



Instructions: General American Dry-Flo Covered Hopper Car Kit

9/2014

Thank you for purchasing the Tangent Scale Models General American Dry-Flo Covered Hopper Car Kit! A few quick notes before starting:

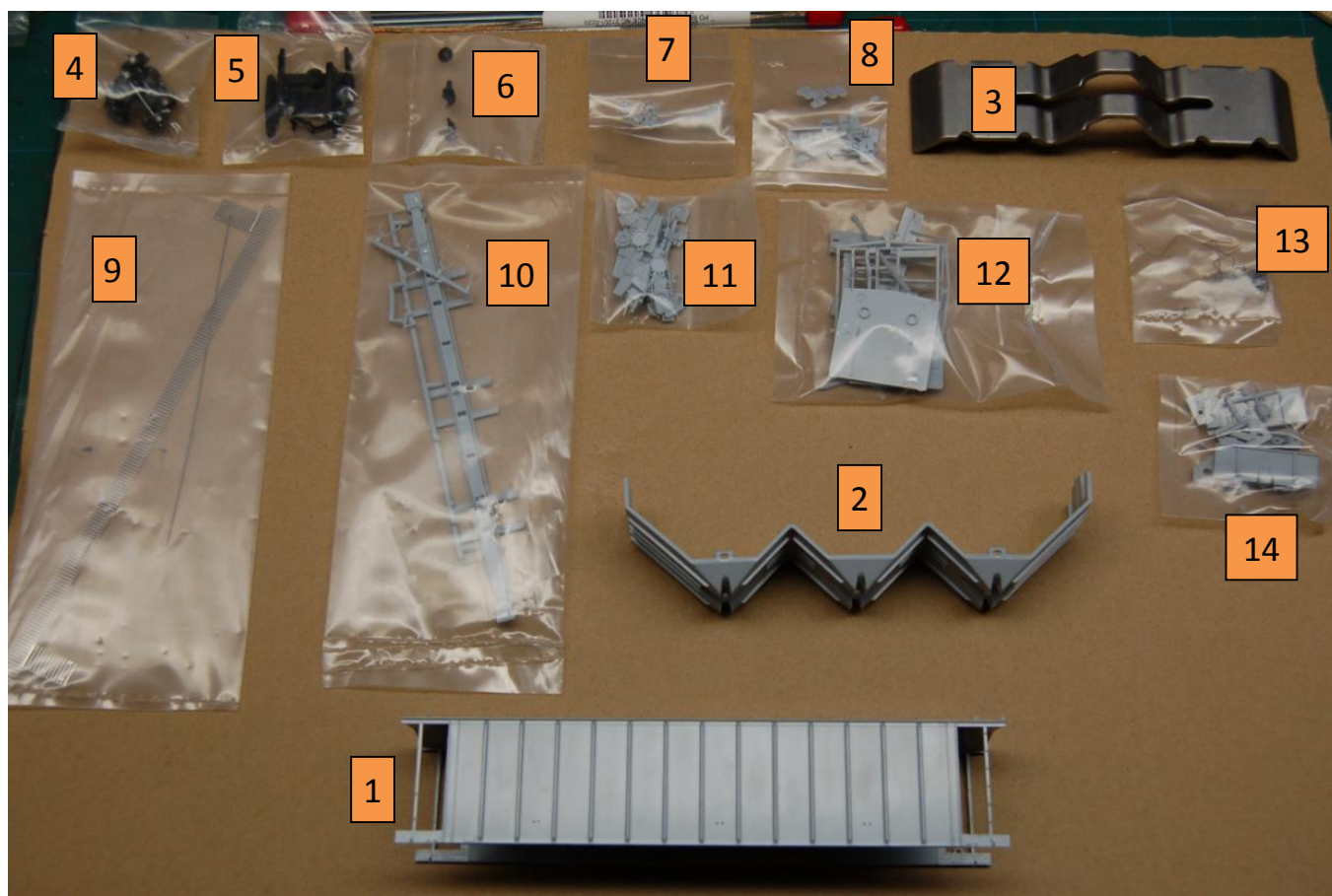
- **Instructions have many large images:** Since some model builders are more visually oriented, we have included *both* text and photos within these instructions. As you can see, many of the images are rather large, to aid in your model building.
- **There are more images at the end:** If you want to see more views of a completed model as a reference for your building, scroll to the end of this document. This is another advantage over a printed instruction sheet.
- **Modeling from computer screen is ideal:** If possible we recommend modeling from your monitor. You can then enlarge the images as you see fit, and you save ink and paper at the same time.
- **There are several ways to complete your kit:** While there are multiple sequence steps possible to build this car, we believe the sequence included here yields the best results.
- **Prototype photos:** While you likely have your own sources of prototype photos, please recall that for each RTR scheme that Tangent releases, we include a prototype photo on our website. You can use these as references in addition to your own sources.
- **We want feedback:** If you find something missing from our text instructions, or an error within these instructions, please let us know by submitting a comment to us on our website or sending an email to support@tangentscalemodels.com. Thank you!
- **These instructions are meant for adults:** While we applaud bringing younger modelers into our hobby, this model includes many small parts, some of which are sharp and/or delicate. Therefore, this kit is recommended for those 14 years of age and older.
- **We offer our trucks separately:** Our gorgeous new Barber 70-ton S-2-A Roller Bearing trucks are available separately, with your choice of RP25 or Semi-Scale tread free-rolling all-metal wheels! Separate brake beam detail included!



- **We offer semi-scale wheels separately:** We offer semi-scale wheels separately in 12 or 100 axle packs – in either 33" or 36" diameters - to fit all of our trucks – and those from other brands!



Overview of this kit's contents:



Standalone parts included:

- Part 1 - Body shell
- Part 2 - Body hopper bottom (effectively the “bays and slope sheets”)
- Part 3 - Weight (for inside tank body)

Parts bags included:

- Item #4 contains our 33" all-metal standard tread wheels
- Item #5 contains our Barber 70-ton S-2-A Roller Bearing trucks with separate brake beam part
- Item #6 contains metal screws for assembly
- Item #7 contains different brake rods and brakewheels
- Item #8 contains different versions of shaker brackets for the carbody side of the car (some cars do not have any shaker brackets, so consult your prototype photos for guidance). This bag also has end bracing bolster parts.
- Item #9 contains the etched running board plus the wire underbody brake line
- Item #10 contains stirrup steps, the centersill bottom, and the roofwalk end supports
- Item #11 contains round hatches for the roof, pneumatic outlets, and release rods for the bays
- Item #12 contains the end sheets, end ladder cages, and bolster plates
- Item #13 contains all of the wire parts
- Item #14 contains the brake system components, hopper dividers, and coupler box lids

Parts needed/recommended:

- Couplers. Our draft sills are designed for Kadee “whisker” shank couplers - #153.

Tools needed/recommended:

- Liquid styrene cement
- CA-type cement or cyanpoxy – for wire to plastic joins
- Canopy cement – for running board to plastic roof joins (made by Pacer and other brands)
- Hobby knives - #11 and #17 are ideal
- #78/#79 drill bit in a pin vise is useful, although a #11 blade can be used gingerly
- Small Phillips head screwdrivers

This kit is NOT recommended for children aged 14 and under.

One caution is in order before you get started: there are many very small parts included in this kit. The assembly sequence requires you to have several bags open at a time, so we recommend a clean and open work surface so that you can keep all of the parts in the open and accessible. Let's get started!

BODY CONSTRUCTION:

1. **Install weight into body.** In the bag of screws (item #6), you will see that there is a pair that have a larger head to them (it actually looks like there is a small washer under the head). These are the screws that you use to secure the weight to the hopper bottom. Position the weight and secure with the two screws as pictured below. Incidentally, the finished car will total 5 ounces once the car is completed (including trucks and wheels), so additional weight is not needed unless you desire cars greater than NMRA recommended weight by more than 10%.



2. **Install the body hopper bottom into body.** The hopper floor snap fits into the body casting and has indexing pins to aid in positioning. If you gently spread the body sides apart the floor will snap into place. Secure with liquid styrene cement. You are now building a "body assembly".



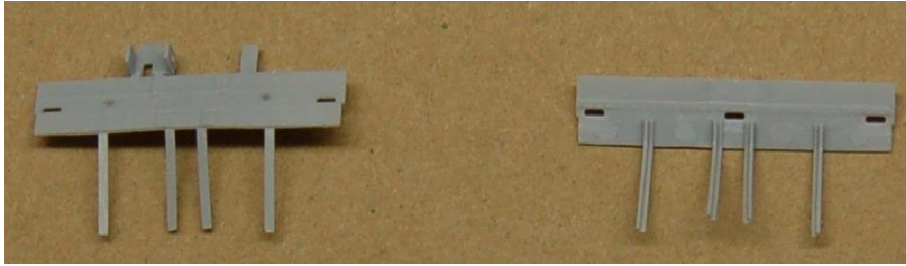


3. **Install the End sheets into the body assembly.** Start with the end sheets. There is an A end and a B end (the B end is the brakewheel end). The B end sheet has a small casting that looks like a plate with a bar over it in the lower left corner (pictured here).



This sheet will go on the B end of the body casting. The B end on the body is the side that has a small bracket with a pin on top of it on the side sill. The body casting has an indentation that the end sheets fit into. You need to make sure that the hopper slope sheet fits behind that slot to ensure that the slope sheets fit properly. Tack the slope sheet with CA if necessary. Insert the end sheets. Make sure that the horizontal ribs of the end sheets are flush with the car sides. Glue in place.

4. **Install end slope supports into body assembly.** Again, there is an A and B version of the slope sheet supports. The B end has support brackets for the brake gear, and also has two small locating tabs (the A end has three tabs). When installing the, four "arms" go toward the inside of the car to rest on the slope sheet. Glue in place making sure that it fits flush with the top of the side sill to ensure it is flat.



See image in next step to better understand installation.

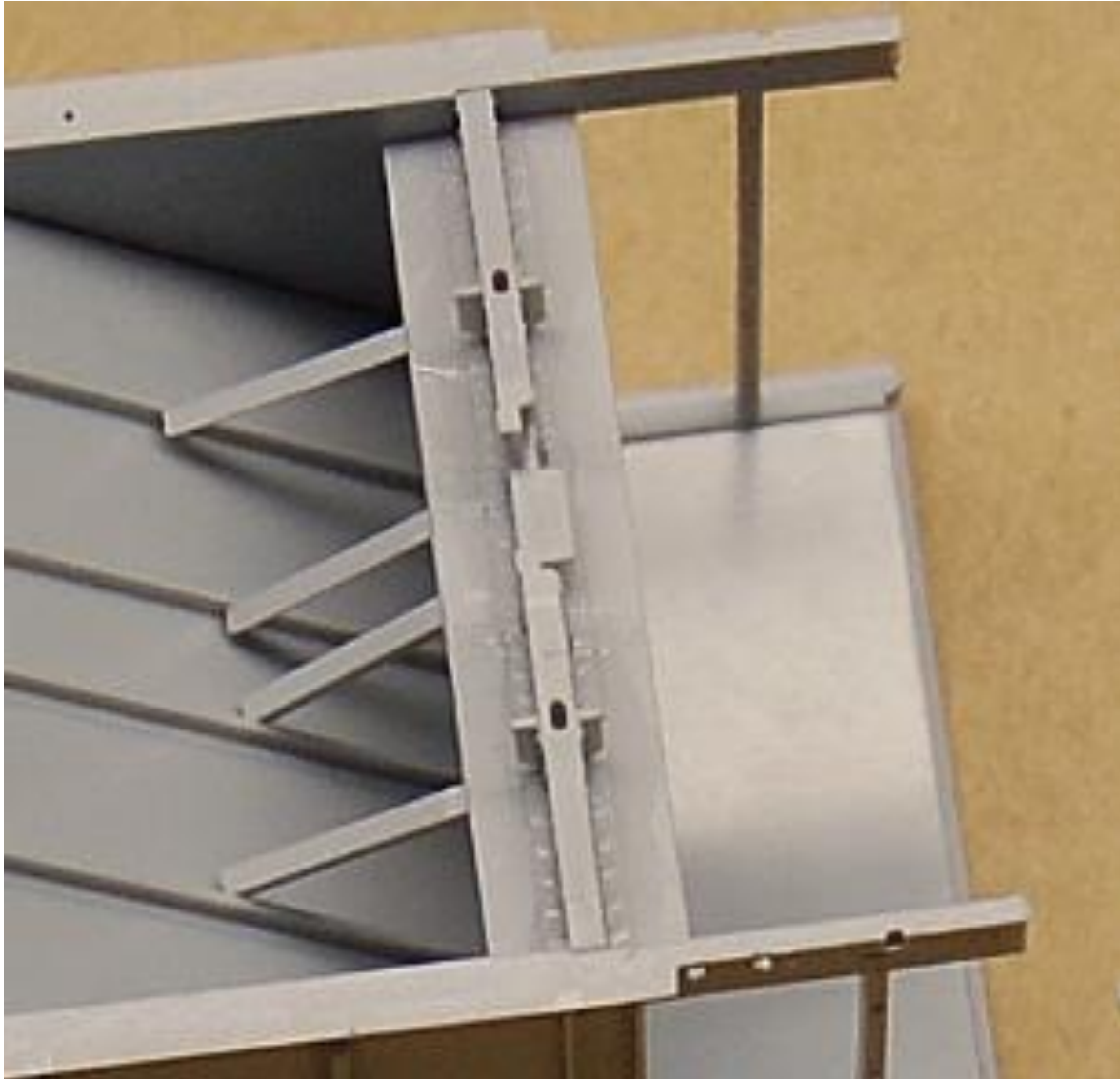
5. **Install hopper braces.** There are four triangular gusset plates that fit in between the hopper bays. Each of the plates has a flange on the “point” of the triangle and a small lip on the top. Orient the gussets so that the flange faces the outside of the car and the back of the gusset rests against the rib that is cast into the hopper casting and glue in place. You will see in a future step how the lip on the top of the gusset fits against the center sill.

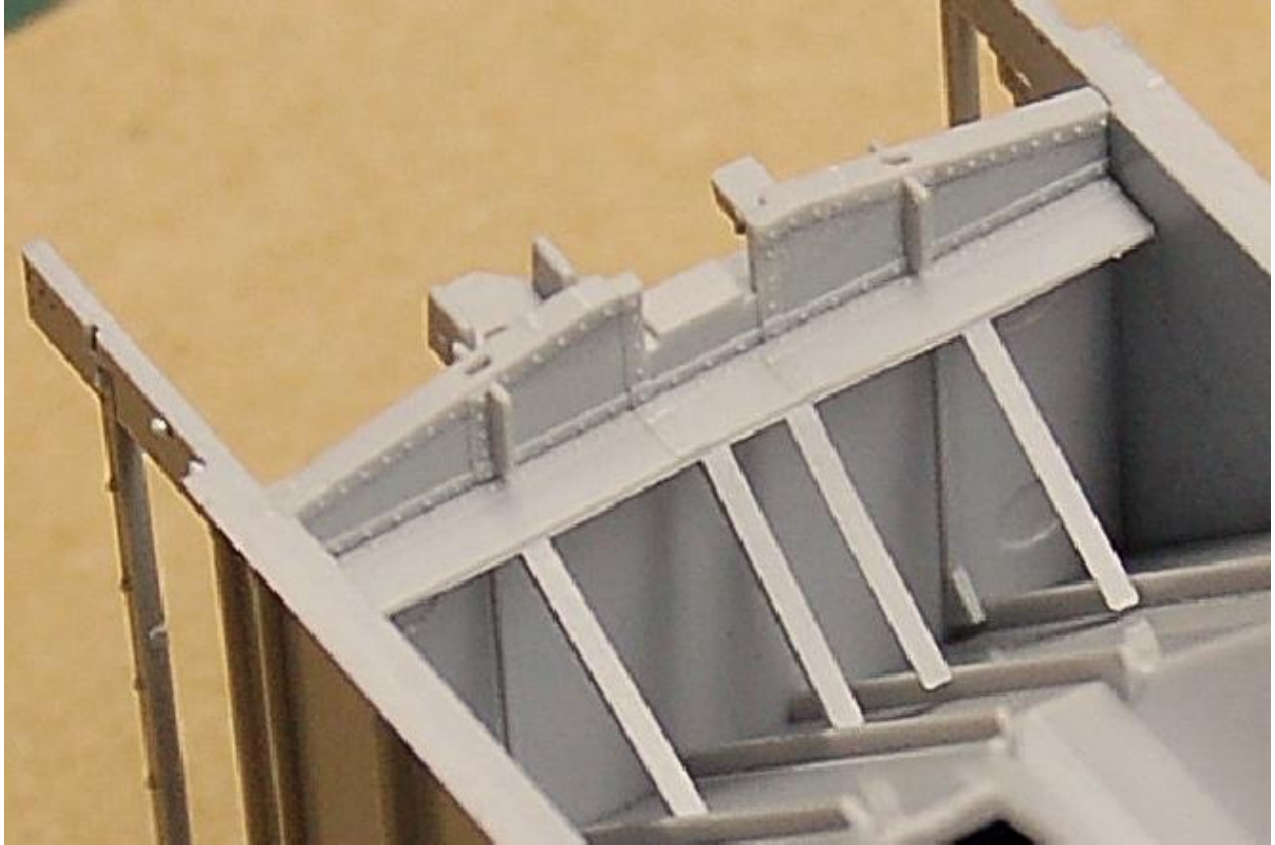


6. **Install the cross braces.** There are two large cross braces that fit over the triangular gussets. Slide the cross braces over the gussets and seat so that the top of the cross brace sits slightly below the side of the car. Glue in place.



7. **Install bolster parts.** The bolsters have a small tab on them in the center of the casting. This tab faces the end of the car. You will also see small notches in the car sides that the ends of the bolsters fit into. There are also small pins on the slope supports from the previous step that aid in the positioning of the bolsters. Position bolsters and glue in place making sure that the ends of the bolsters fit flush with the car side when seated in the notches. Glue in place.





8. **Install the center sill to the bottom of the car.** To begin the center sill installation, locate the four small z-braces. These go on the ends of the center sill (two on each end) and can only fit one way. Determine which parts go on each side and glue in place.

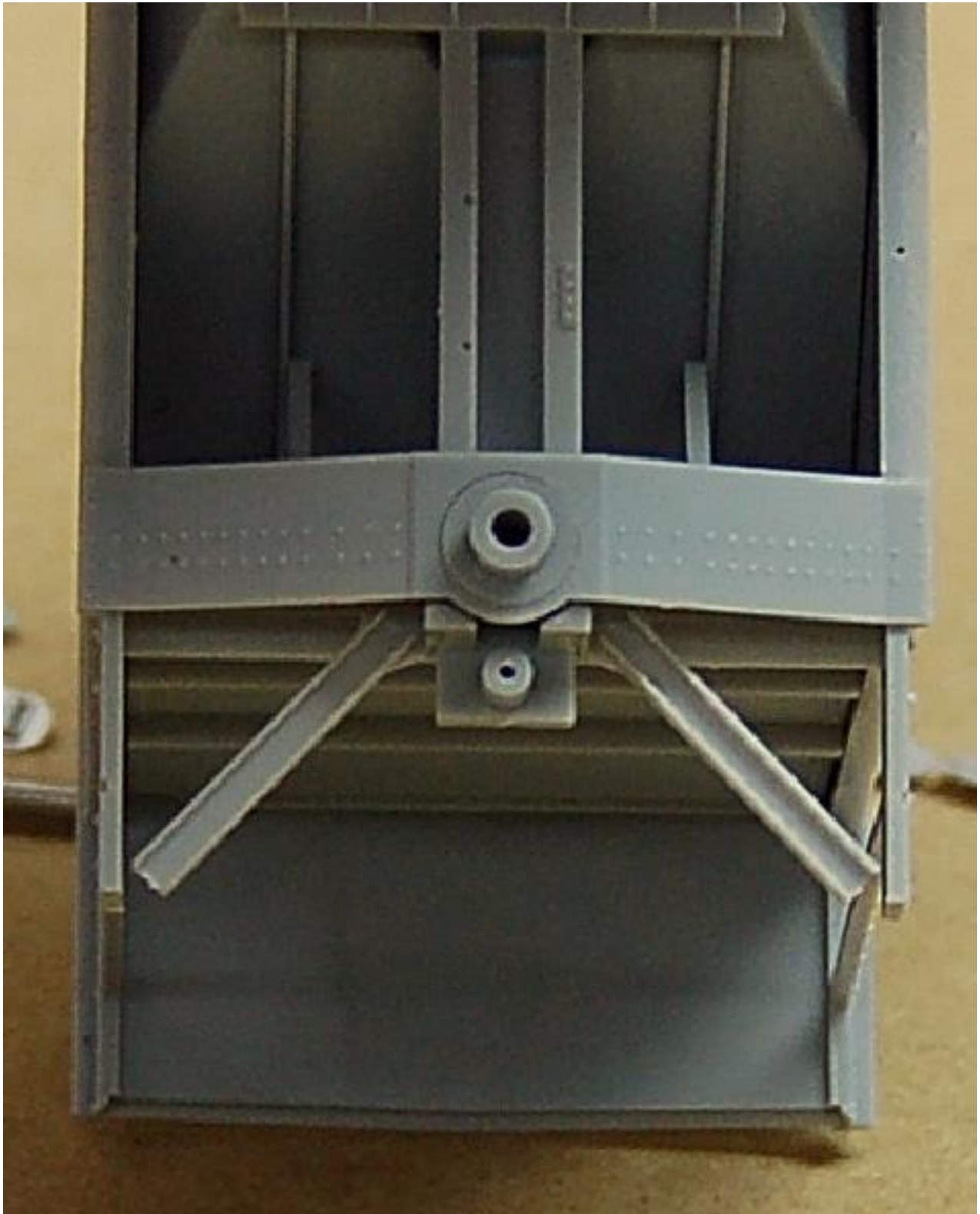
The center sill has a specific orientation. The simplest way to determine which way it goes in is to look at the bottom of the casting. On the outer ends by the truck kingpins one side has two mounting holes and one side has four. The side with four holes goes toward the B end of the car. Put sill in position and glue in place. Now you can see what the lips on the hopper gusset plates are for!

9. **Install the bolster caps.** You will see that one side of the cap has a semi-circle for the kingpin. This faces the end of the car. Position and glue in place.

COMPLETE THE CAR ENDS:

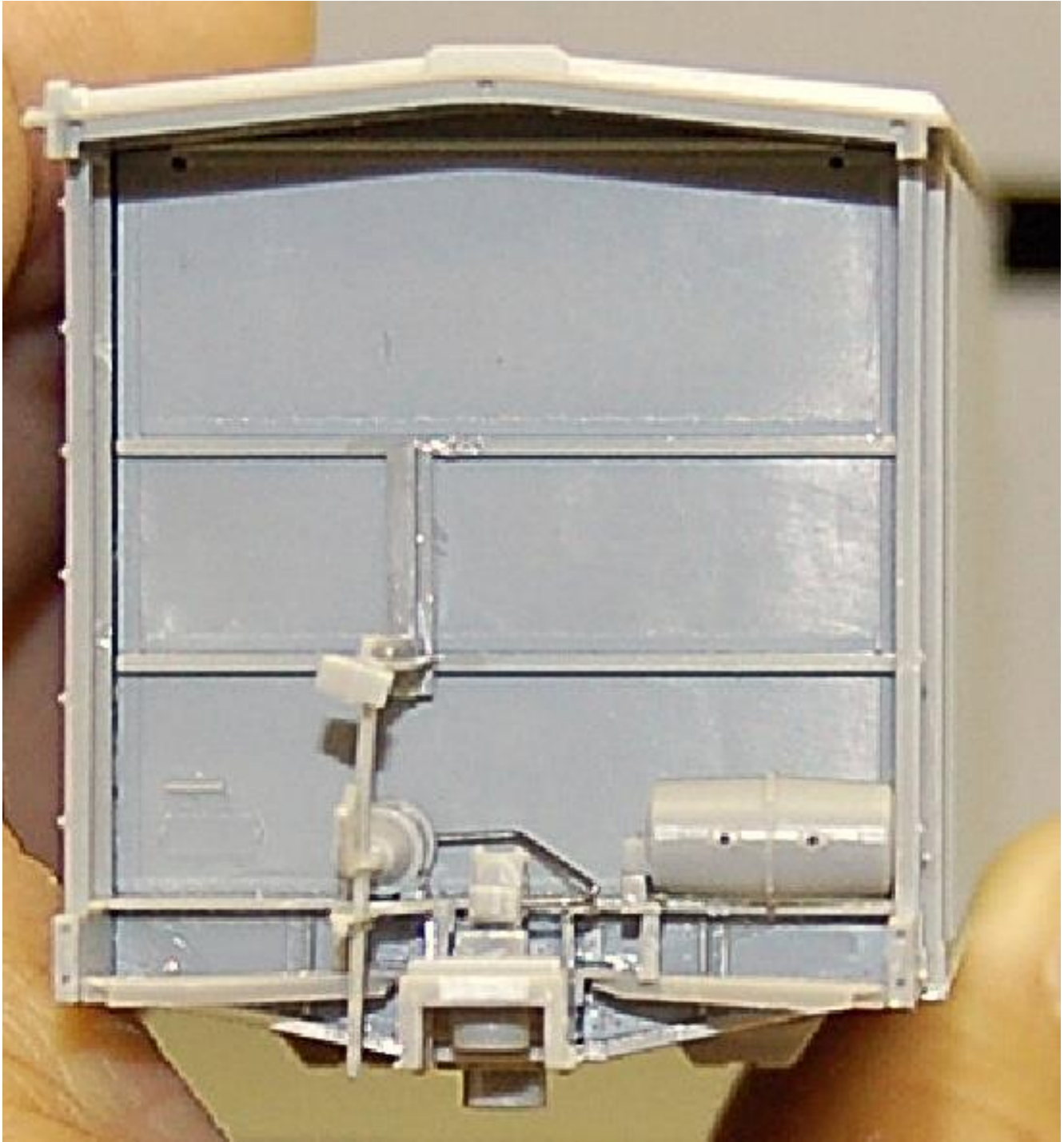
10. **Install corner support channels (LABEL THESE IN BAG DESCRIPTION).** Begin by finding the four L-shaped channels that go from the center sill to the outer corners of the car. On the end that fits into the center sill you will see a small bit of flash remaining from the molding process. Clean this off with a hobby knife or file so the channel fits flush. When installed the channel side faces toward the bottom of the car. You will also notice that one of the parts has a small post on it. This goes on the B end of the car as it is used as part of the support

system for the brake components. Fit the four channels into the notches in the center sill and glue in place. When in position they will sit flush with the bottom of the side sill. The outer end of the channels will be secured to a plate on the end cage in a future step.





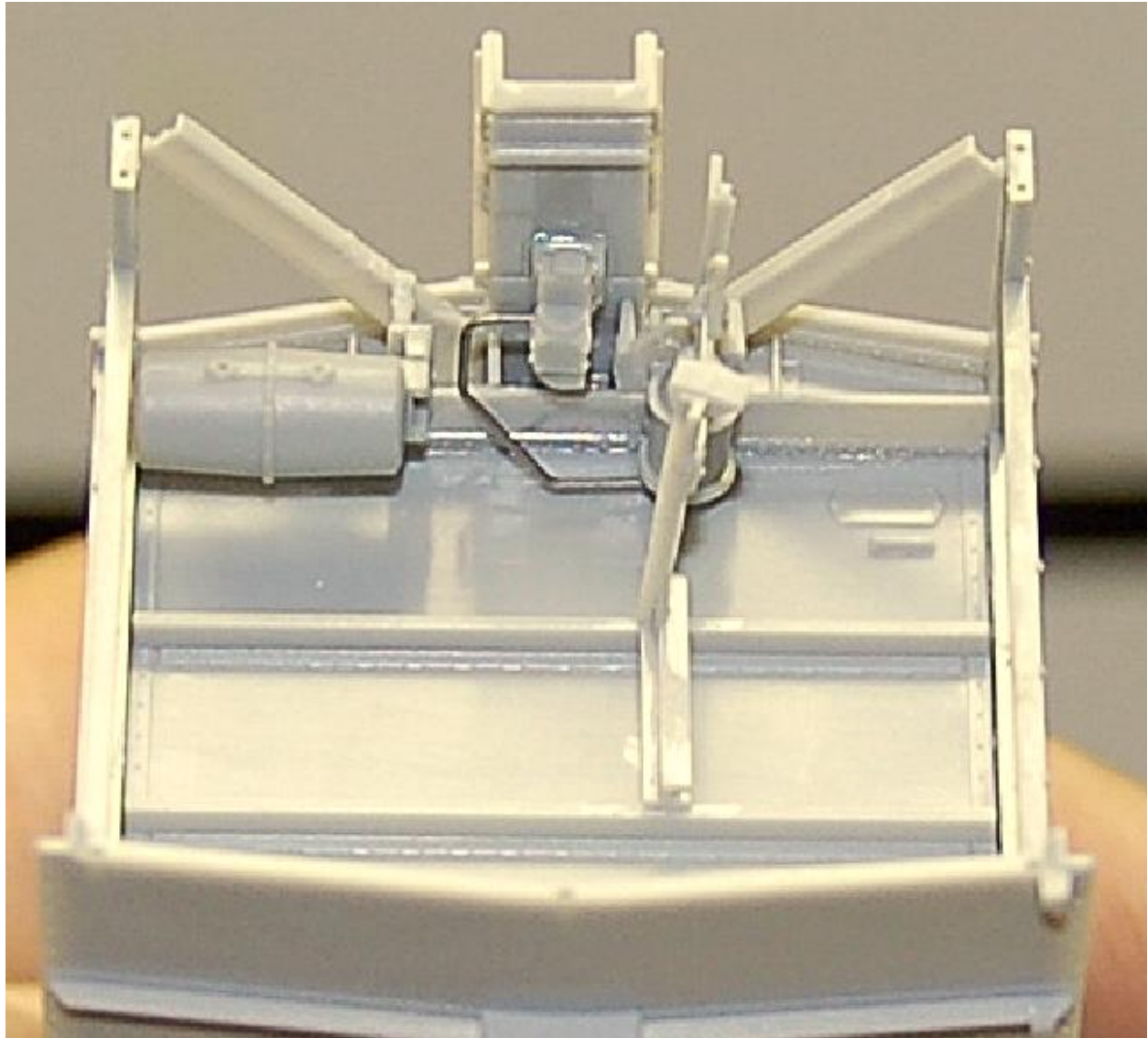
11. **Install the air reservoir.** Start the installation of the brake components by installing the air reservoir. It sits on the bracket that is on top of the side sill and the post on the channel installed in the previous step. The small holes in the reservoir face the end of the car. Glue in place.



12. **Install the cylinder assembly.** You will notice a small hole in the back of the cylinder that accepts the air line that goes into the triple valve. You will need to insert the air line (from the wire parts bag) into the cylinder before the assembly is installed as it will not be accessible after installation. You can tack the air line in place with a little CA which will

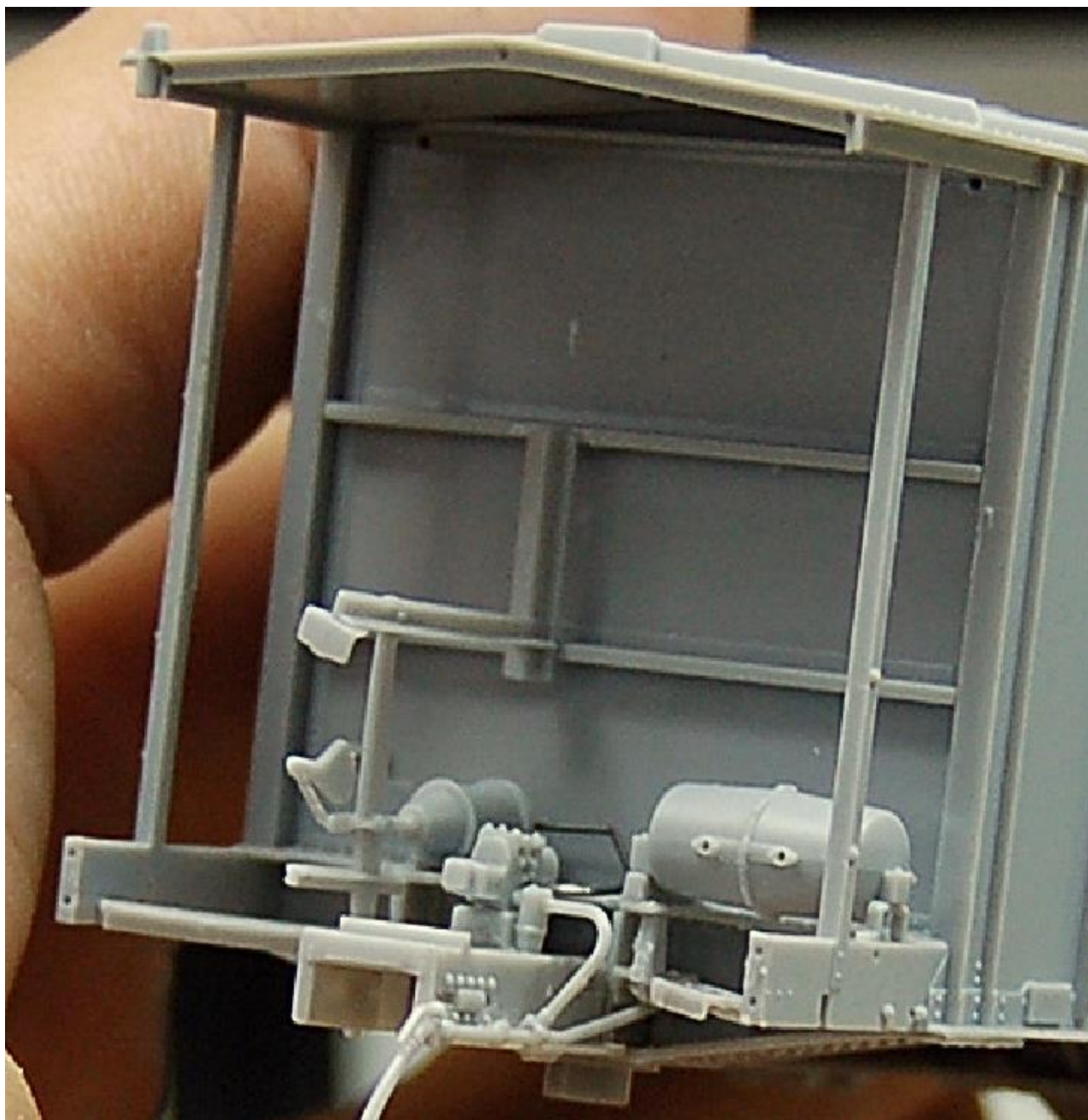
hold it in place but also allow you to adjust its final position in the triple valve. Glue the assembly in place. See image above.

13. **Install the coupler pockets.** The coupler pocket for the B end has a small pad on top of it; this pad is for the triple valve. The coupler pockets are held onto the center sill by the smallest screws. We would advise that you drill and tap the holes with 1-72 drill and tap set (available from your hobby shop from several brands, including Kadee) first as the screws are very small and may not thread themselves in the holes. We would also suggest a small drop of CA to add a little additional security. Make sure that the pockets are level with the center sill as well as centered.
14. **Install the triple valve.** Glue the triple valve on top of the small pad on the coupler pocket. As you are looking at the B end of the car (from the end) the holes in the triple valve will be on the right hand side. The line from the brake cylinder that you tacked in place goes into the lower right hand hole in the triple valve. You can also locate the two lines (from the wire parts) that go from the air reservoir to the triple valve. Secure in place with CA. In bag #11 you will find a small plastic rod that has a smaller rod protruding from it. The smaller rod gets glued into the largest hole (lowest left) of the triple valve and the part sits vertically and rests on the coupler pocket. Next, glue the air hoses into the mounting holes on the sides of the coupler pockets. You will need to find a "U" shaped hose with a C clamp on the end of it next. This gets glued into the small plastic rod from the previous task and the C clamp end goes around the air hose. Glue in place.

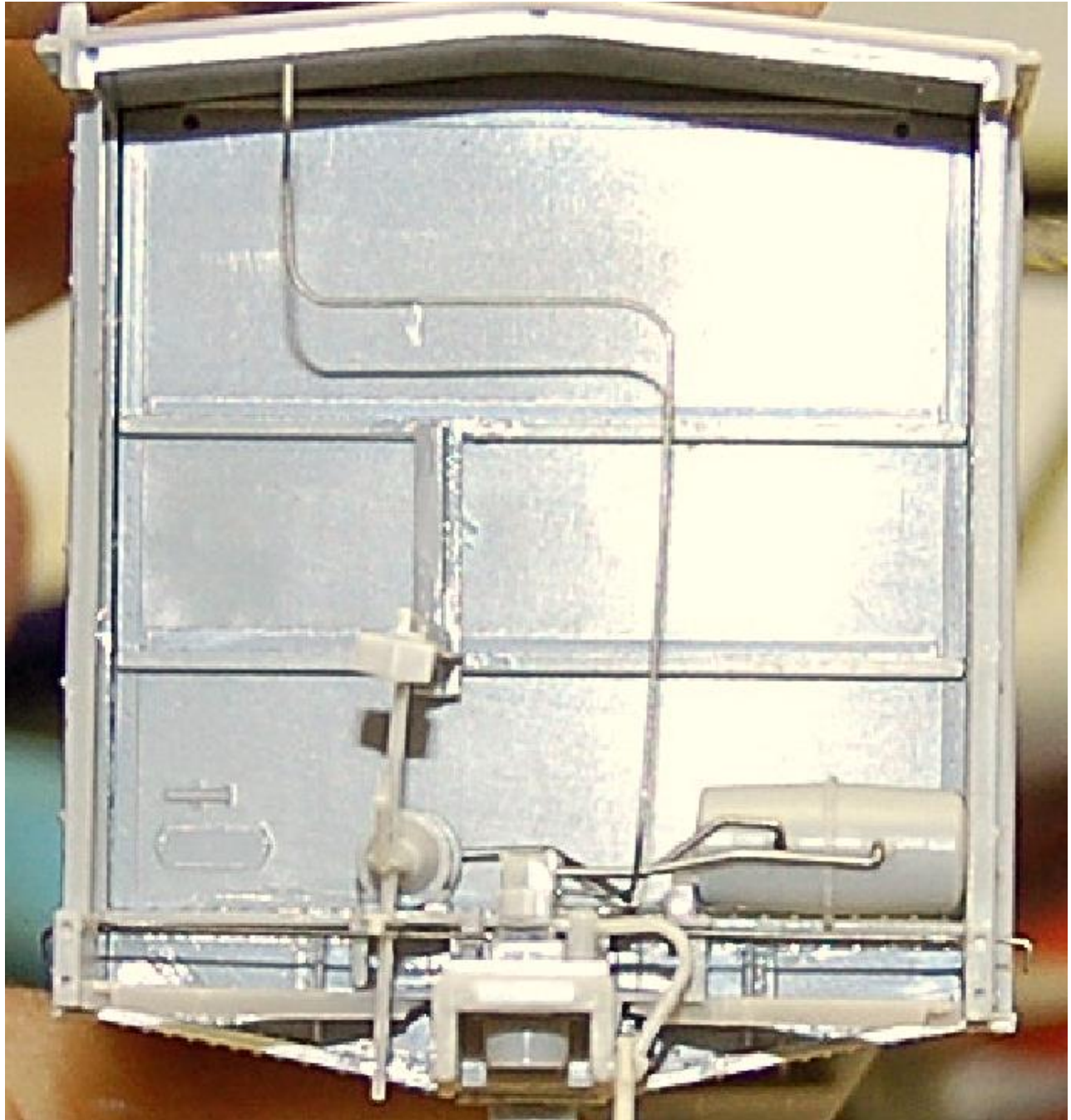




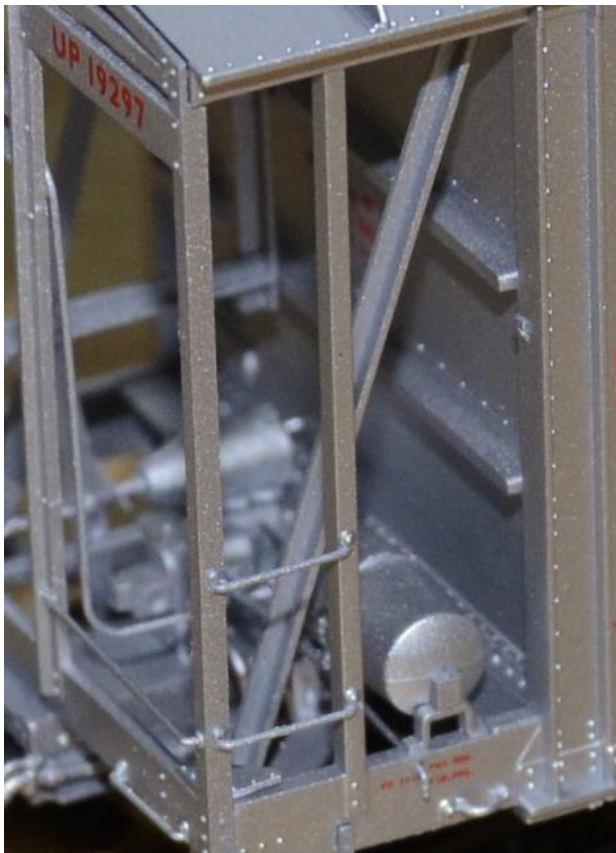
15. **Install Air lines.** There are two wires with a small bend at the end that go to the brake cylinder. These go through the small holes in the side sills and go to the base of the triple valve. Locate and glue in place with CA.



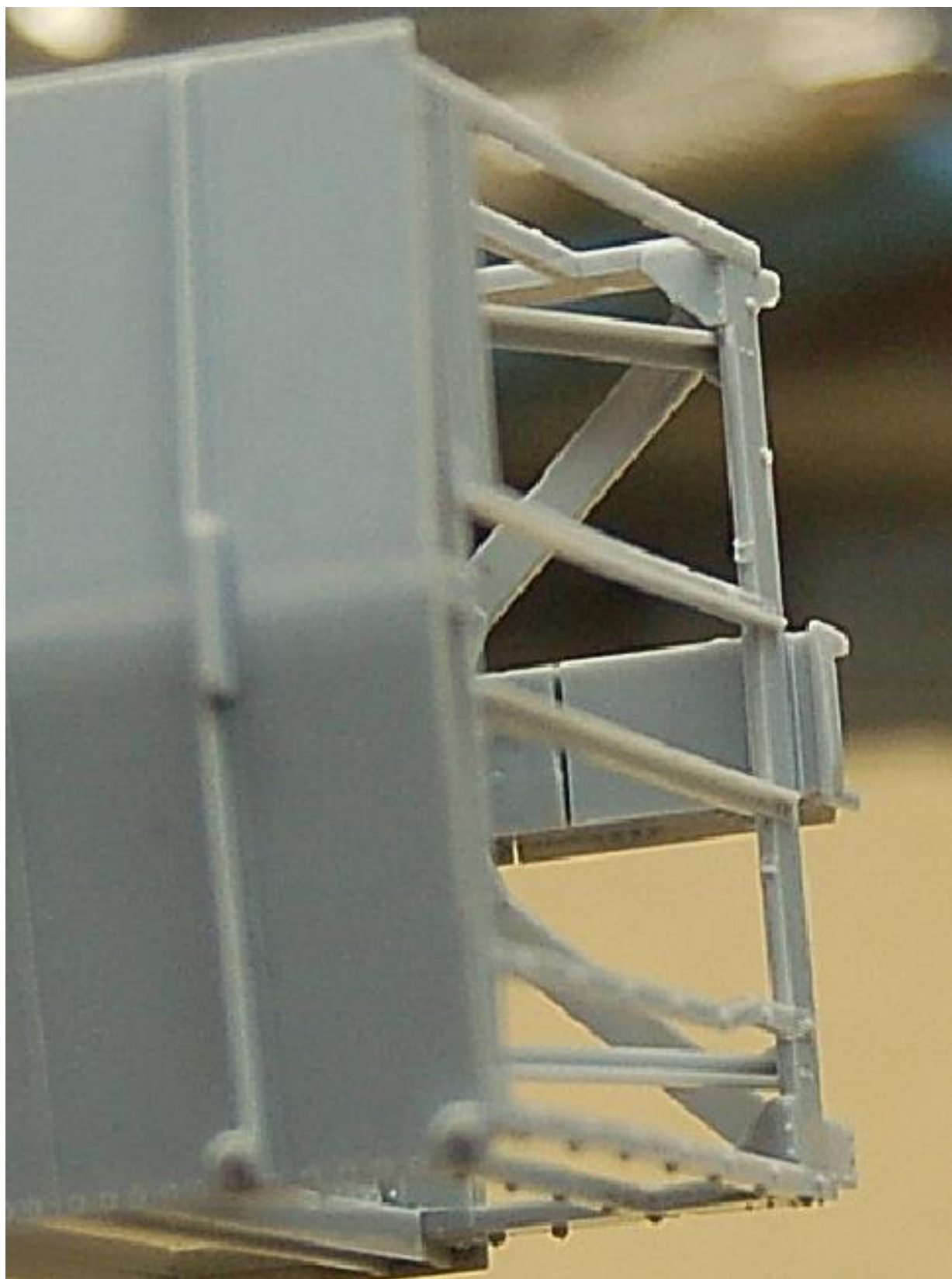
16. **Locate the retainer line next.** This part is easiest to position before the end cage is in place. Tack the retainer line in the triple valve with CA and position it so that the longest straight part of the wire is vertical and in line with the end of the car.



17. **Install angle braces.** There are four long angle braces that go from the top of the end sheets to the ends of the car. There are left and right braces. They have a small flange at the top of the brace that will face the outside of the car when installed. Determine which braces go into which positions and glue in place, positioning them so that they sit toward the inside of the angle braces from the center sill that you installed earlier.



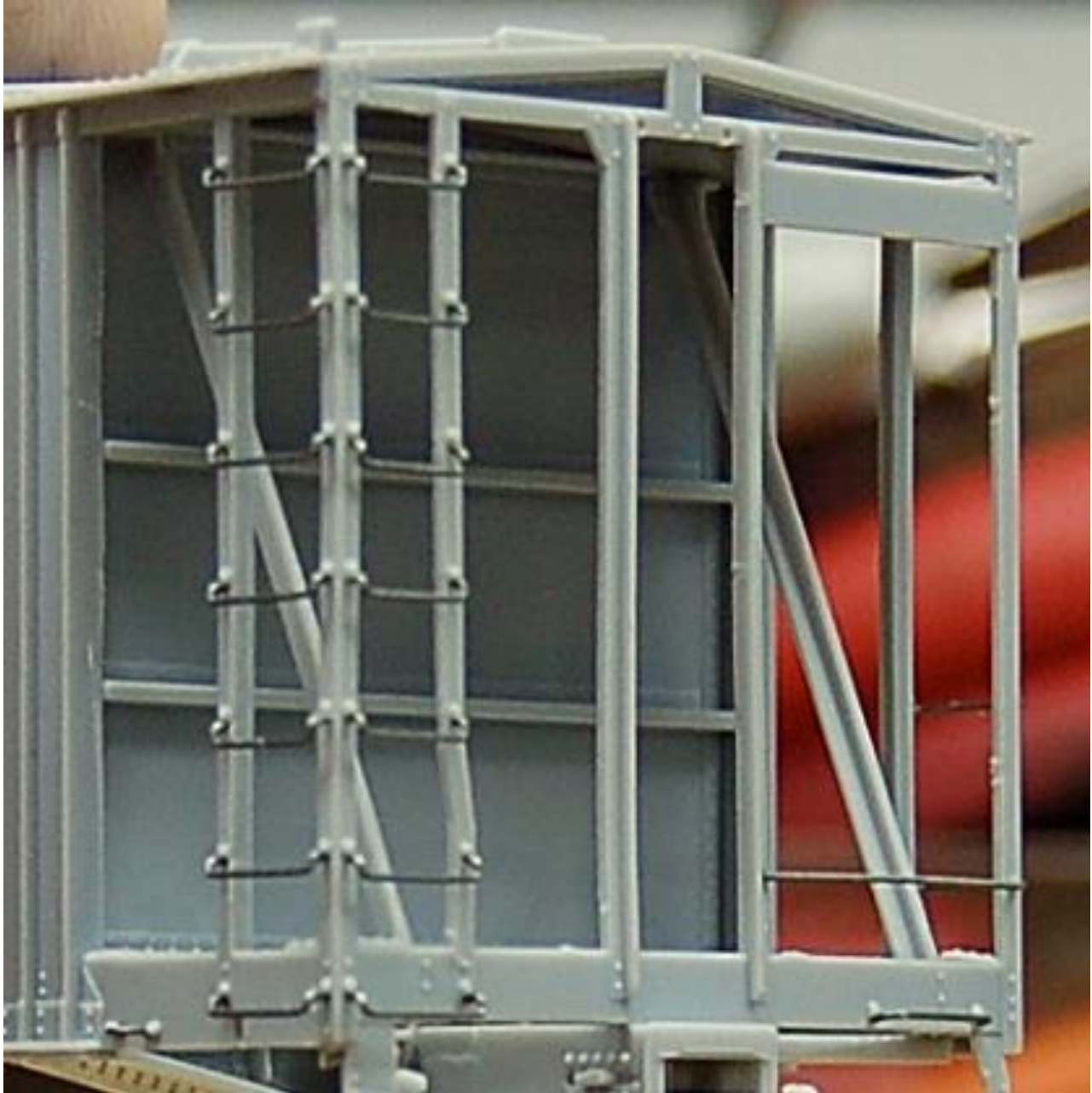
18. **Install the end cages.** The angle braces from the previous step will rest on the small tabs at the bottom of the end cages. Glue the two end cages in place, and also glue the channels the flat mounting pads on the end cages. Make sure that the B end end cage is located on the end of the car with the brake parts.



19. **Install the triangular corner gusset parts.** The last task is to locate the four small (very small!!) triangular corner gussets. Apply a bit of liquid cement to the corners of the ends and position the gussets. When in position, glue in place permanently. See photo above for the triangular corner gussets.
20. **Install the retainer valve.** Begin by locating the retainer valve – it is a straight piece of wire with a small “L” on the end. Glue in place to the AB Valve on top of the retainer wire and into the locating hole on the side of the car – at the B end.



21. **Install grab irons.** The next step will be to install all of the grab irons. There are two styles of grab irons - straight grabs and drop grabs. Organize these into two piles. You will see that the drop grabs come in two lengths. The longer of the two are for the side ladders and the bottom two steps of the end ladders. The shorter ones are for the rest of the end ladder steps. The straight grabs (the shorter ones) are for the side rungs, as well as the lower right rung on the car ends. The longer straight grabs are fairly self-explanatory (there's only one place they will go!). *You will also notice four bronze colored straight grabs in the wire parts bag. These are for the underframe details so put them aside until a later step.* Install all wire grab irons and secure with CA.

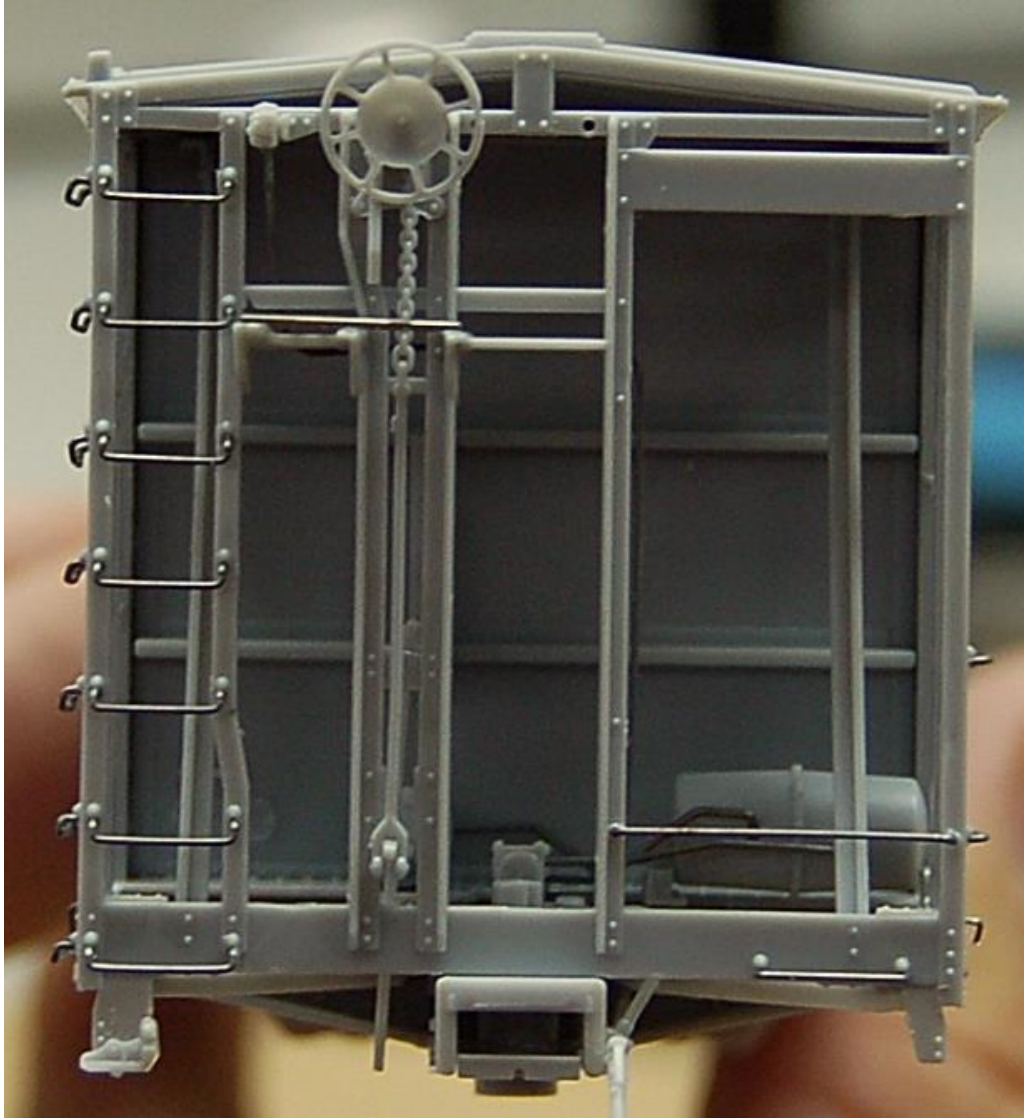


22. **Install brake rod and brakewheel.** There are two brake staffs provided with this kit: Ajax and Universal. There are three brakewheels provided with this kit: Modern, Universal, and Miner. Choose the appropriate version for your prototype and glue in place.

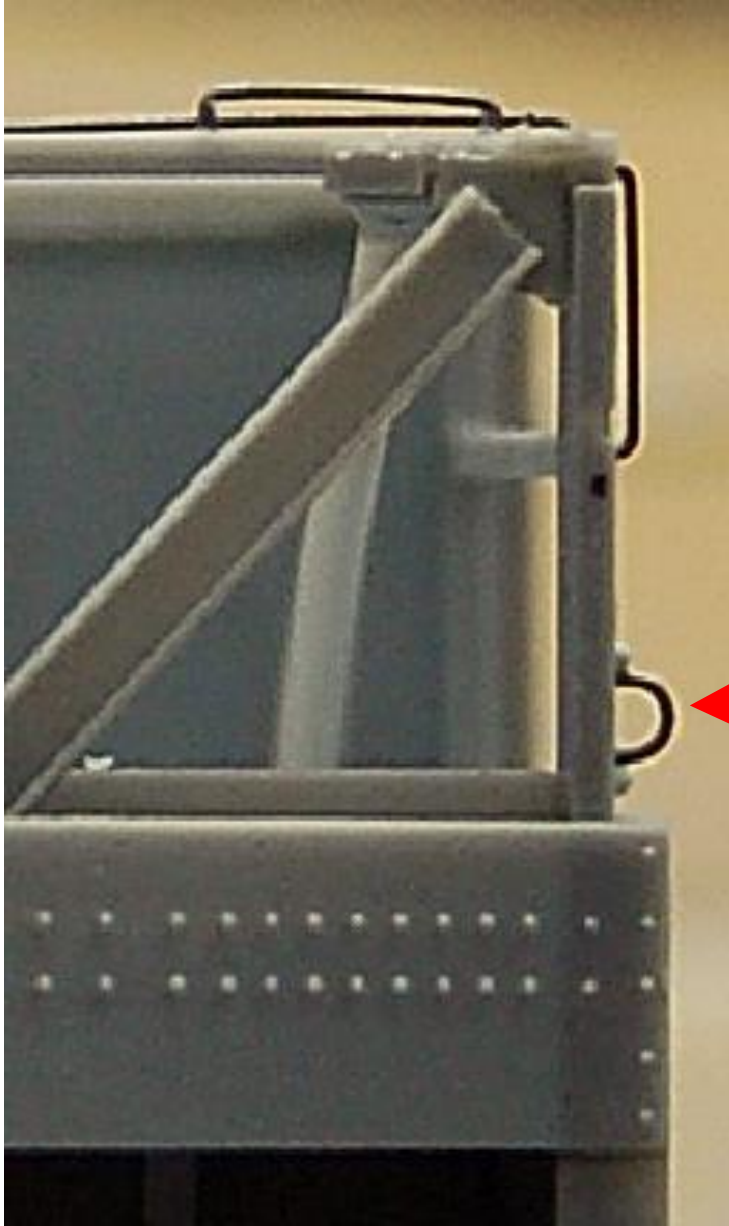


If you are in doubt, use the configuration in the prototype photo below which is the most common.

23. **Install brake platform.** Secure the brake platform with CA.



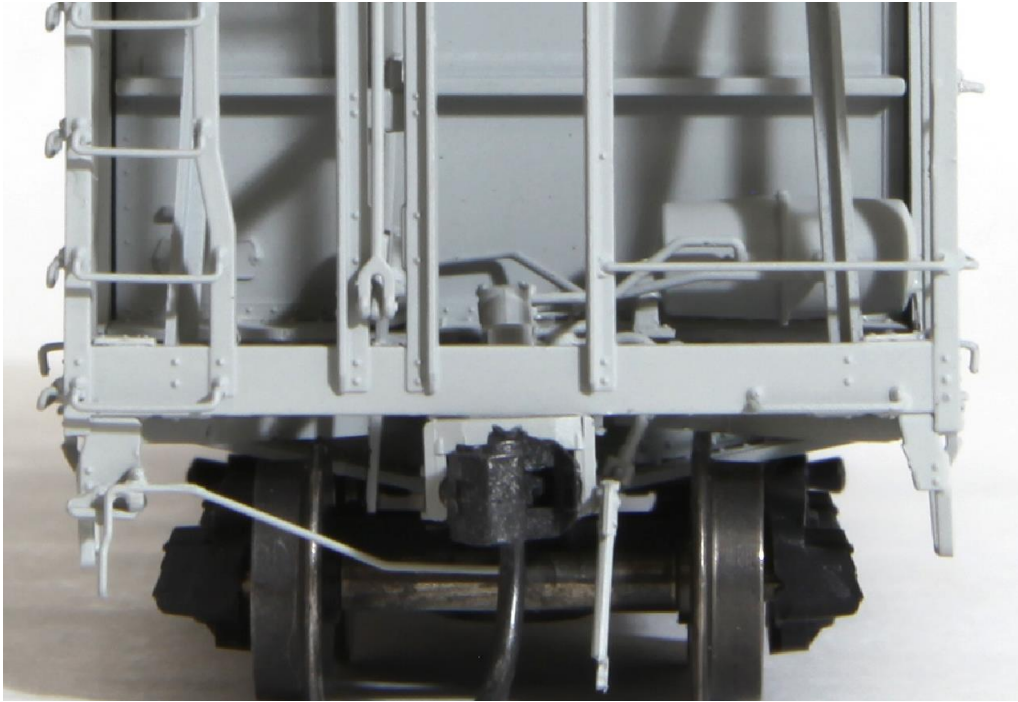
24. **Install the 4 wire roping staples.** There are four small U shaped wires for the roping staples. Locate and CA in place on the four corners of the side sills.



25. **Install shaker brackets to body of car.** There are also two different styles of shaker pockets: Square back and Oval back. Refer to photos and install which version is correct for your prototype. Beware that some cars may not have shaker brackets.

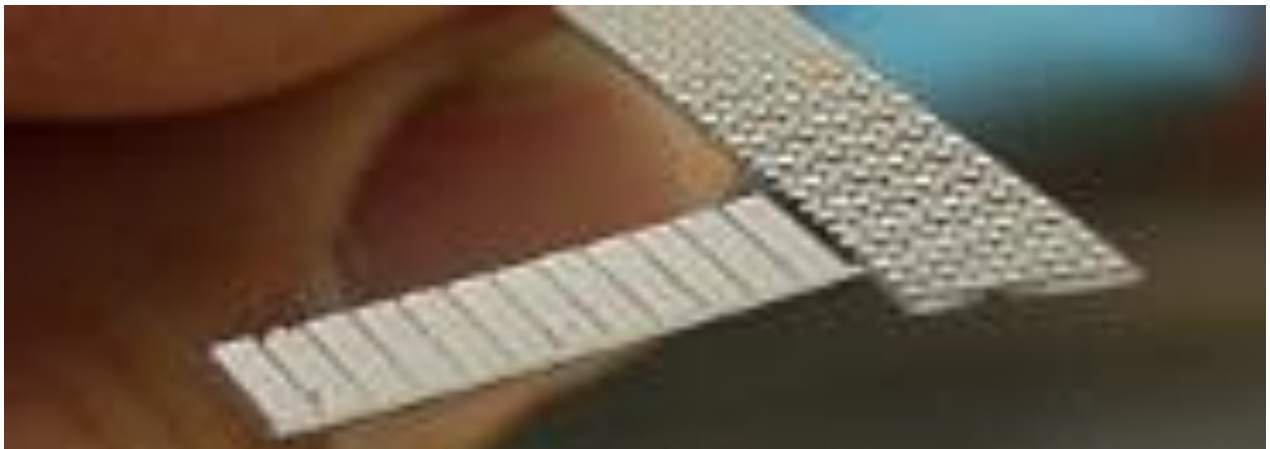


26. **Install the wire cut levers.** Locate the two small cut lever brackets and glue in place on the car ends. Find the cut levers from the wire parts and CA in place in the notches in the cut lever bracket and coupler pocket cover. * You may want to only glue the cut lever on one side if you are installing couplers after painting (which we recommend). This will make it easier to get the coupler cover on and off. Below is a photo of what they look like after installation.



ROOF DETAILS:

27. **Gently bend the etched metal running board.** Bend the end platforms of the running board down slightly to follow the slope of the roof (from the center to the side of the car).



28. **Attach etched metal running board to body.** Because the running board and roof are dissimilar materials, we suggest using Canopy Cement to secure it since it is very flexible and will allow the two separate materials to expand and contract at their own rate.

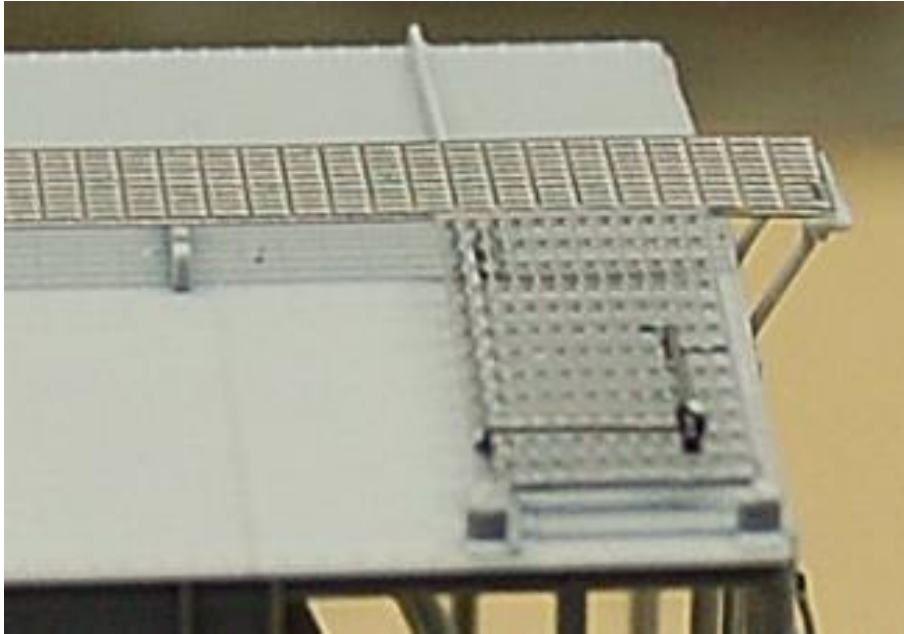


Glue in place, starting at one end of the car and working toward the other end.

29. **Install the end support brackets – eyebolts first.** The last step is to install the corner wire grab irons. Begin by gluing the wire eyebolt parts in the corner holes with CA.



30. **Install the end support brackets – L-shaped corner grab irons last.** Then fish the L shaped corner grab through the eyebolt and position into the locating holes. Glue in place with CA.

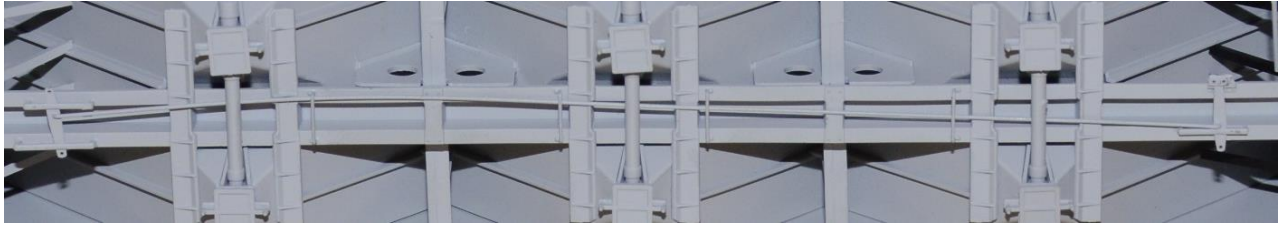


31. **Glue the roof hatches to the roof.** The roof hatches are keyed so they can only be installed one way. Glue the lower hatch piece in place, then glue the upper hatch piece on top of the lower.

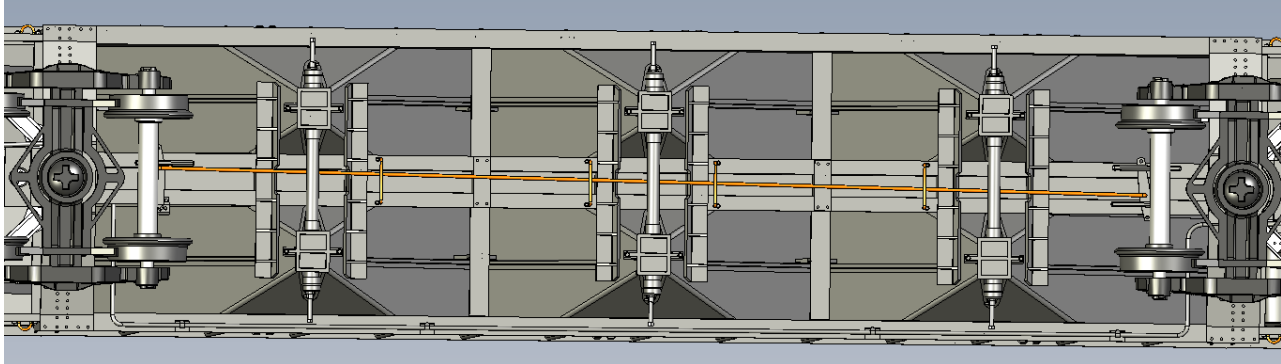


UNDERFRAME DETAILS:

32. **Install underframe brake parts.** Begin by locating the plastic brake parts and the connecting wire. They can only be installed one way. Once they are glued in place install the connecting wire in the locating holes in the levers. Secure wire with CA.



33. **Install underbody “grab irons” – brake hangars.** Locate the four bronze color grabs and insert in four locations along the center sill. Glue with CA.



34. **Install the plastic train line.** Locate the outer train line and glue in place in the four mounting holes along the bottom of the car side.



35. **Install the U-shaped cradles.** Begin the hopper assembly by locating the 6 U shaped cradles. These cradles fit into the slots in the hopper bottoms. These get inserted and snap in place.



36. **Install the pneumatic outlets.** Glue the pneumatic outlets into the slots of the cradles you just installed. Glue in place. Glue the outlet covers in place on the outlet rods.

FINISHING UP:

37. Step 12: Stirrups

38. We waited for this step until the end as the stirrups are quite fragile!

39. There are two different stirrups-one for the left side and one for the right. Gently remove the stirrups from the sprue and glue in place in the appropriate corner. The one side of the stirrup goes into the mounting hole on the car side and the vertical side of the stirrup gets glued to the back side to the small tabs on the car ends. Position so that the bottom of the stirrup is parallel to the ground.

40. Step 13: Paint

41. We only have two suggestions for painting this car. The first we have already mentioned-wait until the car is painted before installing couplers. Painting couplers could make them very "sticky" and not perform at their best. If you have had success in the past in painting couplers then disregard this suggestion! The second-if you are going to follow the first-is to stuff a small piece of paper towel into the coupler pocket to keep paint from getting inside. Also not absolutely necessary, but it could allow couplers to operate a lot more freely.

42. This completes the basic assembly of our kit. After decaling and a bit of weathering, install trucks and couplers and enjoy your work!

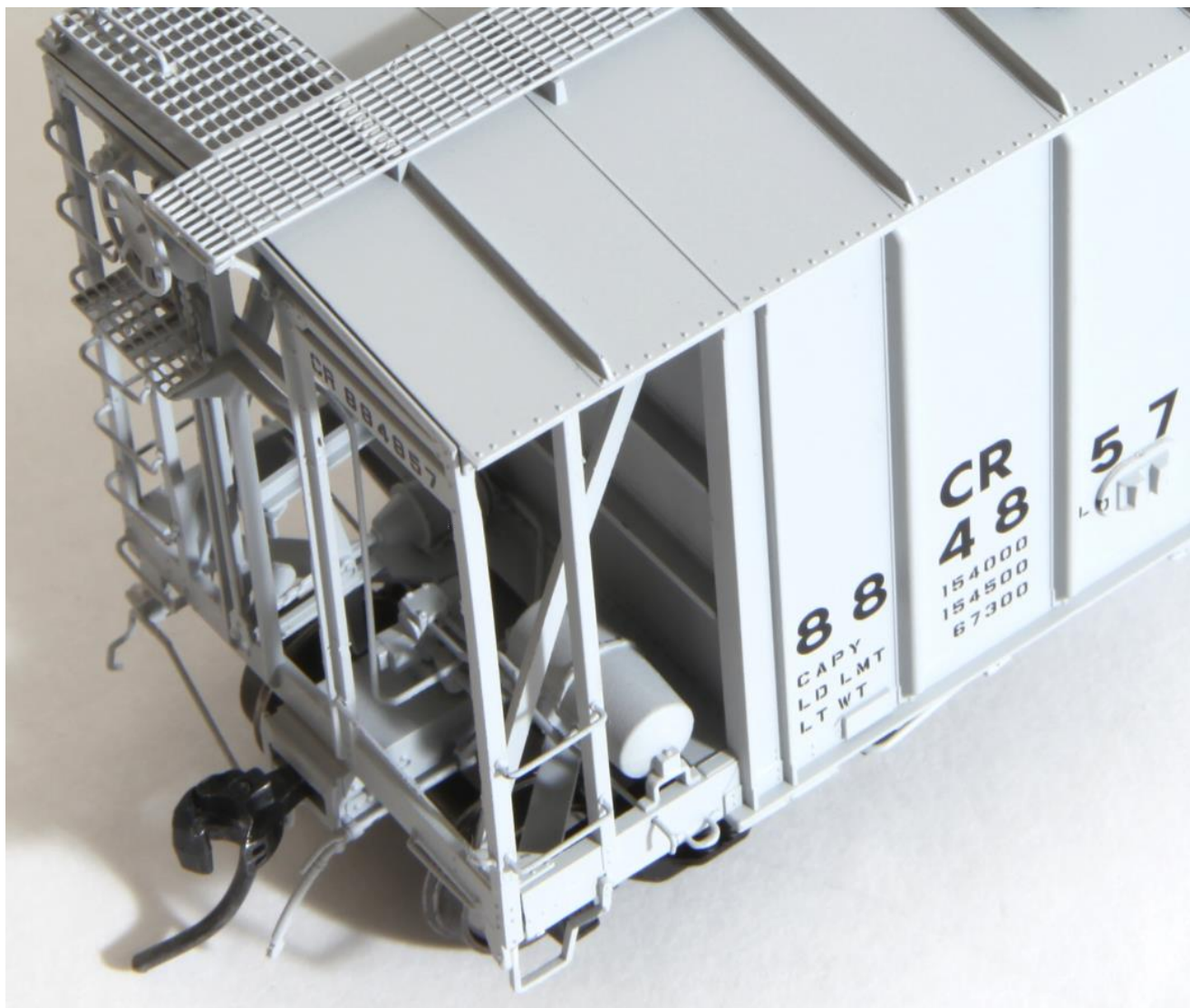
Thank you again for buying this car from Tangent Scale Models. Your hard-earned dollars allow us to continue to bring you more models in the future.

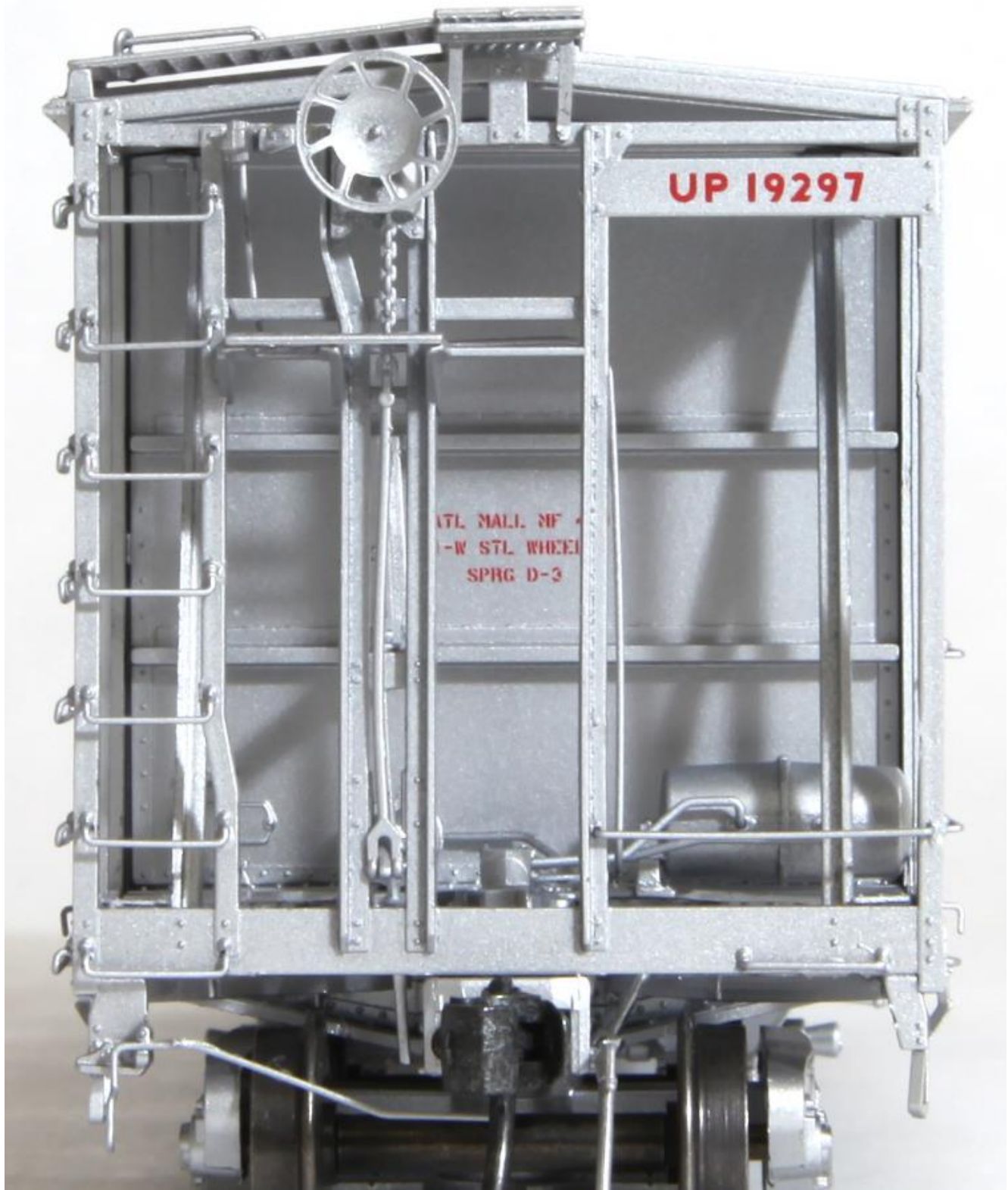
Want to share your creation with the world? Please feel free to upload an image of your customized Tangent model to: <http://tangentscalemodels.com/share/>

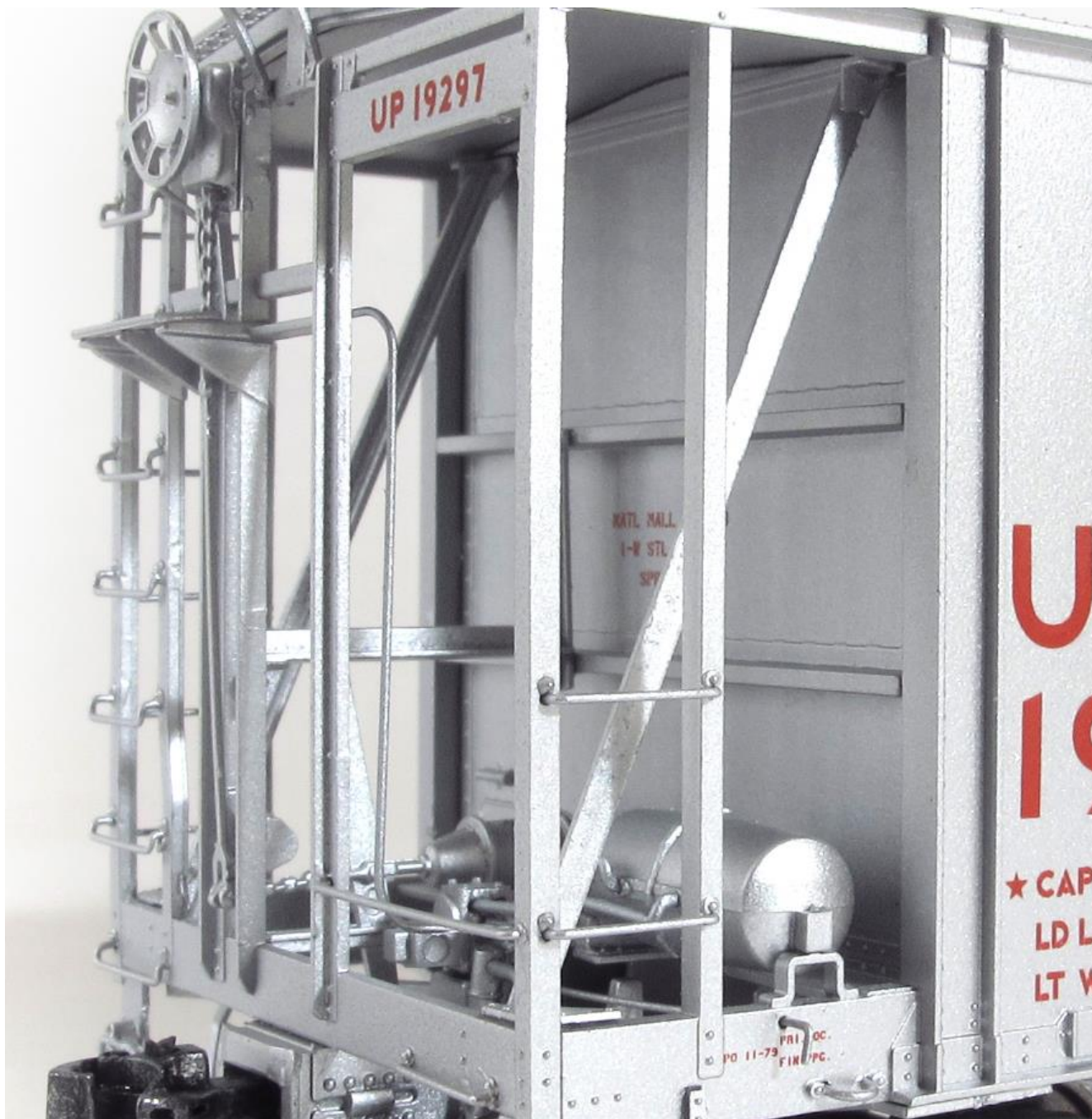
More images of finished cars are below.











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