they remove fairly easy with the point of the Xacto knife or tweezer points. Each car gets four brackets; placement is not critical but they seem to line up in photos about where shown. Use thin ACC on the back surface and a tiny bit on the front edge. They should touch the side frame edge and the hopper body.

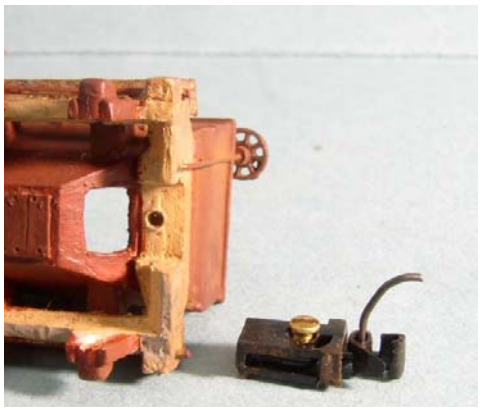


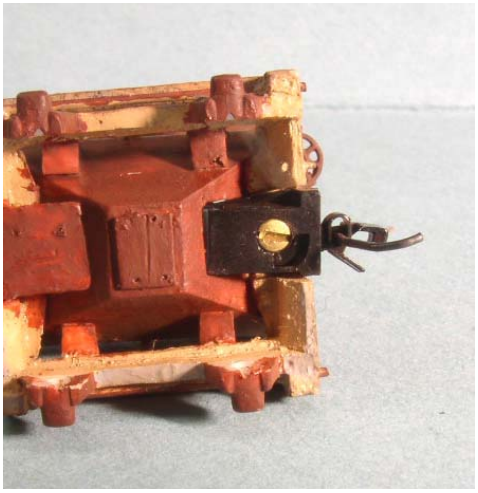
COUPLERS

I managed to come up with three different coupler options; historic link and pin couplers using a cast resin coupler pocket and .010 wire link; a very short shank dummy knuckle coupler that mates with either conventional or “Z” sized couplers, and a method to install MT “Z” automatic couplers. Resin parts are supplied for both the link-and-pin and dummy knuckle couplers; the Z couplers are not included. When you’re deciding what to do, consider using one “Z” coupler at either end of a long cut of these cars and the ‘links’ in the middle as the close coupling possible with the link-and-pin option looks very impressive.



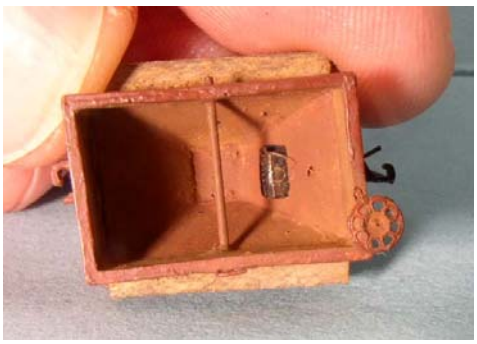
6. If you’re using the dummy knuckle coupler, trim flash out with a sharp #2 blade, and check fit with your normal coupler. Make sure there is sufficient ‘slop’ for some twist and vertical movement. When satisfied, glue the coupler box in the frame end pocket as shown. The ‘link and pin’ box mounts in the same manner if you use that option.





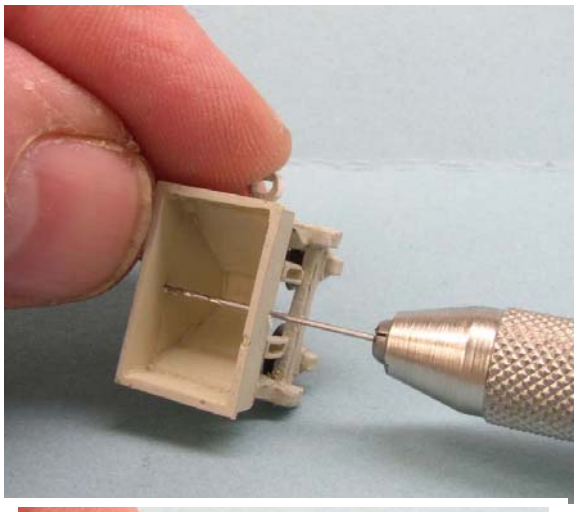
7. Z coupler boxes can be installed by cutting a hole in the hopper body frame as shown with a sharp #2 blade. Remove wheels. Score lightly and cut intentionally small, then trim opening to fit the back of the coupler box. Drill frame .035 as shown for a 00-90 screw; tapping not necessary. Also note how the coupler trip pin is rebent.

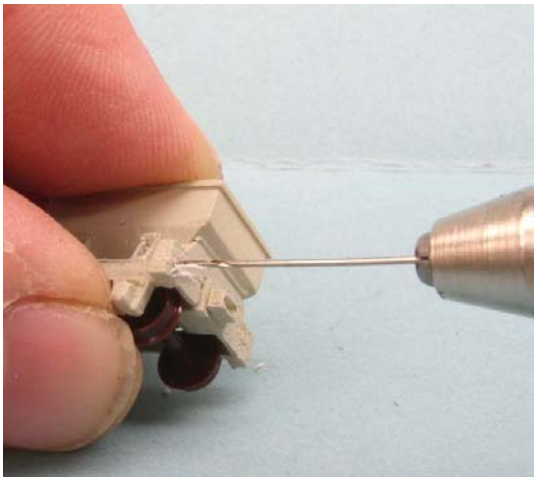
8. Note that the intrusion into the hopper itself for the back of the Z coupler box is really very small.

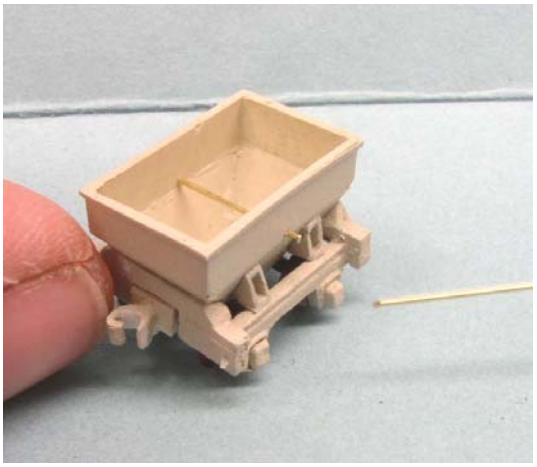


FINISHING THE CARBODY DETAILS

9. The car body should now look ‘something’ like the car at the left, with the coupler boxes and side brackets installed.



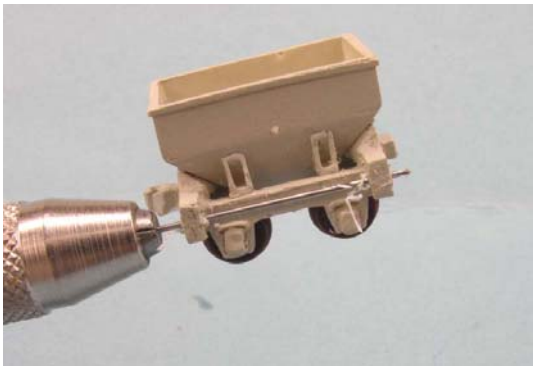




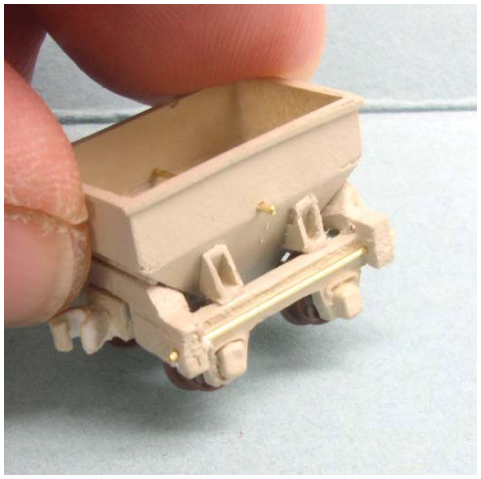
10. The unloading mechanism on the car consisted of a shaft right through the hopper, winding a chain on the outside on both sides. The chains were connected to the hopper door gates underneath the car. The shaft originally had a direct winding wheel, which was replaced by a worm gear and a vertical winding crank on the sides.

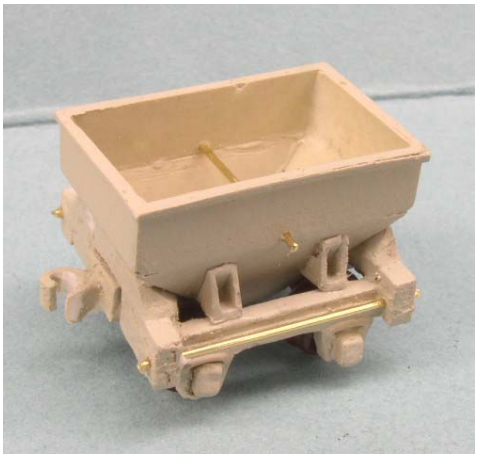
11. So to simulate that, drill a .020 hole across the carbody, at the bottom center edge of the flat-sided hopper.

12. The car didn't have truss rods, but it was reinforced (apparently after delivery) with iron rods on the outside of the wood frame. Drill all four corners of the car .020 so that the wire is flat, centered, and square alongside the 'wood' frame.

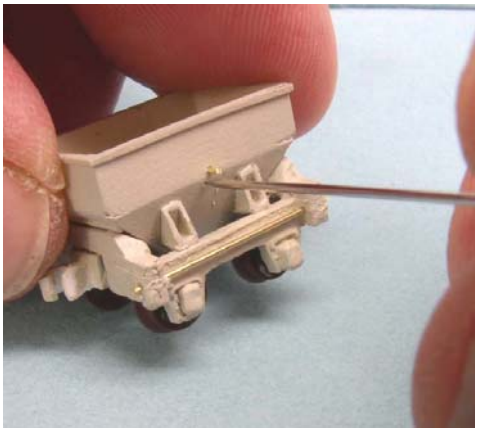


13. Insert and trim .020 brass wire for the unload crank shaft (left) and the side reinforcement bars (below)

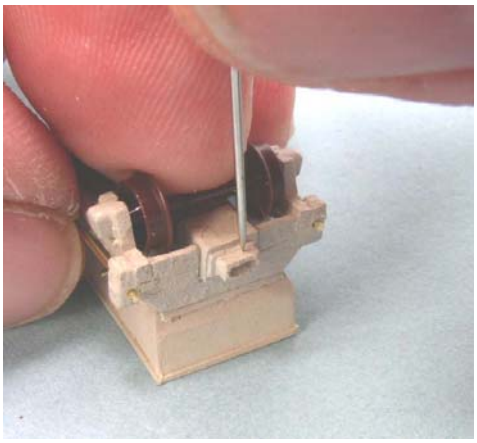




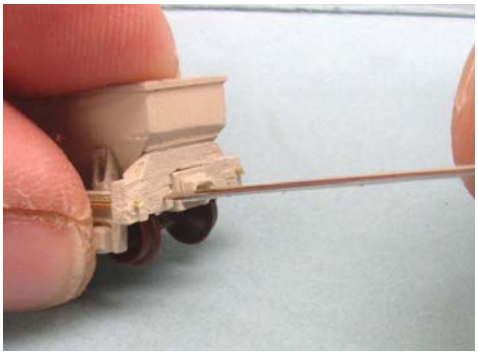
14. ACC the .020 rods in place. A needle works best to transfer small amounts of ACC to the carbody, rather than use the tube nozzle. Also keep a little tissue handy to blot/wick out excess ACC if it does happen.

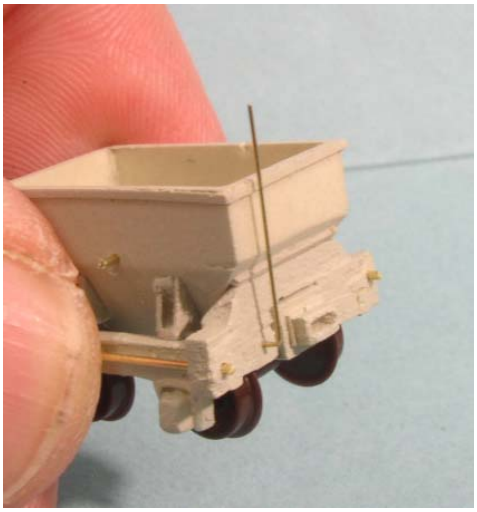


15. Now use the needle to mark the various .010 holes like a punch. The crank location is about 3 scale inches just below and to one side of the shaft. (right).



16. If you are using the link-and pin boxes, mark a hole for the pin, working from the bottom (left). Mark the next hole for the vertical brake staff to the left of the coupler box, low on the frame edge, on one end only. (below).

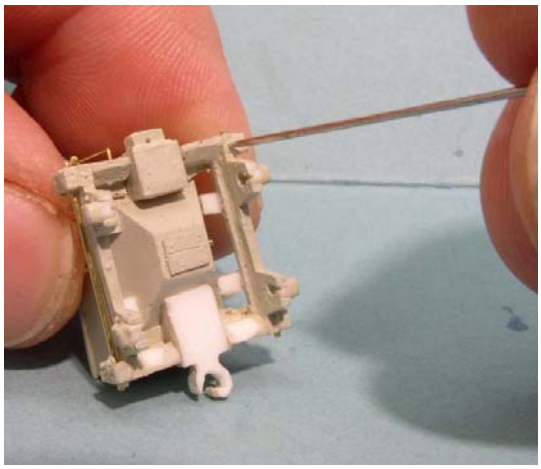


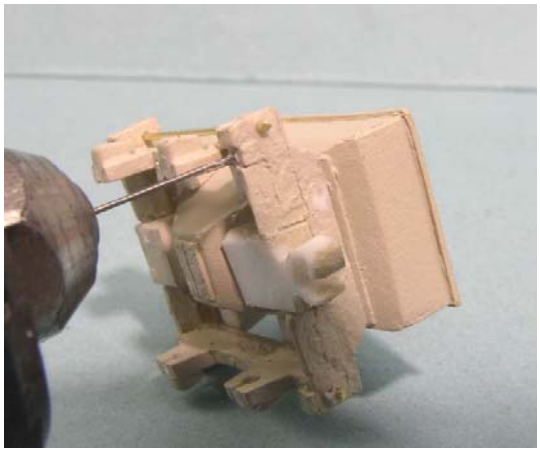


17. Drill the various hole locations .012 (#80) with a pin vise or a Dremel on low speed. Bend a piece of .010 wire and ACC in place for the vertical brakeshaft. Don't worry on length, it can be trimmed back later. If you want, fashion a tiny "U" from wire and make a top bracket to secure the handbrake shaft to the top edge of the hopper; drill and ACC in place.

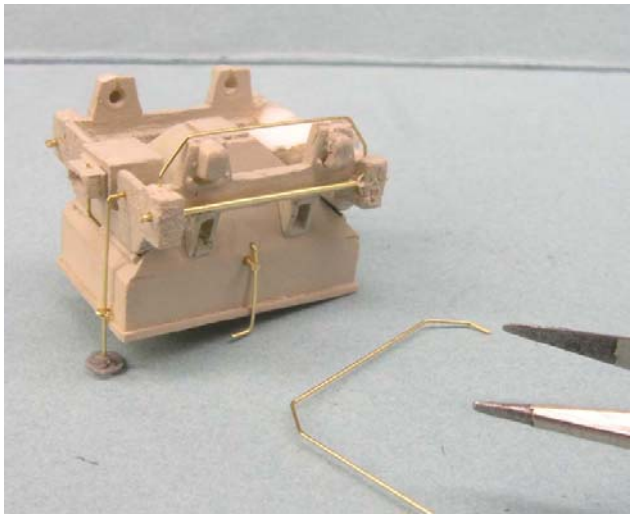
18. (left) Bend a piece of .010 wire for the unloading crank as shown. ACC in place on the side. The "crank" handle seemed to be normally positioned parallel to the car side edge.

19. Punch/mark four holes on the bottom edges of the end sill for the jounal reinforcement bars (below).

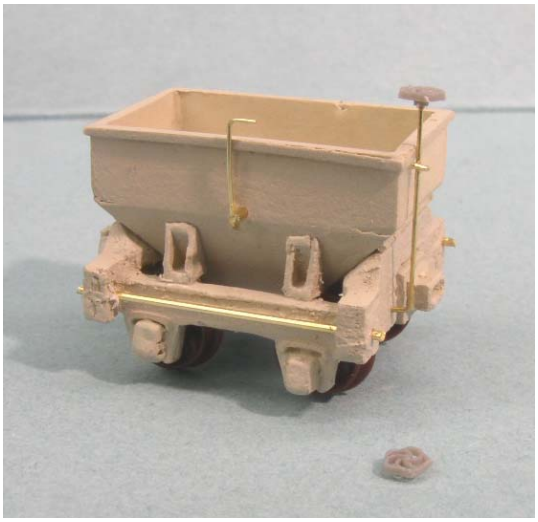




20. (left) Drill the end sills .012 (#80) for the brass wire journal reinforcement bars.



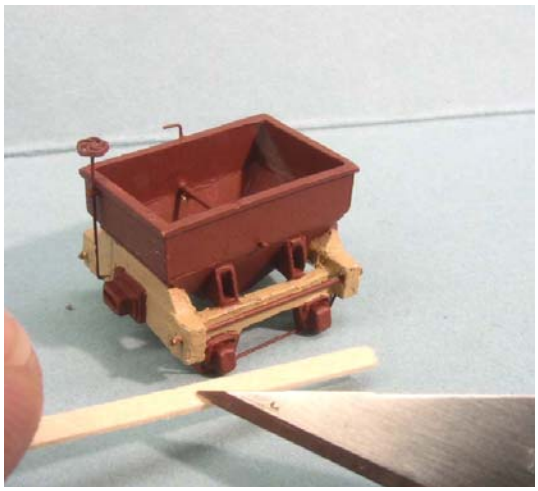
21. Bend .010 wire to the shape shown at left, and fit into the sill holes and across the bottom of the wheel journal boxes. Take your time on this step. ACC in place.



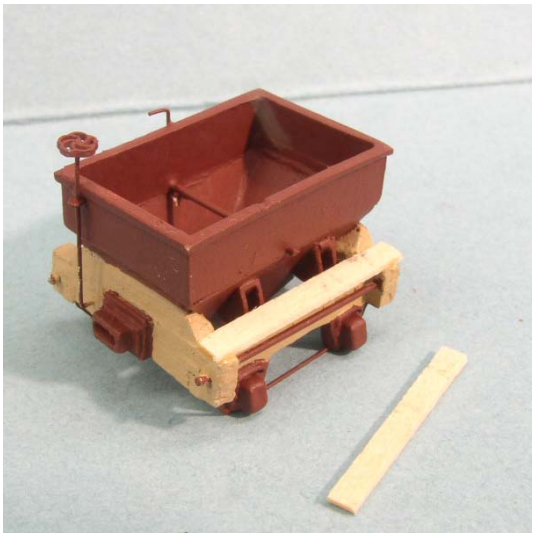
22. Trim the top of the handbrake shaft to desired length and ACC the brake wheel on top. Photos show brakemen standing on the ore loads with the brakewheel at waist level, so use that as a general height guide.

PAINTING AND FINISHING

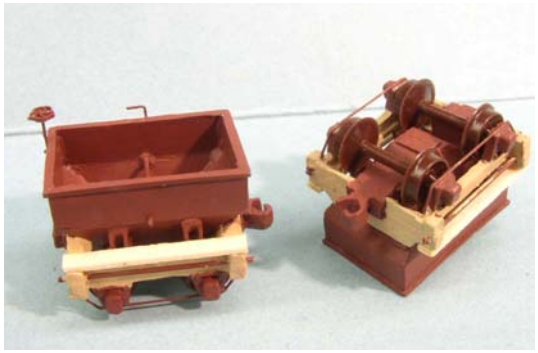
23. Huh? Well, if you put the running boards on now, its about impossible to paint behind them. Learned that the hard way. So lets paint the car now. I have NO IDEA what color they were painted, so this is pure conjecture. The car bodies were definitely darker, and the wood was weathered a lighter color than the carbody.
24. Remove wheels! I brush-painted the iron parts basic Boxcar Red (using Pollyscale acrylics) and the 'wood' frame parts with Floquil Foundation (a nice raw wood color). Note that I DID NOT paint the bearing areas where axles ride. Mine took two coats over two nights. Polly-Scale can produce an excellent finish just from brush application.



25. NOW cut the stripwood to length for the side running boards.



26. ACC the wood running boards on the frame (left) and reinstall the wheels as a final test (below).



27. If you want to do any decals or lettering , do them now. I then applied a diluted wash of Polly S “Grimy Black” onto the foundation and stripwood to gray this material out somewhat. The Grimy Black wash will do a nice job of graying out the wood color

28. I used AIM weathering powders for the final finishing; medium earth for the hopper bodies and wood and a little black for the details.

29. The “Link and Pin” coupler option can be done by fashioning a loop from the .010 wire. Fashion a small oval of wire and ACC or solder it closed, trim to shape. Insert in ONE coupler box and secure with a scrap of .010 wire bent lightly at the top for the coupler pin. Do not glue in place. Holding the cars together, insert a second pin in the second car with a pair of tweezers. There’s no particular need to either paint or glue these in place. While a semi-permanent coupling, it can still be taken apart if necessary. The close-coupling of this option is rather phenomenal!