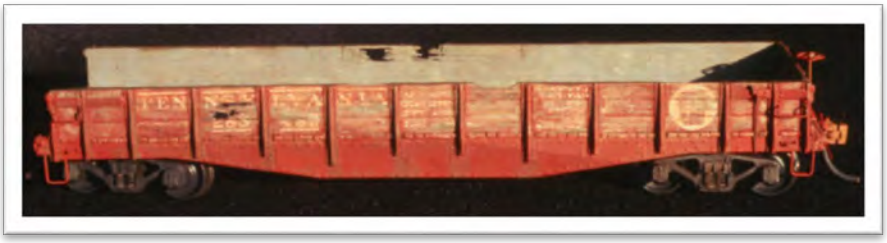
The Keystone Modeler

Pennsylvania Railroad Technical & Historical Society

No. 100 Spring 2017

Inside:

- Six Favorite Articles of past and current *TKM* staff
- 110 pages of great modeling articles



The Keystone Modeler
Pennsylvania Railroad Technical & Historical Society

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FRONT COVER, CLOCKWISE FROM TOP LEFT

Funaro & Camerlengo GR gondola kit by Elden Gatwood; kitbashed resign G28 gondola with cover by Jack Consoli; enhanced Train Miniature/Walthers X29 boxcar by Ben Hom; NKP Car P70grR coach kit by Bob Chapman; scratchbuilt stone arch bridge by Jack Consoli; craftsman ND cabin car kit by Jack Consoli.

The Keystone Modeler

Manuscripts and photographs submitted for publication are welcome. Materials submitted are considered to be gratis and no reimbursement will be made to the author(s) or the photographer(s) or his/her representative(s). The Society reserves the right to reject, for any reason, any material submitted for publication.

Please contact the editor for information and guidelines for submission. Photo files 800x600 pixels or larger in JPG format are preferred. Statements and opinions made are those of the authors and do not necessarily represent those of the Society.

The Keystone Modeler on CD-ROM

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Disc 3	August 2005 to July 2006	*TKM* Nos. 25 – 36
Disc 4	August 2006 to July 2007	*TKM* Nos. 37 – 48
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Disc 8	Spring 2011 to Winter 2012	*TKM* Nos. 76 – 79

Each disc is $15.00. There is also a disc containing all issues from 1 to 48 for $60. If you are a resident of Pennsylvania, please include PA sales tax. Include an additional $15 for shipments outside the US. Send a check or money order in US dollars payable to PRRT&HS to:

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Welcome to a special issue of *TKM*. To commemorate our 100th issue, we have asked each of the persons who was part of the staff since the beginning to choose a favorite article. It is hard to believe that *TKM* has been around this long! It is also amazing that this issue is about three times as long as our normal e-zine.

We are indebted to Al Buchan for deciding that a publication separate from *The Keystone* would be useful to our membership, especially since the majority of them seem to be modelers. He is our Editor Emeritus, and he set an example for any who would follow him. We are also indebted to all who have volunteered their time to help design and edit *The Keystone Modeler*, as well as all the talented modelers who have contributed to our on-line publication.

If you have never contributed to *TKM*, I sincerely hope you will consider doing so. As editor, I worry from month to month whether we will have enough material to publish.

Articles of interest to Pennsy modelers also appear elsewhere, and in the April, 2017 *Model Railroad Craftsman*, Josh Surkosky describes the extraordinary effort he made to produce an N Scale FW2 and an F1.

I also want to update everyone on the status of the fundraising for stabilizing the five steam engines at the Railroad Museum of Pennsylvania that are slated to go into the new roundhouse. Half of the needed $250,000 has been raised, and any additional money will move the locomotives that much closer to the goal. Contributions of any amount, small or large, are welcomed by the Friends of the Railroad Museum of Pennsylvania, P.O. Box 125, Strasburg, PA 17579.

Jim Hunter, Editor

Pennsylvania Railroad Technical & Historical Society

The purpose of the Pennsylvania Railroad Technical & Historical Society is to bring together persons interested in the history and modeling of the Pennsylvania Railroad, its subsidiaries and its acquired companies. Our goals are to promote the preservation and recording of all information regarding the organization, operation, facilities, and equipment of the PRR.

The Society's quarterly illustrated journal, *The Keystone*, has been published continuously since 1968. Each issue of 64 or more pages contains illustrated original authoritative articles about locomotives, cars, other equipment, facilities, and operating practices of the PRR. The Society also publishes its own thoroughly researched books and other materials concerning PRR history. *The Keystone Modeler* is also a quarterly special 30-plus page online publication of the Society.

The Society meets annually, usually during a weekend in early May, providing an opportunity for its members to get together and learn more about the PRR. Local chapters around the country also provide members and guests with regular meetings that feature PRR related programs.

Information about our Society may be found on our website – www.prrths.com. To join the Society, send $40.00 to:

PRRT&HS
PO Box 54
Bryn Mawr, PA 19010-0054

All memberships are for a calendar year, back issues of The Keystone for the current year are sent upon joining. Overseas membership has added postage fees.

PRRT&HS Interchange

Selected Society Merchandise of Interest to Modelers

PRR Equipment Drawings on Microfilm

Copies of PRR equipment drawings are available from the Society's microfilm collection. To order drawings, you must know the drawing number and title. Ordering information and lists of arrangement drawings are available on the Society's website. Go to www.prrths.com, select National Society, and then The Interchange. If you require a printed copy of this information, please send your address and a check for $2.00 made out to PRRT&HS to:

Richard C. Price
779 Irvin Hill Road
McVeytown, PA 17051

The Keystone Modeler
NEWSWIRE
With Steve Hoxie

PRR Product News

ATHEARN
http://www.athearn.com/
PRR EFS17m (GP9)—HO Scale

(Athearn)

Athearn has announced ready to run models in their Genesis line of the GP9 in two versions. Road numbers 7024 and 7046 are Phase II units from the November 1955 delivery. 7117 and 7138 are from the June 1957 delivery and are identified as early Phase III, retaining the four 36" fans. All four models will be available without sound and with DCC/Sound. Sound equipped units will have the highly regarded Tsunami2 decoder. The models are expected to be available in January 2018.

BOWSER MFG. CO.
http://www.bowser-trains.com/
PRR X31A Inset Roof Double Door Boxcar Kit—HO Scale

(Bowser)

Bowser currently has available kits for the double door, inset roof version of the X31A in the circle keystone scheme. Correct 2D-F12 coil and leaf spring trucks with metal wheel sets are included. The X31 and its subclasses were a PRRPro project. Photos and archived email discussions are available on the group's website.

PRR K11 Stock Car Kit—HO Scale

(Bowser)

Bowser again has the K11 available; this time in kit form. The kit is available in several paint schemes. Shown here is the plain Freight Car Color.

PRR X31F Turtle Roof Double Door Boxcar Kit—HO Scale

(Bowser)

Bowser has in stock kits to build the distinctive X31F turtle roof boxcar, designed during World War II to transport Jeeps.

BROADWAY LIMITED IMPORTS
http://www.broadway-limited.com/
PRR Delivery Schedule

BLI HO P70 and P70R coaches are currently in stores. The latest run of the HO J1 2-10-4 is still due in May.

CENTRALIA CAR SHOPS (INTERMOUNTAIN RAILWAY CO.)
http://www.intermountain-railway.com/
PRR Diner—N Scale

The **Centralia** diner announced through **Intermountain** in both Fleet of Modernism and standard three stripe schemes is still due in Aug/Sep 2017.

(Intermountain)

CON-COR INTERNATIONAL
http://www.con-cor.com/website/
PRR mP54 Combine and Coach – HO Scale

(Con-Cor)

Con-Cor has listed on their website that they are taking pre-orders for the mP54 combine and coach. These will be available in several paint and lettering schemes. A delivery date of first quarter 2107 is still listed so keep checking the website for updates.

N SCALE KITS
http://www.nscalekits.com/
PRR FM Flat Car Kit —N Scale

(N Scale Kits)

N Scale Kits has available kits for the FM class flat car. Both a conventional flat car with stake pockets and a car configured to carry containers are available. The kits are produced using white cast metal with laser cut wood decks. Etched metal details are provided as are decals, but no trucks or couplers. DD1 containers are available separately on **Shapeways** here:

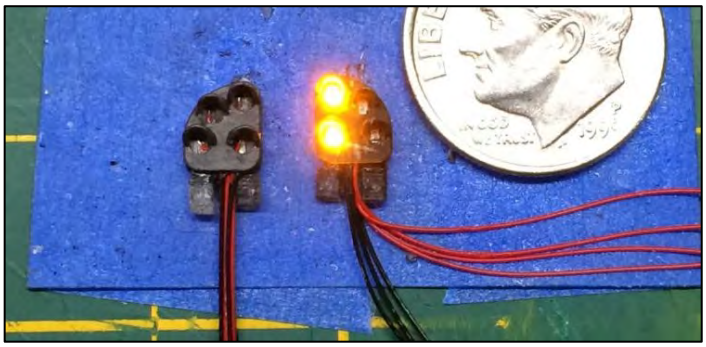
https://www.shapeways.com/product/X7NZQ2EWC/prr-dd1-containers-in-n-scale?li=shareProduct

RAPIDO TRAINS
http://rapidotrains.com/
PRR FA2 Alco Diesel—HO Scale

(Rapido)

The **Rapido** FA2 is still expected to be delivered in late summer 2017.

SHAPEWAYS
https://www.shapeways.com/product/532988UQ5/ho-dwarf-signal-jhdd101?optionId=43306453
https://www.shapeways.com/product/L6LJSGN6H/ho-dwarf-signal-jhdd111-swe-usa-version?optionId=59322603
PRR Dwarf Signals – HO Scale

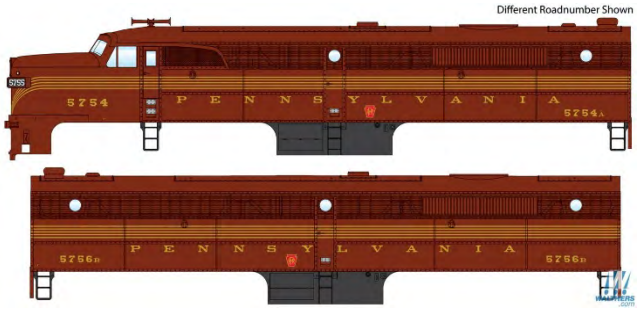


(John Winer)

Pennsy modeler John Winter has been documenting progress on his very nice PRR Southwest Branch in the free (free!) online magazine **Model Railroad Hobbyist.** His blog can be accessed at http://model-railroad-hobbyist.com/node/22280 . Scroll to the bottom of the page to get to subsequent pages; he is now up 40.

John discovered these HO dwarf signals on **Shapeways.** Apparently Danish and Norwegian railroads use these. The modeler must install 0402 SMD LED's. Here is one photo from the blog to whet your appetite. Additional photos and discussion can be found on John's blog; go to pages 39 and 40. The **Shapeways** links above lead to both early and late style signals. Castings of multiple signals can be found on the pages, too.

WALTHERS
https://www.walthers.com/
PRR PA1 and PB1 Alco Passenger Diesel—HO Scale



(Walthers)

As reported in the last issue **Walthers** is developing the PA1 and PB1 in the Tuscan 5-stripe scheme for their Mainline series. It will be available with DC or DCC with Soundtraxx sound. It is now scheduled for delivery August 28.

Upcoming Events

May 18 –21, 2017 Camp Hill, Pennsylvania
PRR&THS Annual Meeting
http://pennsyrr.com/index.php/home

June 2 - 3, 2017 Enfield, Connecticut
New England/Northeast RPM Meet
http://www.neprototypemeet.com/Welcome.html

June 17, 2017 Richmond, California
Bay Area Prototype Modeler's Meet
http://www.bayareaprototypemodelers.org/

June 23 – 24, 2017 Collinsville, Illinois
St. Louis Prototype Modelers' Meet
http://icg.home.mindspring.com/rpm/stlrpm.htm

July 30 – August 6, 2017 Orlando, Florida
NMRA National Convention and National Train Show
http://nmra2017orlando.org/

Advance Planning

October 26 – 28, 2017 Lisle, Illinois
RPM Chicagoland (formerly Naperville)
http://www.rpmconference.com/

Our Favorite Articles from *The Keystone Modeler*

In August of 2003, Al Buchan published the first issue of *The Keystone Modeler*. At the time, Al was not only the editor and founder of this publication, he was the president of our Society. Al is also a former Pennsylvania Railroad manager with intimate knowledge of the railroad we model. These are the words he used to introduce *TKM* to the membership.

Modeling and the PRRT&HS

The time has come to present more modeling information and news to the Society's members. However, where to best publish this information has been the subject of discussion with the Board of Directors as well as deliberations on several online discussion sites.

Technical and historical information about the PRR is definitive or completed (as best we know it), and is best documented in a permanent printed publication such as *The Keystone*. On the other hand, modeling information is generally short-lived, in that it is constantly changing and in need of periodic updates based on new and better products and techniques. Therefore, modeling information is better suited to an environment where additions and changes can be made and updated to keep up with state of the art modeling. As a result, we are establishing this new online modeling magazine, *The Keystone Modeler* (*TKM*), to announce and review new PRR products and present articles of interest about PRR modeling.

A Celebration of *TKM*

For this our 100th issue, we invited current and past TKM staff to choose their favorite article from the first 99 with a few comments on why they chose it. Here are their choices.

Al Buchan, Editor – Issue 1 to 60 – 2003-2008

"As the founding editor of *TKM* I have a very difficult time determining my favorite article as there are so many. Special things that come to mind are Elden Gatwood's flat car and gondola series, Jack Consoli's Position Light signal and stone wall series, Ben Hom's X29 series,Greg Martin's monthly column on what's new in the market place and the Special Reefers of the FGEX, WFEX, BREX 1940-1953 issue.

"When we got *TKM* off the ground I had no idea how successful it would be. At the time, it may very well have been the first, or near first railroad specific online modeling magazine. As it turned out it became, with much administrative assistance by Jack Consoli, quite successful with the first 60 issues coming out on a monthly basis.

"When I stepped down at the five year point I knew it was time for an upgrade and Tim Garner was, in my mind, just the guy to take it on. Tim has certainly taken it to the next level.

"I am very disappointed that I will not be able to take part in the 100th issue celebration during the May 2017 Annual Meeting. Thanks to all that have made this venture the success it is."

From Issue No. 3, October 2003

Modeling the Pennsylvania Railroad's Gondola Fleet, Part 2 – Class GR and GRA
by Elden Gatwood

Nominated by:
Jack Consoli, Associate Editor – Issue 1 to 100 – 2003-2017

"While there have been countless great modeling articles published in the first 99 issues of *TKM*, my vote goes to: ***Modeling the Pennsylvania Railroad's Gondola Fleet, Part 2 – Class GR and GRA*** by Elden Gatwood.

"Published very early on, back in issue #3 of October 2003, my reasons for this choice are many. In fact, it was the *first* actual modeling article in *TKM*. It was the first of a still-ongoing series of articles on modeling a specific class of freight cars (one of my personal favorite topics). This article really set the template for a thorough and complete modeling article: solid and informative prototype information and background; presentation of available modeling options for that prototype; detailed description of all materials and non-typical modeling steps undertaken; coverage of construction, painting, lettering, weathering and good model photography to document it all. It also went beyond just building a model out of the box, it showed how to make more out of the available model by adding missing details and correcting or improving those not deemed consistent with the rest of the model. It thus fostered the mentality *TKM* has attempted to encourage of making the model into what the modeler wanted it to be, not being limited by what was sold to you by the manufacturer. It was also the first great example of going beyond what is safe and easy in weathering models, to make them look really "real". The physical distressing of the wood components on these cars and the multilayer paint applications to get the correct look of that specific type of weathering that evolved on that particular type of those PRR cars was stellar. If this wasn't a bright light in the beginning announcing that we were serious about our PRR modeling, nothing was. I feel this article really set the bar high for all future *TKM* content and challenged modelers to do their best, and the subsequent 96 issues have not let us down."

From Issues 8, 9, and 11 – March, April, and June 2004

29,000 Boxcars – Modeling the Ubiquitous X29
by Ben Hom

Nominated by:
Greg Martin, New Products and Product Reviews – Issue 1 to 55 – 2003-2008

"My choice is a most authoritative piece in three parts that appeared in March, April, and June of 2004. It is perhaps the most comprehensive article ever written on the X29 boxcar by one of the most authoritative modeler/historians I know and a good friend – Ben Hom."

From Issue No. 32, March 2006

The Landscapes of the PRR Part 5-1 – PRR Stonework Masonry (Part 2)
by Jack Consoli

Nominated by:
Tim Garner, Art Director – Issue 70 to 100 – 2009-2017

"Jack is one of my favorite *TKM* authors and I think this is one of his best. Jack's articles are always interesting, well-written, well-researched, and wonderfully illustrated with photographs and drawings. His model work is among the best I've seen. I also highly recommend his series on building signals and anything on diesels. His two-part article in **The Keystone** on EMD F-units is the definitive work on the units on the PRR and an invaluable reference in my modeling of those diesels."

From Issue No. 33, April 2006

Modeling an ND and NDA Cabin Car
by Jack Consoli

Nominated by:
Jim Hunter, Editor – Issue 61 to 100 – 2008-2017
Assistant Editor – Issue 23 to 60 – 2005-2008

"My favorite article is *Modeling an ND and NDA Cabin Car* by Jack Consoli, April, 2006. This piece demonstrated what became characteristic of all the articles Jack would produce in the future: the thorough research and documentation on which his models are based. This article also has special significance because the model was built before *TKM* existed, but Jack's research – extending to crawling under Strasburg's ND cabin – impressed his friends when he still lived in Indianapolis. I also chose this article because I am partial to cabin cars."

From Issue No. 57, April 2008

Modeling the Pennsylvania Railroad's Gondola Fleet Part 18-2 – The G28 Class Gondola Variants
By Jack Consoli

Nominated by:
Elden Gatwood, Chairman Modeling Committee – Issue 1 to 100 – 2003-2017

"Thorough, entertaining research on the prototype; engrossing background on the reasons why it was so equipped; and meticulous, eye-popping craftsmanship. Truly exemplary modeling. Jack sets a standard we can only hope to match."

From Issue No. 77, Summer 2011

Modeling Pennsy's Class P70gsR Coach
By Bob Chapman

Nominated by:
Steve Hoxie, Newswire Editor – Issue 71 to 100 – 2009-2017

"By far, my favorite is an article by Bob Chapman: *Modeling Pennsy's Class P70gsR Coach*. I like this article because it is well researched and written, results in an excellent model, and covers a popular, much needed prototype for which we have no other choice."

Modeling the Pennsylvania Railroad's Gondola Fleet

by Elden Gatwood

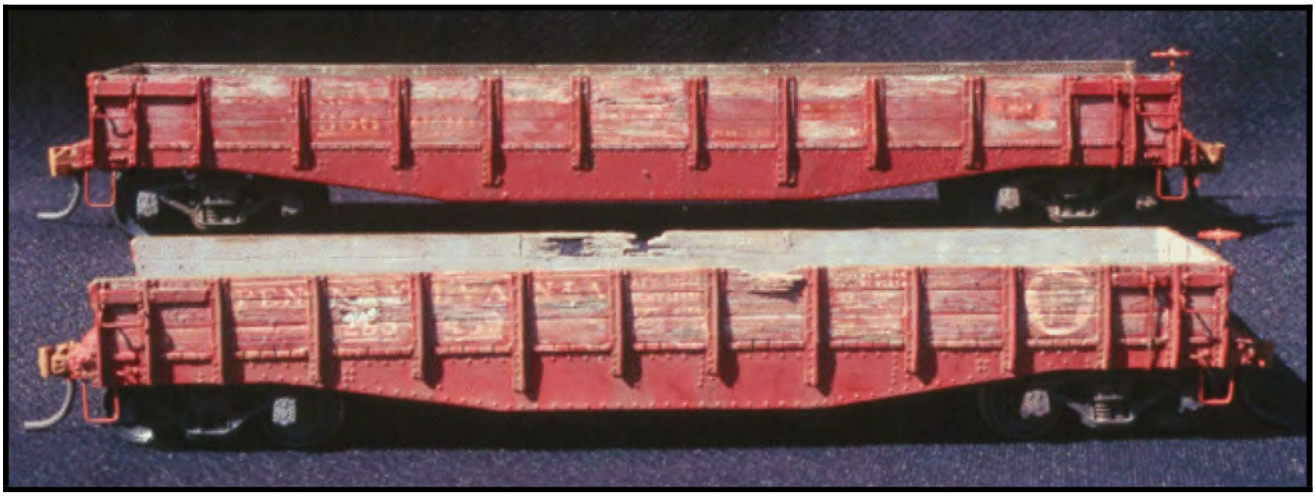
All photos by author unless otherwise specified.

Part 2 – Class GR and GRA

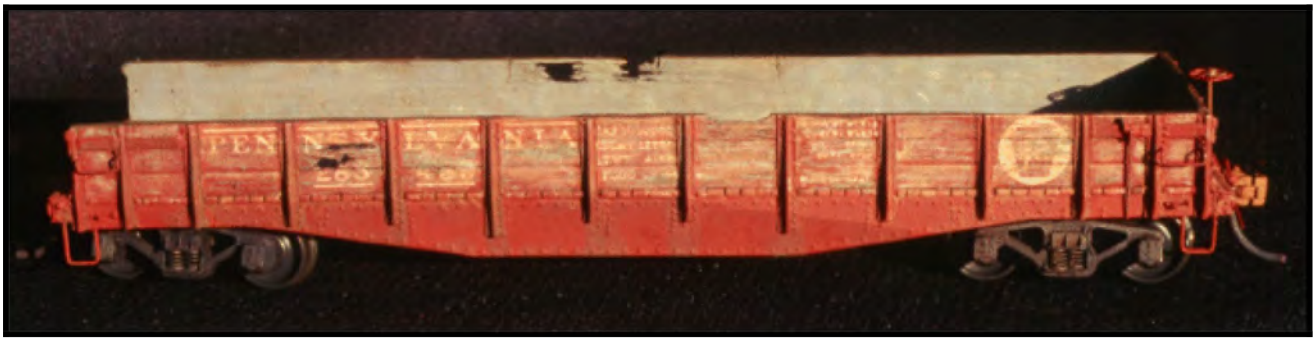
Introduction

We continue this series with the first major classes of PRR gondola of the 20th Century, the GR and GRA classes. As mentioned in Part 1, this will be the first resin kit we cover, and hence, will be covered in some detail. For those of you used to constructing resin kits, just scan the text for specific details.

[*Both classes have a very similar appearance and the class GR is only three feet shorter in both inside and coupled length than the GRA. This can lead to difficulty differentiating between the classes especially in photographs. The spotting feature that easily differentiates the classes is that the GR side ribs are all evenly spaced while the class GRA side ribs are all evenly spaced, except for the two center ribs, which are wider apart than the rest. See photo below – Ed*]

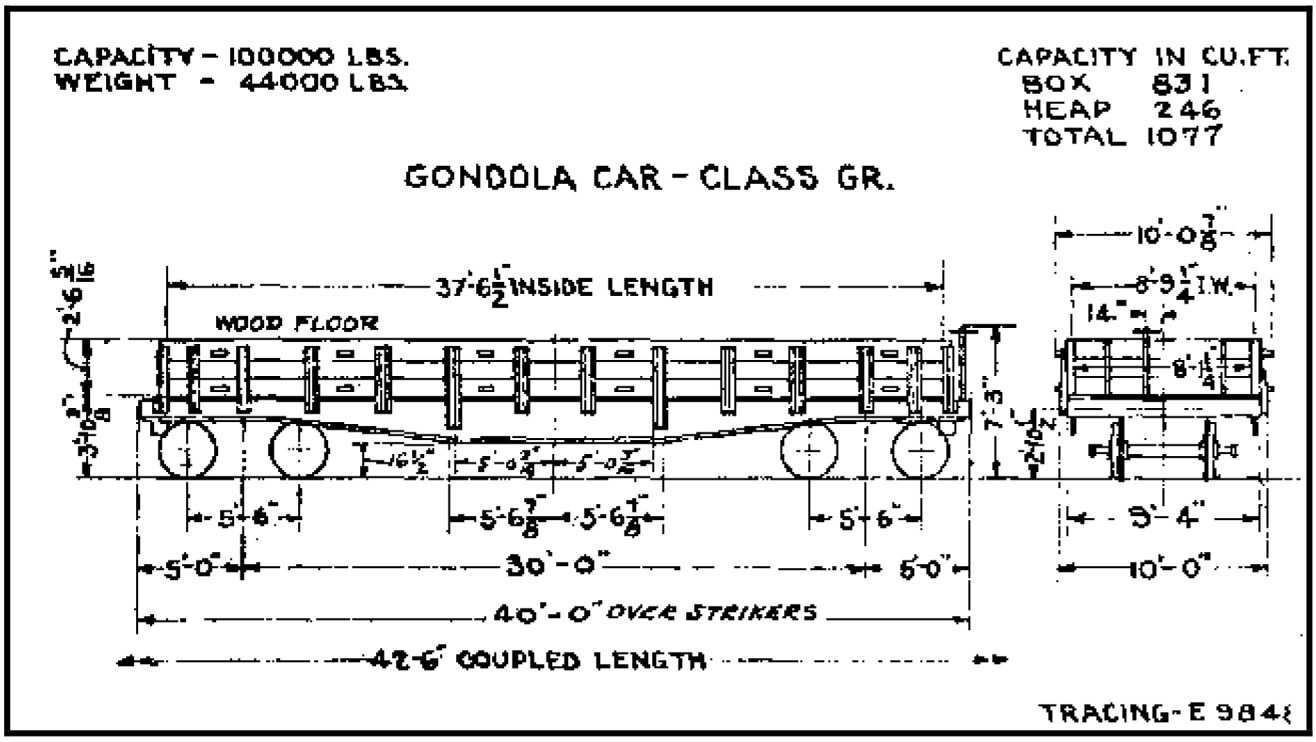


The class GR

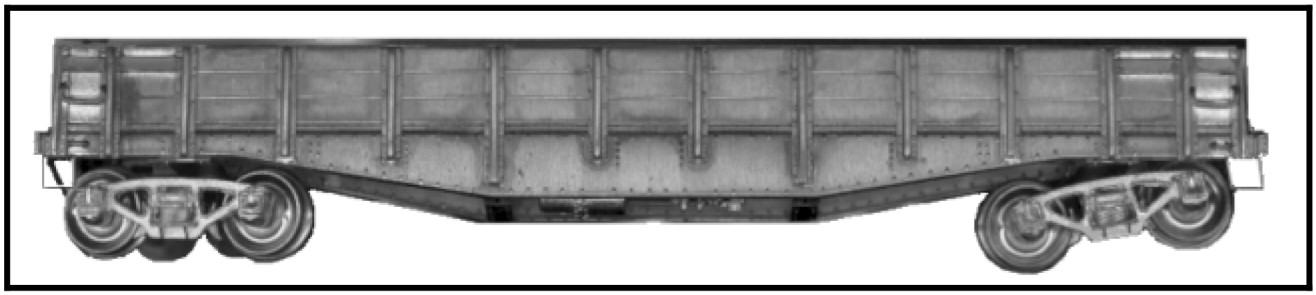


The class GR were short, composite gondolas that were for all intents and purposes a flat car with wooden side extensions held on with pressed steel ribs. The cars were furnished with drop ends and protruding end sills. Safety chains and Carmer cut levers were standard features as-built. This car was small in length and volume compared to its later brothers, and although over 16,000 were produced after the turn of the century, they were being retired by the thousands in the mid 1930s. There were 198 in service in January 1953, and believe it or not, a handful of revenue service GR gondolas lasted into the 1960s! And of course many served as work

equipment in the MW department and modified as idler cars on wreck trains. This car is a perfect candidate for beating up and weathering heavily.



PRR class GR equipment diagram. Note drawing includes stake pockets on the side panels. These began disappearing ca. 1943, but some remained to the end. Al Buchan collection.


A brass model class GR available from Railworks and the dimensions of the model compare favorably with that of the actual car. Railworks erroneously marketed this model as a class GRA. Some can still be had at train shows. Unpainted model collection of Al Buchan.

The GR can also be modeled with the Funaro & Camerlengo (F&C) resin kit and although it is not state-of-the-art, it has nice exterior detail. You must add interior detail, including wood grain, rivet, and end detail, and on some kits the ends are too narrow and must be widened to match the floor. At times the F&C kits can be purchased in their "two-for-one" deals, so they can be quite a bargain. For that reason the GR can be a good kit to practice on, as making mistakes in the carving of wood grain and addition of rivet holes in the interior is not going to be that visible or critical. As with almost all gondola kits, considerable weight must be added, in this case in the fishbelly portion of the underframe.

The F&C kit has the advantage of being made of relatively soft resin and is "distressable". The sideboards can be carved and failed for that cool beat-up look that wooden gons so often had. Additionally, if you build this resin kit, the simpler ones will seem like a breeze!

If this is your first resin kit, I would suggest you work slowly and build confidence as you go along. Resin kits are really not difficult to build; you just need to be patient. At the same time,

they are not "shake-the-box" kits, so count on spending a few nights on it. Moreover, after you're done, you will have a newfound respect for your own abilities.

Sanding

Begin by laying out the parts and making sure you have everything. That includes two sides and ends, a floor, an underframe, brake details, end sills, and extra rivet strips and such. I find the easiest way to assemble resin kits is using a sheet of glass on which is taped a large sheet of fine sandpaper. Tape it in the corner so you can use the rest of the glass sheet for assembly. My sheet of glass is an old framed picture that no one liked that I grabbed up for this purpose. It has a nice lipped edge to catch parts, and I can transport it around without worrying about breakage.

Take each resin sheet of parts and sand them down on the sandpaper until the flash is as thin as possible, then cut out the parts using a new hobby knife blade. Go as close to the part as possible but avoid cutting into it. Take it slow. Once each part is cut out it will be the proper thickness. Finish up with small files or sandpaper to get the edge clean. The sanded surfaces give a nice glue bond, too.

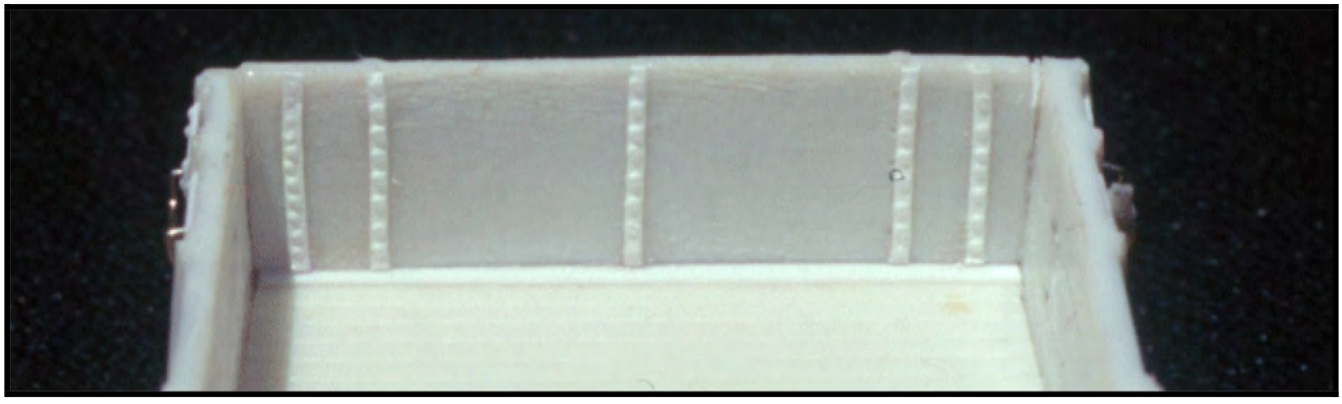
Gluing

On the subject of bonding, you want to have fresh *thick and thin* cyanoacrylate (CA) glue for these kits. A couple new bottles are cheap, and old CA doesn't bond well. The thick CA will set well on a palette and stays in place on the part. The thin can be used to come back and bond things together more permanently. Put some thick CA on a sheet of old styrene or a piece of plastic sheet and use a piece of fine wire bent into a small "L" to apply it.

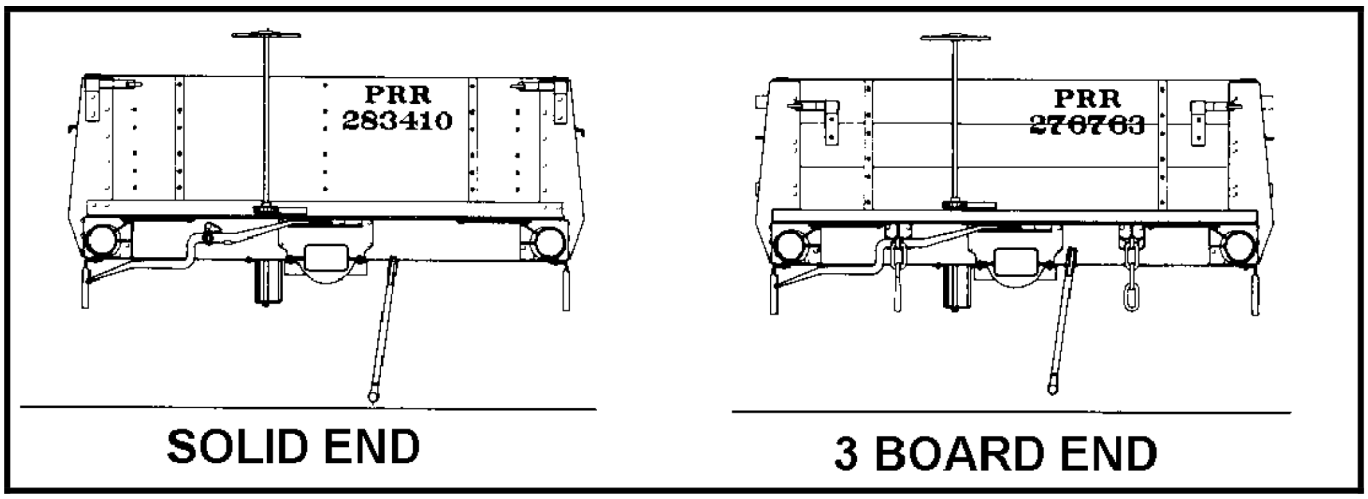
First, dry fit the parts to make sure they are of the proper dimensions. The floor should fit the underframe and between the ends with room to attach the sides. Similarly, the sides should match the length of the floor and underframe. If not, any of the parts can be made larger by application of thin styrene strip. No part should require large amounts of sanding to fit!

Interior Details

Before we begin assembly, we need to add interior details to the sides and ends. First scribe the sides and ends with the same number and size boards as one the exterior of the parts using the scribing tool of your choice. Next, take a razor saw or coarse sandpaper and sand the sides and interior of the drop ends along with the direction of grain (horizontal). Once you have enough grain, you can emboss holes into the interior walls. In reality, there were bolt heads on the insides of the planks to attach the them to the steel side stakes, but after weathering the car, it is quite difficult to tell the difference between small indentations or raised bumps on the planks, and the indentations are much easier to execute. Take one side face up and one side face down, and then butt them together by their top edges to determine where the bolt holes should be. Emboss them with a needle in a pin vise, or something similar. It is not hard. The drop ends on the GR had all the bolts attached through batten strips (see photo below). You can make them out of thin styrene sheet, embossed with bolt heads on the back. They need to match the alignment of the ones on the outside.



Unpainted interior end with added rivet strips.



End variations from the February 1990 *Mainline Modeler*, not to scale. Most photographs show the latches to secure the end to the sides are as shown in the left drawing. There is a photograph showing the latches as shown on the right drawing, but it is not known how common that scheme was. Drawing used with the permission and encouragement of *Mainline Modeler* Magazine and Hundman Publishing, Inc. Reproduction rights limited to personal use.

Grabs irons, and other hardware

You now have a choice as to whether or not you want to drill the holes for the grabs and towing staples. If so, take a #79 bit and drill a hole in each of the locations indicated on the kit's drawing. There is one grab and one towing staple per corner. There are also straight grabs on the ends. You may also want to drill a hole for mounting the Carmer cut lever later, once you see where it should go.

Body Assembly

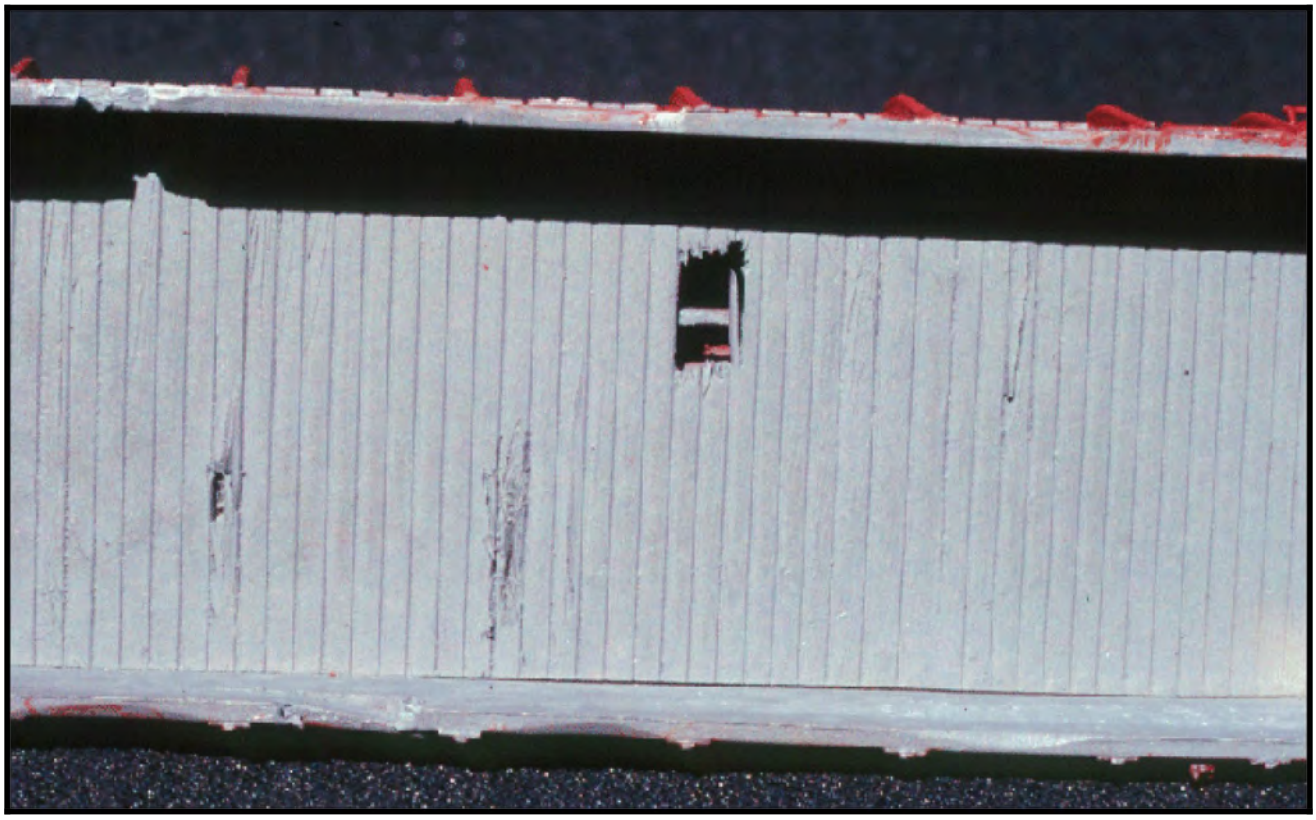
Now take one side and one of the drop end/sill assemblies (the "U"-shaped structure that holds the drop end). Take your wire and pick up a line of thick CA. Apply it to the end of the side in a thin bead. Take the drop end/sill assembly and apply it to the side with the top edge flush. You can take the two parts and place them top down on the glass and then apply the glue from the inside corner if you want. That will get the two parts aligned properly. Don't worry if it doesn't align the first time. You can carefully break the bond and start over. Once these two are attached you can attach the other drop end/sill assembly. It is easy if you use the glass for a guide to keep the "box" from going together cockeyed. Now take the remaining side and glue first one end of the side, then the other, between the two drop end/sill assemblies. The box you created should lie flush upside down on the glass. **Perfect**!

Now fit your underframe into the box. If you dry fit them correctly earlier, it should be close. If you have to minimally sand the underframe to fit, do it. Use the sandpaper on the glass, and move your fingers around the piece while you are sanding to get it square. A small square can come in handy here. Now insert the underframe with the bolster members flush with the bottom of the side, all around. You can tack each corner in place with small applications of CA. **Not too much!** You want to get it right before you bond it in well. Are you satisfied? Use some more CA to bond it in better, but wait to bond it all the way around until you are done with the body. That way you can still take it apart if needed. Now fit the flooring into the box. If the flooring is too short like mine was, take thin styrene strip and extend it. Once the floor is in, and evenly spaced from top to bottom all the way around, bond it in.

Distressing the "box"

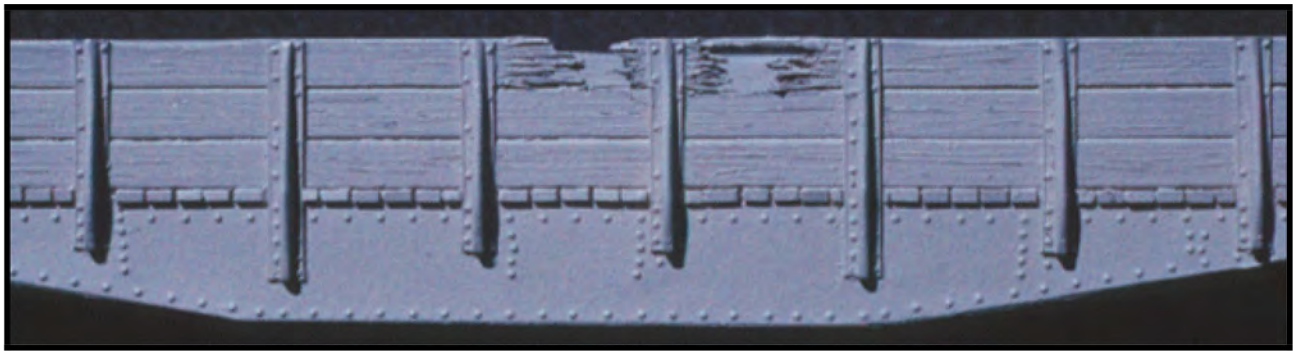
Now you can distress the box if you like. I cut a large hole in the floor to represent a punched out section of flooring. It looks really cool, and was not hard to do. I started by drilling a hole through the flooring from the bottom, then carving with a pointed blade until I had opened

up a convincing hole as shown below. I carved around one of the floor stringers to make it look even nicer.



Interior floor with added holes and distressing.

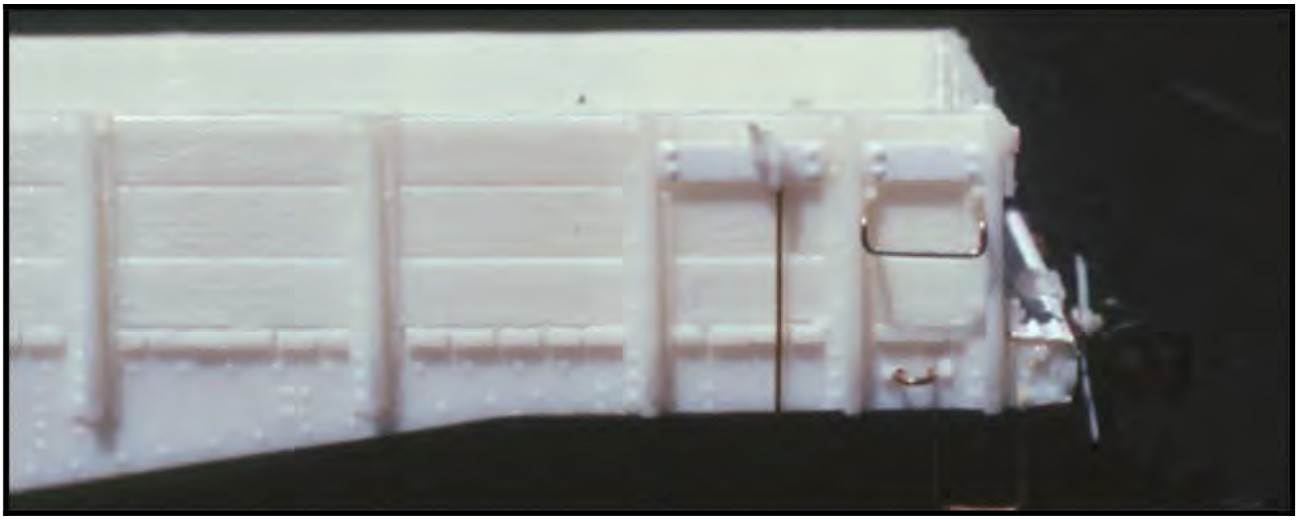
As shown below, I also carved up random boards to make it look like there was some rot, and other signs of abuse. These can be stained and highlighted later to make them stand out. Now do some side boards, too. Hooks, magnets, and claws made the interiors of these old cars look like hell. Are you satisfied with the look of the box?



Broken side board detail.

Glue the drop ends, with their newly-added rivet strips, in place, or omit one or both for a really beat up car. You can also replace one drop end with a simple solid end, or built-up board end, as was done to many cars in later years.

If you are modeling post-WWII, you need to add side-end stiffeners. These were small pieces of steel added between the last two (end-most) ribs on the sides, and just below the tops of the sides (see below). You can use styrene strip with rivets embossed from the back. Use the drawing for a guide.

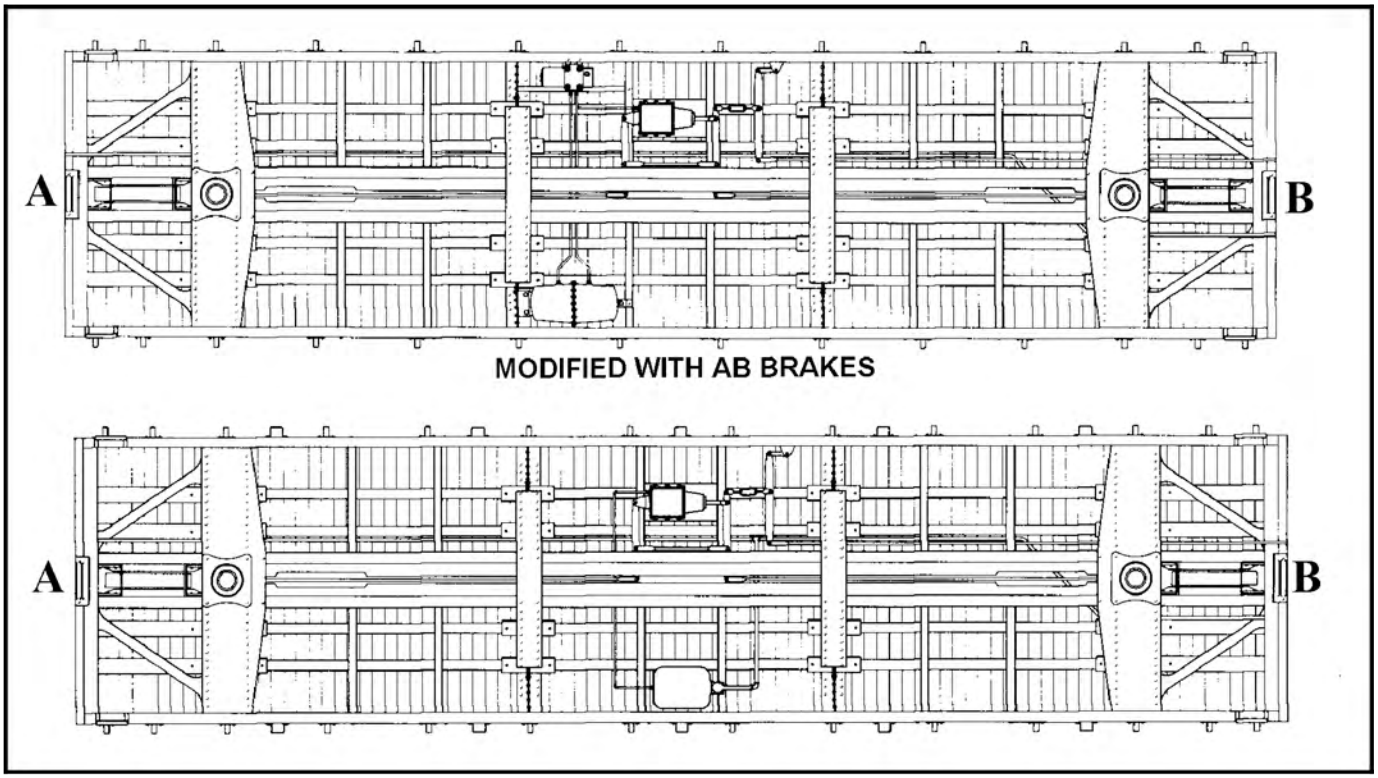


Added side stiffeners and brake detail.

Brake detail and trucks

You can now make a decision as to how much brake detail you want to add. With the fishbelly, you can't see much, so it's up to you. Just the tops (actually bottoms) of the triple valve, reservoir, and brake cylinder might show, so you might want to just glue them in place and call it good enough. If you carve a large hole in the floor, add enough detail to show through the hole. The trainline, brake rods, and brake piping may be visible.

Now drill #50 for your truck screws, only ~1/8" deep, no more. (I always do this before installing the underframe or floor so you can just drill through and tap without worrying about wrecking the floor). Use 2-56 x 1/8" truck screws.



Drawing looking up at the underside of the car. From February 1990 *Mainline Modeler*, not to scale. The original drawing was mislabeled. Drawing used with the permission and encouragement of *Mainline Modeler* Magazine and Hundman Publishing, Inc. Reproduction rights limited to personal use.

Additional Details

The F&C kit omits the rivet detail from the top of the end sill. If you want, add one "full sill deep" .005" thick styrene strip with rivets along the edge of the end sill and one shallow .005" thick strip with full rivet detail to the inside edge of the end sill, as shown below. You may also want to add a brake staff pawl assembly. I found one in my resin parts box, but you could use most anything, like one shaved from an extra brake platform.

Added rivet detail strips on top of end sill.

Install the grabs on the sides and ends, plus make small "U"-shaped pieces for the towing staples. Grabs and wire are supplied for this, and you can form the staples over a drill bit.

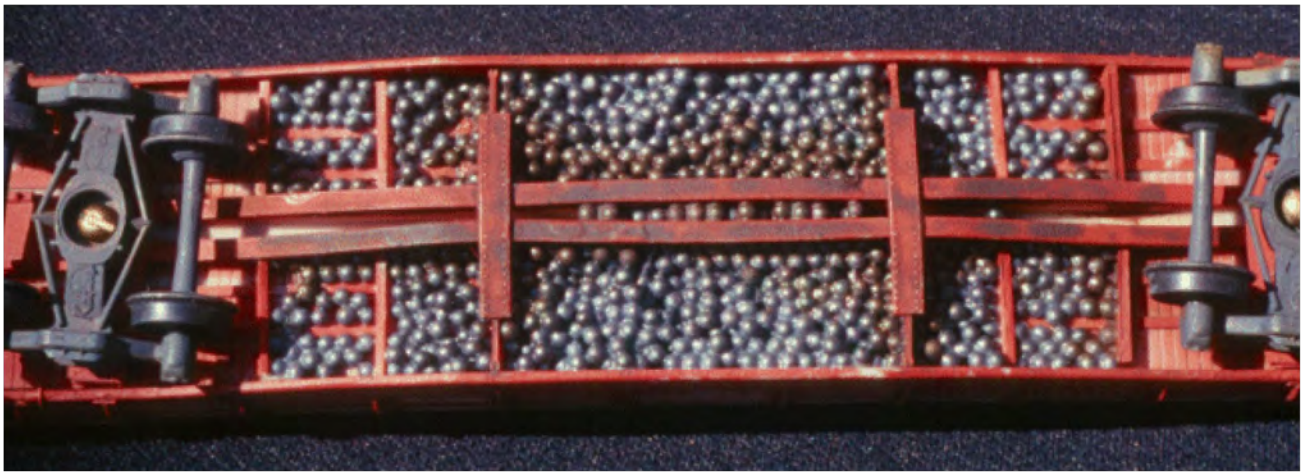
Now drill #74 for the straight A-Line stirrups, or follow the directions for the kit-supplied ones.

Install couplers in their boxes, flush with the ends. You will have to cut the top lip off of the Kadee® coupler box to get it to fit flush. If you like, add coupler box screws, but make sure you don't punch through the floor!

Drill for and install the Carmer cut levers using the drawing for a guide. The skinny, rounded end goes to the outside, and the other hangs over the coupler shank.

The kit does not contain a brake retainer, but the Tichy parts sprue may. Either way, you may want to add one. It goes on the side of the end-side stiffener that is closest to the "B" end of the car (see previous close-up photo of side). Use the drawings. I used to omit these, but try to add them now. Add a pipe from .010" wire running from the bottom of the retainer under the edge of the side, vertically. Cool, huh?

Add weight. I use lead shot, but anything similarly heavy will do (see photo below). Do not fill areas of the underframe with holes you might have created in the flooring above. Fill non-visible areas of the fishbelly and use white glue to hold in place. Let it dry overnight.

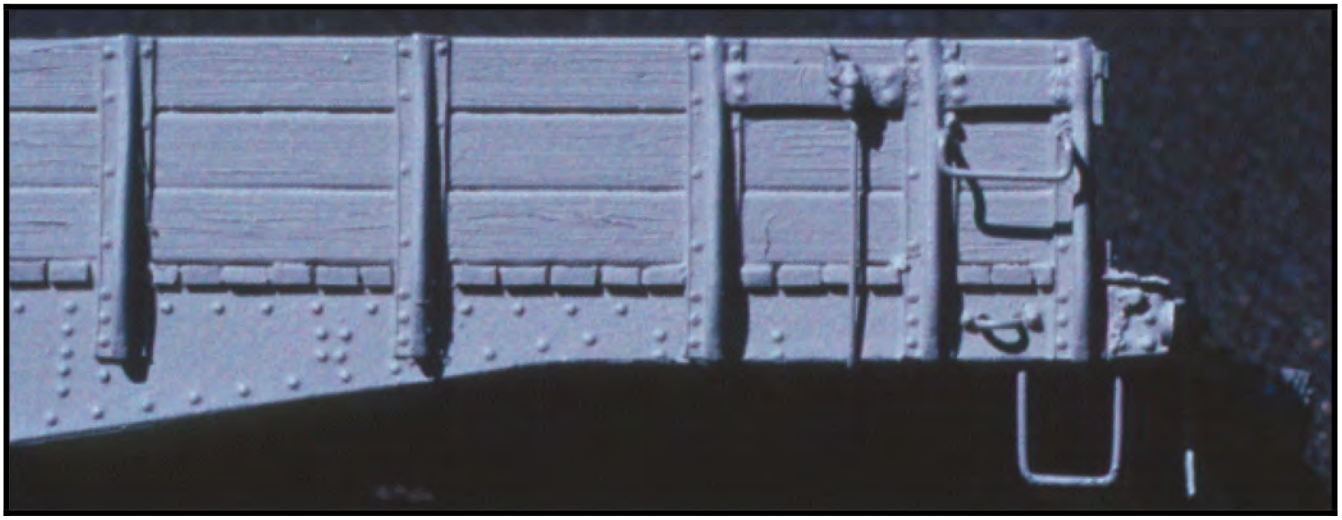


Weight added in underframe area.

Now you might want to assemble, *but may not want to apply yet*, the brake wheel and staff. Glue it on a piece of .015" wire, drill the hole in the end sill according to the drawing, and install temporarily, for ensuring the fit and height of the wheel. Wait until after the car and staff are painted and weathered and all to install permanently.

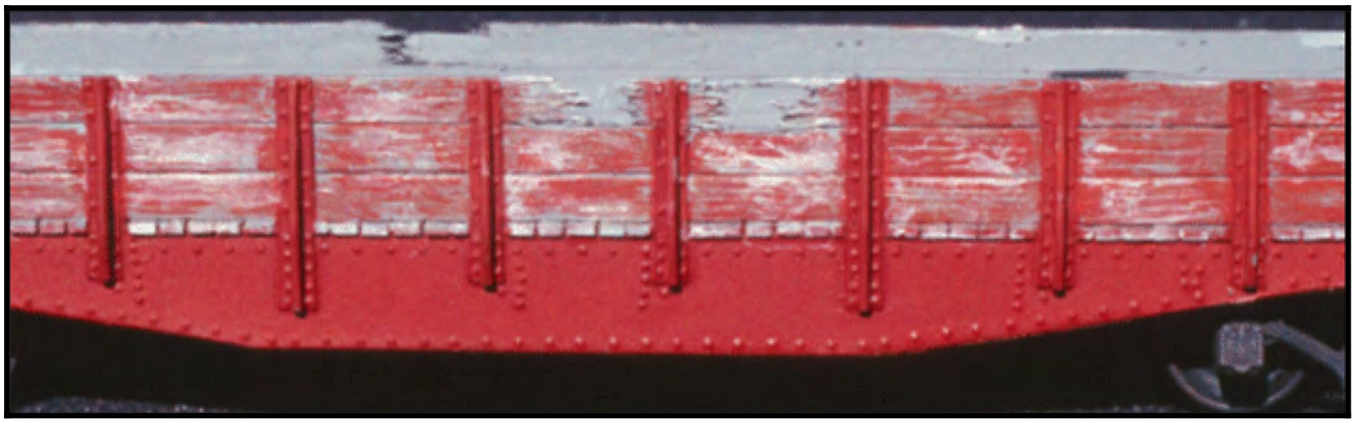
Painting, Decaling and Weathering

Paint the car medium grey first. This color looks good as a start for the heavily-weathered interior and exterior wood as shown below.

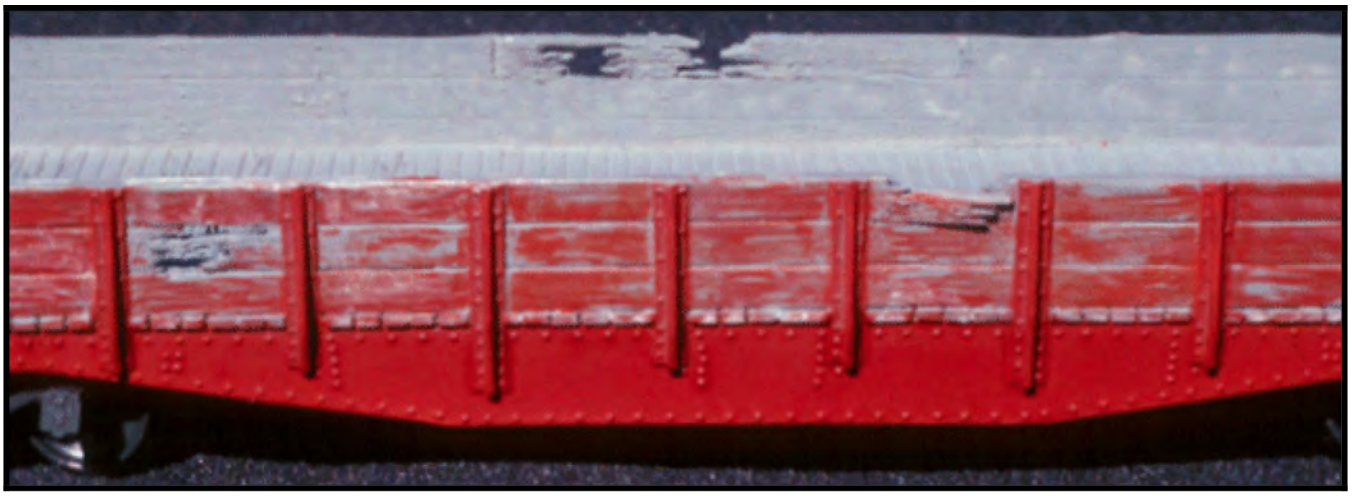


Then mask or cover portions of the interior wood, and shoot the car with "freight car color." Don't worry too much about the shade; just make sure it is red enough. You will weather the dickens out of it later….I use Modelflex Light Tuscan Oxide Red, or a mix of 50/50 lacquer-based Floquil Zinc Chromate Primer and Boxcar Red. Make sure the car has a gloss finish when done for the decaling.

I masked the wood off and painted the "metal" parts with freight car color. Then I came back and painted on some remaining color onto the wood to represent chipping and peeling (see photo below).

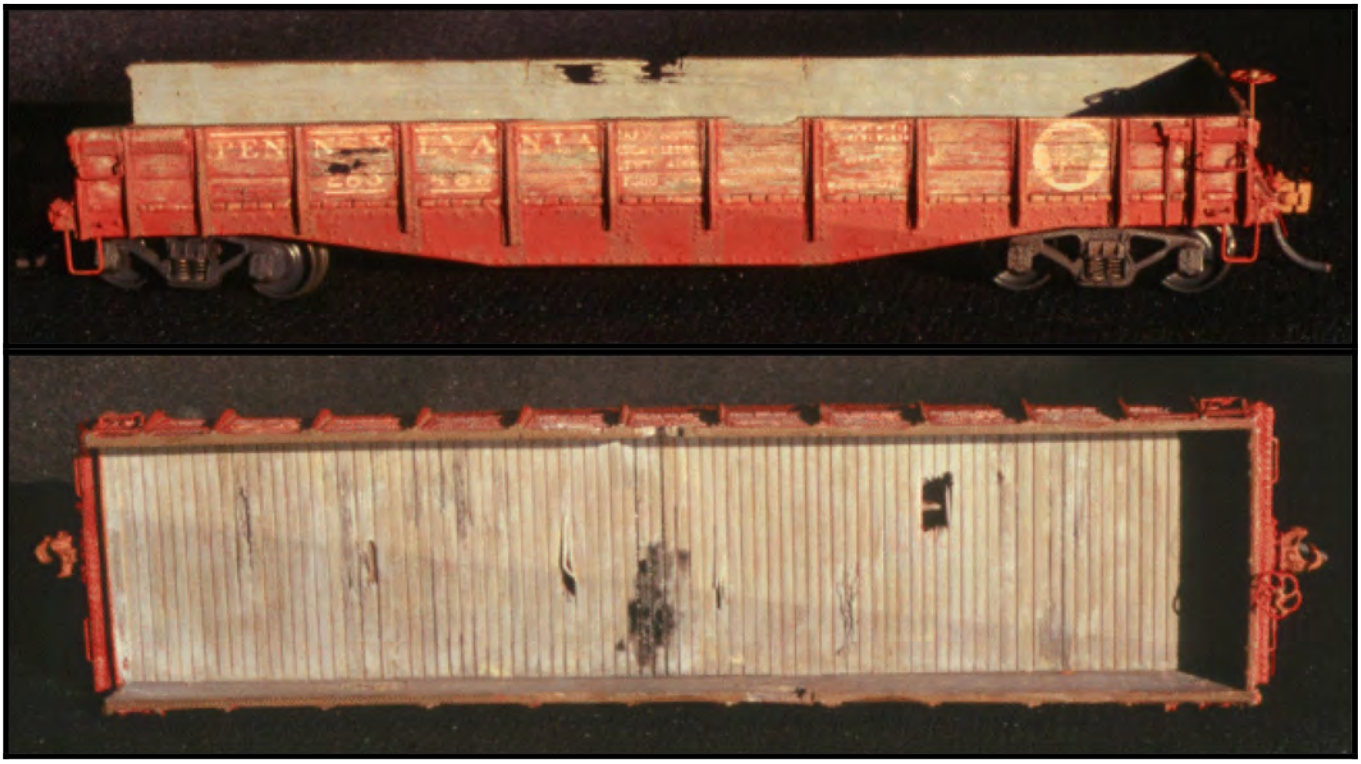


Painted and partly weathered side without lettering. You have the option of coming back and highlighting some more of the distressed areas (see photo below), although this may also be done following decal application.



Decals are currently only available for this class from F&C, although the sharper Westerfield GRA decals can be modified and used. You have the option of further distressing the decals. Most of the lettering was on the wooden portions of the car and can be distressed horizontally like the wood grain. This also allows the setting solution to get in deep. Use setting solutions to get them deep into the cracks. Seal the lot with Dullcote or another flattening agent. Let dry for a day.

Now use a dark wash on the interior and exterior to highlight the boards and rivet detail. Use rusty washes down the side below the ribs and rivet patches. Next, highlight the boards as you see fit. Pick out individual boards and follow them along with a lighter grey paint. The upper boards tended to be more beat up and rotted. The top reinforcement strip was heavily rusted. Pick out individual areas with light paint and dry brush them. In general, dark colors go into the grooves and gaps and light ones do the surface highlights. Looks right, doesn't it?



Interior and exterior of after weathering

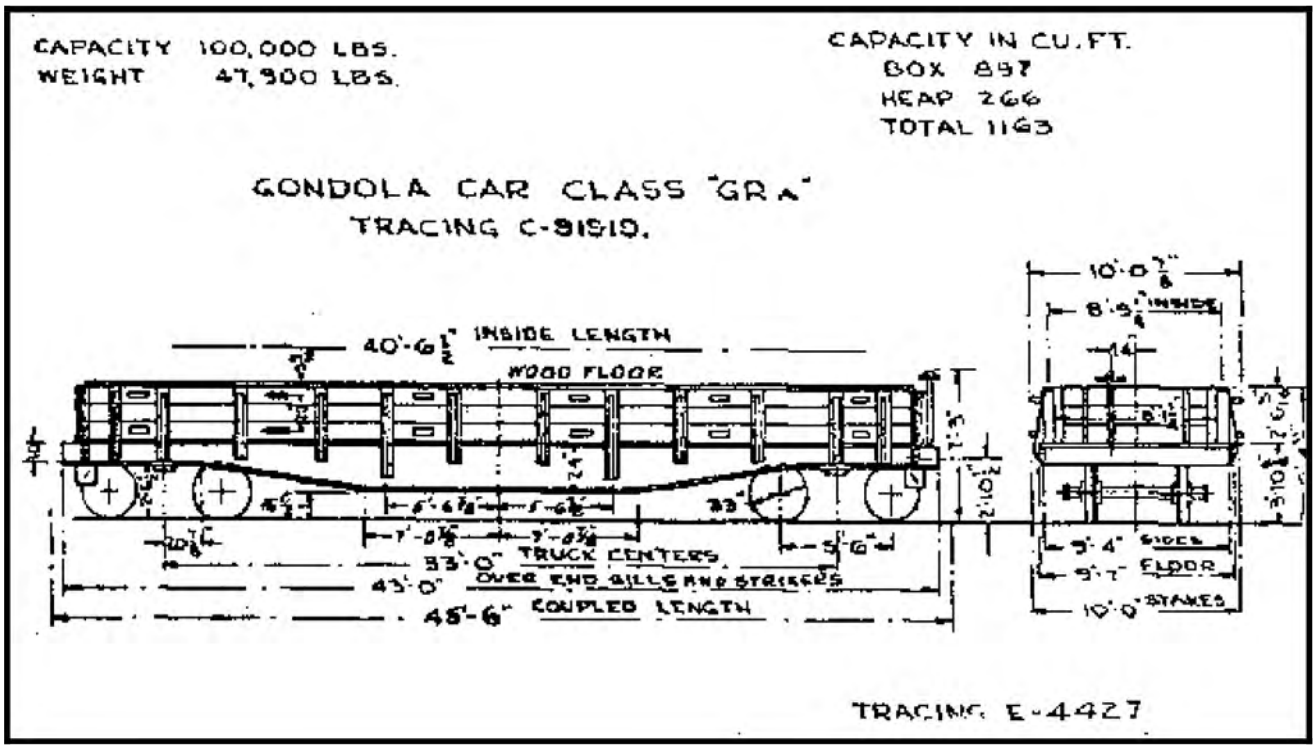
Trucks and Couplers

Now add trucks. I used the Kadee® 2D-F8 truck for weight. Pre-paint the wheel sets Grimy Black and side frames black with rusty overspray separately. The side frames can be enhanced by painting oily black on the bearing housings. Add the brake wheel if you did not do so earlier and dirty wash it, too. You're done! You can add scraps of stuff like Chartpak tape or sand or wooden strips for dunnage or whatever to represent leftover portions of a load.

The class GRA

Westerfield GRA kit built-up by author as described below.

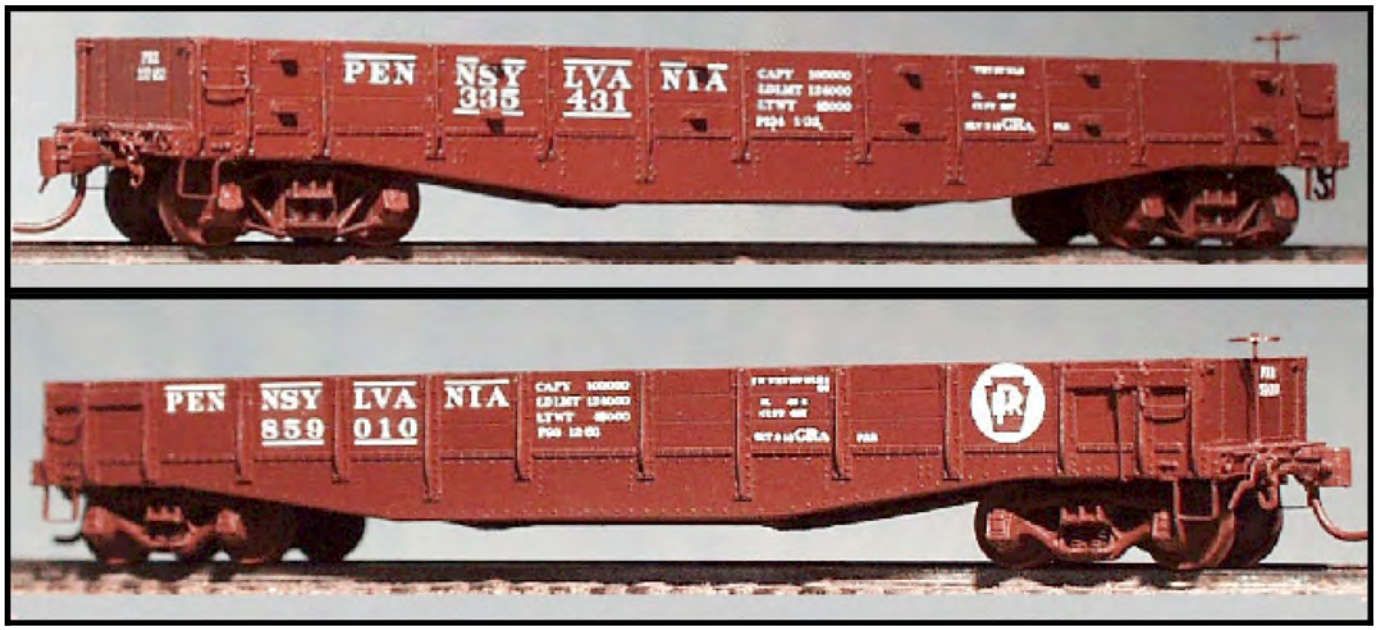
The class GRA were three feet longer in their inside, truck center, over striker and coupled lengths than the class GR, and had a slightly higher capacity in cubic feet. All other height and width dimensions were the same. So other than being three feet longer, they were for all intents and purposes the same car as the GR. The total fleet numbered over 14,000. The cars began disappearing in large numbers during the late 1940s, but three revenue service cars made it into 1968. Like the class GR many also served as work equipment in the MW department and modified as idler cars on wreck trains. This car is a perfect candidate for beating up and weathering heavily.



PRR class GRA equipment diagram. Al Buchan collection

The GRA is available as a resin kit from Westerfield, which builds into a very accurate replica. It is not available as a one-piece kit as of yet, but does have interior detail on the sides and

ends, unlike the F&C GR kit. The Westerfield GRA also has side-end stiffener pieces, safety chains, and fine Carmer cut levers. The decals are also more accurately rendered. For you early-period modelers, the Westerfield kit has several early variants, including the version with stake pockets. It can also be built with several of the early Lines West and other variants of the lettering scheme.



Westerfield class GRA gondola kits, top with and bottom without stake pockets.
Courtesy Westerfield Models.

There are not many things you need to know beyond what was discussed above, to assemble the GRA. As with the GR, I would advise that you take care in assembling the car body, as the sides are shallow and it is easy to get the body assembled a little off. It will never run right if you don't get the assembly square.

Because the body is molded in gray resin, it does not need to be painted initially, but the "wood" can be carved into freely to appear rotted or splintered. As with the GR kit, you can carve portions of the floor and sides away. If carving floorboards out, you can add portions of the train line or other piping to be visible through the holes. It looks very good when the car is empty. Remember to avoid putting weight in the cavity beneath the hole(s).

There will be folks that don't like seeing a Pennsy freight car in this condition, but be assured, they were terrible-looking in their last years on the road. One of these little beat-up cars in a string of newer gons appears very realistic.

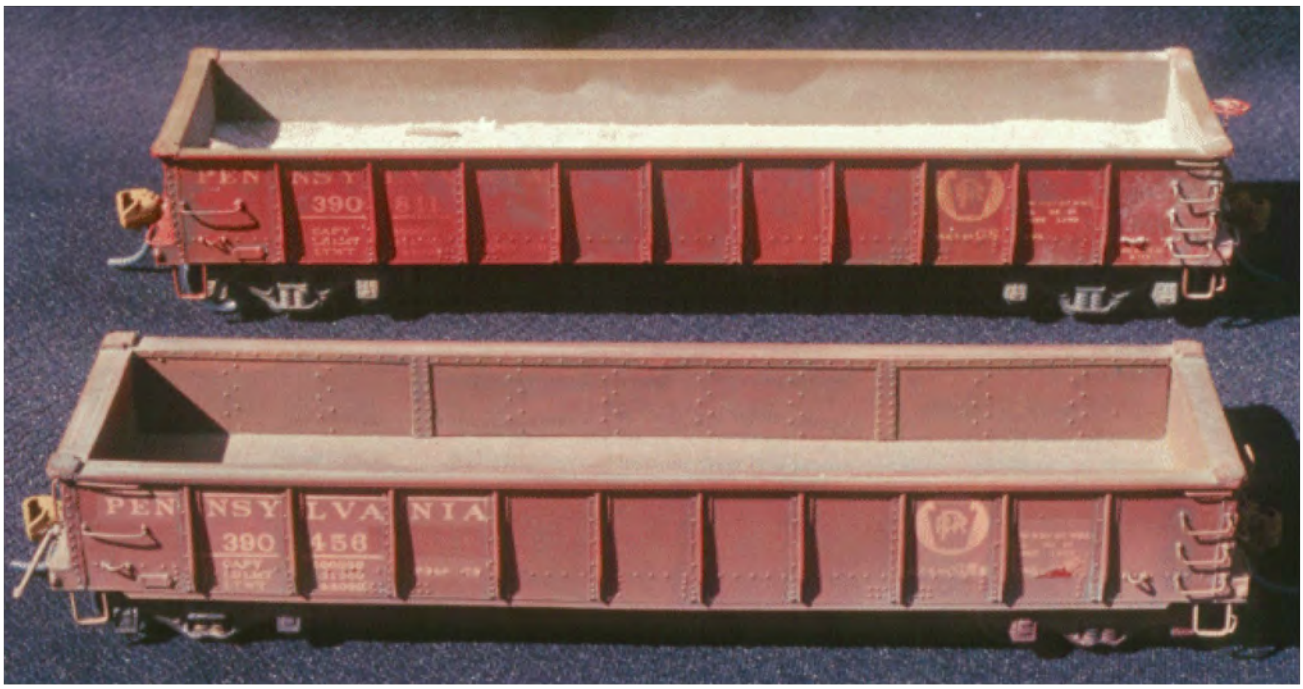
The Westerfield decals are quite accurate. You can also apply them over a gloss finish, then come back and add grain right through the decal. Use setting solution on it again to get the decal to set into the grain. If portions of the decal come off, it is okay. The lettering did not wear well on these wooden sides. Another nice effect is to use a grit blaster to take portions of the white away. Very effective!

Weather the car as discussed above for the GR. Don't spare the rust on the metal parts. You might consider dry-brushing the wood horizontally with some white or light grey to make those boards pop out. Add the brake stand last!

GRA ends after brakestand installation and weathering.

For those that model the pre-WWII period, you will need more of both of these cars. Perhaps you should consider doing a few at a time, as the assembly-line process works well with these cars. For the rest of you, now that you have these two early cars completed, you can move on with the more numerous classes.

We will cover the GS and GSH rebuilds next in Part 3, followed in Part 4 by the G22 series.



The class GS and GSH to be covered in Part 3 in November's *TKM*

If you have any questions, feel free to drop us a line.

BIBLIOGRAPHY

- Pennsy GR-GRA Part 1 – Variations on a Theme, *MLM* February 1990, pp 52-55, by Robert W. Smith. Photos ¾ of class GR 489469, and end of class GR 283410, class GR plans, elevations, lettering diagrams and roster of cars (GR and GRA) by car number by selected years showing ownership.
- Pennsy GR-GRA Part 2 – Variations on a Theme, *MLM* March 1990, pp 66-71, by Robert W. Smith. Photos ¾ of class GRA 859731 (1959- CK), of end PRR 335431, of side class GRA 835517 (1913), ¾ of class GRA 822505, ¾ of class GR 166128, ¾ of class GRA 356566, plans, elevations and lettering diagrams.

PHOTOGRAPHS

- PRR Color Guide 1
  - Pg. 108, class GRA 491496 – crawler crane carrier car
  - Pg. 109, class GRA 494244 – welded rail train car
  - Pg. 122, class GR 494886 – idler car for locomotive steam crane
- PRR Color Guide 2
  - Pg. 114, class GRA 491038 – crawler crane carrier car
- PRR Color Guide 3
  - Pg 117, class GR 49???? – reel car in wire train

PRRT&HS MICROFILM DRAWINGS

In addition to numerous detail drawings of class GR and GRA cars the Society also has the following drawings:
General Arrangement: GR – 7 (one w/ 10" sides), GRA – 5, GRB – 1 and GRC -1.
Lettering Arrangement: GR – 12 (including CV, GR&I, VRR), GRA – 7 (including CV, NYP&N, VRR) and GRC – 2.
To order drawings, you must know the drawing number and title. To obtain a copy of the ordering information, please send a self-addressed #10 envelope with postage for two ounces (currently 60¢ for domestic mail) to: PRRT&HS, c/o The Stanleys, 558 Summit Drive, Lewistown, PA 17044-1252.

PHOTOGRAPH SOURCES

The best sources for photographs of PRR equipment are:

Rich Burg
PO Box 154
Swartz Creek, MI 48473

John C. LaRue Jr.
27491 Duvernay Drive
Bonita Springs, FL 34135-6029

Bob's Photos (Usually at most major East Coast shows)
37 Spring Street
Ansonia, CT 06401

29,000 Boxcars – Modeling the Ubiquitous X29 – Parts 1-3

By Ben Hom

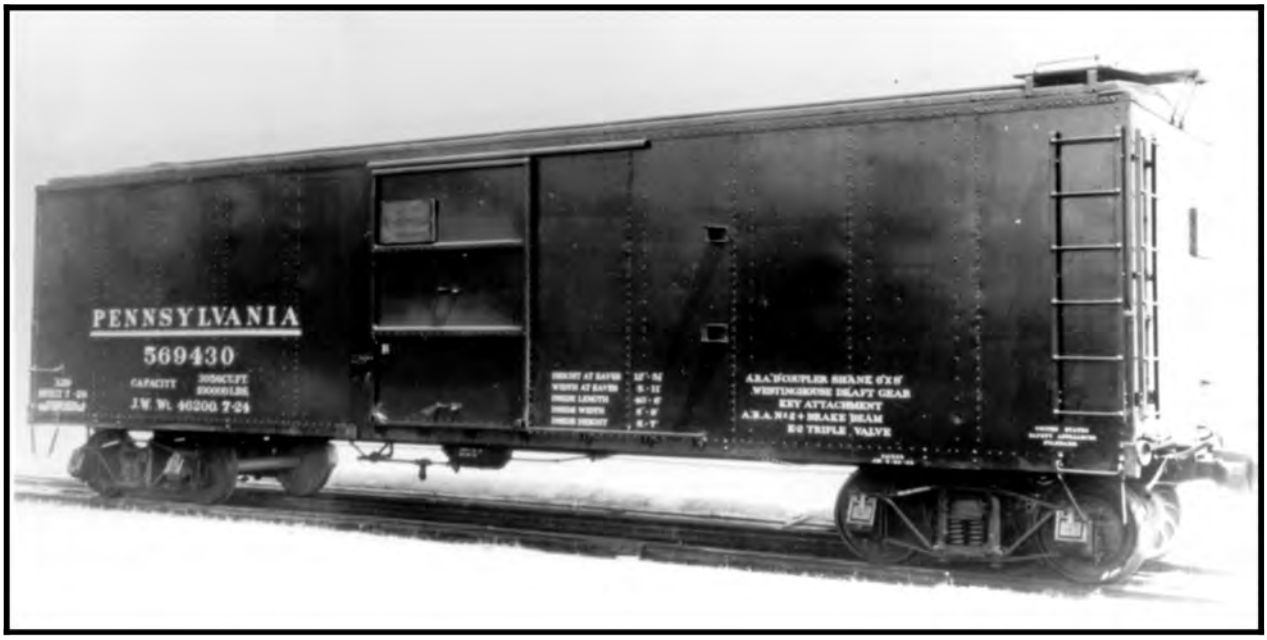
Part 4 – Improving the Red Caboose X29 and Available Models appeared in the July 2004 issue and ***Part 5 – Decals*** appeared in the August 2004 issue.

29,000 Boxcars
Modeling the Ubiquitous X29

by Ben Hom

Photos by author unless otherwise indicated.

Part 1: The Prototype



PRR 569430, Builder's Photo, July 1924. (Richard Burg Collection)

Introduction

The Pennsylvania Railroad built over 29,000 Class X29 general service boxcars from 1924-1934. These cars, along with many thousands of copies built with variations for railroads including B&O, WLE, CNJ, LNE, B&M, and MEC, were a landmark design that transformed the North American boxcar fleet from one consisting almost entirely of wood and composite designs to one where steel boxcars were widely accepted. As general service boxcars, Class X29 boxcars traveled everywhere on the North American standard gauge rail network, and a close look at many train and yard photos reveals at least

one X29 or ARA copy. Their low height contributes to the stair-step "look" of a steam-era freight train, and the boxcars in express service stayed in service up to the coming of Amtrak. Even though many cars were rebuilt with new bodies of post-war AAR design between 1944 and 1959, many unmodified cars went into stores and work service, meaning that even the late 1960s PRR (and PC) modeler could use a couple on his/her layout.

For the modeler, this means that anyone modeling the steam-to-diesel transition period needs at least several Class X29 boxcars on your layout. Despite the inroads of the Class X29B rebuilding program, 25,324 Class X29 boxcars were still in revenue service in July 1950, making up over 1/3 of the Pennsy boxcar fleet. To put this in perspective, this single class of Pennsy boxcar was more numerous than the entire general service boxcar fleets of every North American railroad except the following roads:

Data from July 1950 ORER
CN 66,318
NYC 53,697
CP 51,775
ATSF 30,593
MILW 29,454
B&O 26,313

In the first part of this series, we'll go over the detail variations that the cars exhibited during their long production run and service lives. Subsequent parts of this series will cover how to model these cars from available kits. Additionally, the PRR Projects Internet modeling group has selected the Class X29 boxcar for its next project to be held concurrently with this series beginning in late March or the first week of April. We'd like to close this series with photographs of finished models, as well as displaying the models at the annual PRRT&HS meetings. For more information, see the PRRPro Group web site at http://groups.yahoo.com/group/PRRPro/ or contact Bruce Smith at smithbf@mail.auburn.edu.

Roster

Group[1]	Series		Built	Population[2]						
	Start	End		When Built	Jan 1940	Jul 1950	Jan 1953	Jan 1959[3]	Oct 1963	Apr 1968
A	49313	54463	1928-30	5151	8310	7376 (241)	6886 (241)	5809 (230)	380	34
B	54464	57643		3180						
C	90633	92500	1924-25	1868	1736	1551	1446	1263	223	11
D	93995	96126	1924-25	2132	1920	1689	1547	1290	169	0
E	97949	99999	1924-25	2051	5040	4508 (167)	4225 (165)	3626 (158)	441	23
F	100000	101324	1932	1325						
G	101325	103324	1934	2000						
H	502000	505948	1924-25	3949	3626	3213	2962	2558	292	15
I	566091	574090	1924-25	8000	7934	6987 (2)	6482 (2)	5585 (2)	707	47
Totals				29656	28566	25324 (410)	23548 (408)	20131 (390)	2212	130

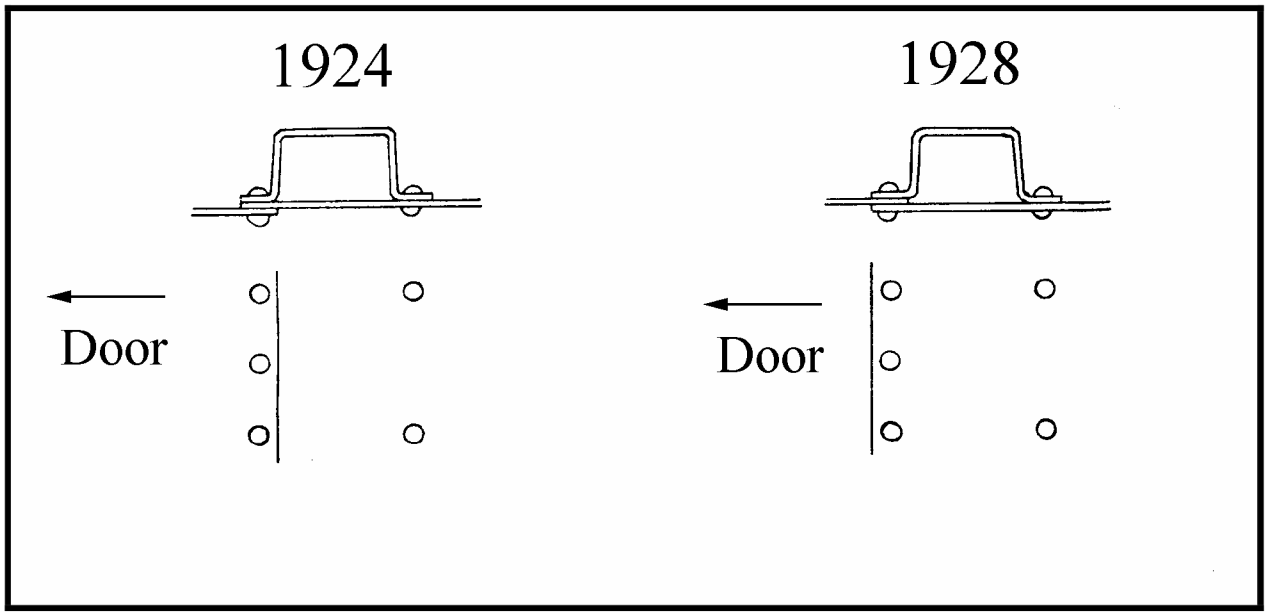
Notes:
(1) Group designations are by Dave Soderblom.
(2) Numbers in parentheses( ) are for express cars where ORER data is available. Individual car numbers for cars in express service are listed in the Notes section of the PRR ORER pages. Additional roster information for 2000-series express cars is listed in the ORPTE, which were not available to the author at the time of publication.
(3) Many older freight cars, including Class X29 boxcars, were stored at various locations during the late 1950s as traffic levels fell off.

Variations

Class X29 boxcars exhibited several variations in detail and fittings over their long production run and service life:

Built		Body Type	Door	Door Track	Doorstop	End	Brake System	Hand Brake	Trucks
1924-1925	As Built	1924	Creco	Short	2 (Close)	Flat	KD	Vert. Staff	2D-F1 2D-F8
	In-Service		Y'town Creco	Short Long	1 (Sill) 2 (Close)		AB KD	Vert. Staff Ajax	2D-F8 2D-F12
1928-1930	As Built	1928 1924	Creco Y'town	Long	2 (Wide) 1 (Sill)	Flat	KD	Vert. Staff	2D-F8
	In-Service						AB KD	Vert. Staff Ajax	2D-F8 2D-F12
1932, 1934	As Built	1928	Y'town	Long	1 (Sill)	3/4 Rev DN	AB	Ajax Equipco	2D-F8 2D-F12 GSC BX.
	In-Service								

Body Type: Cars built during 1924-1925 differed from almost all later production cars in the arrangement of the side sheets, particularly at the overlap of the side sheets closest to the door:



Reprinted/Updated from "PRR Class X29 Boxcars and Related Classes (X28, X28A, X30, K8)," Gary Rauch and Robert Johnson, The Keystone, Vol 9, No 4, Dec 76

The different body types have been designated in the model press as "1924" and "1928", which generally holds true; however, some cars in Groups A and B built after 1928 have been documented with the earlier sheathing design.

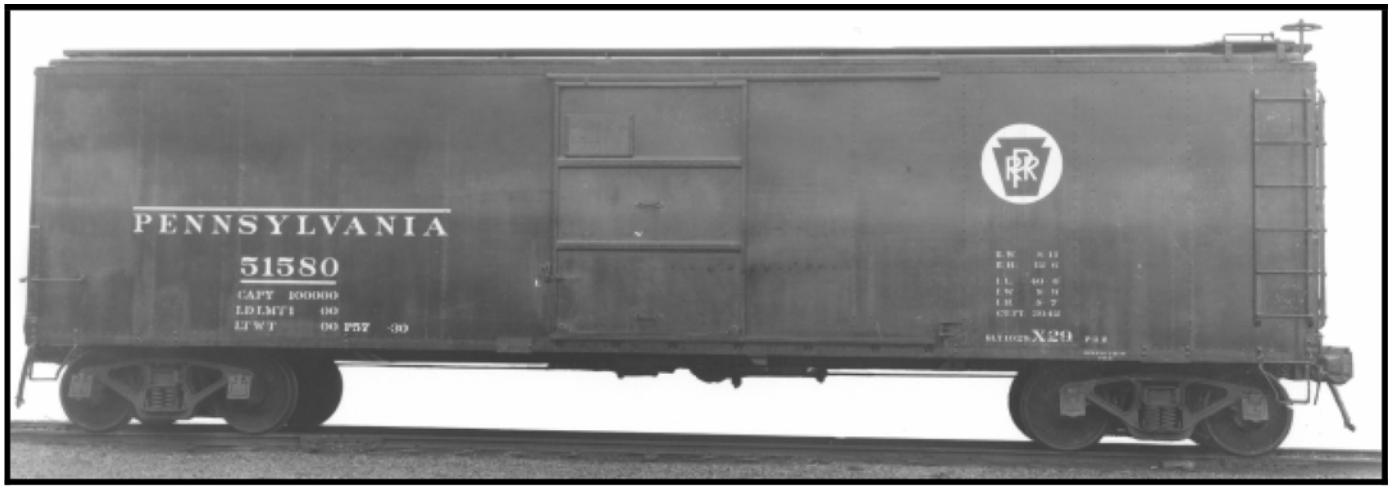
Patch Panels: The junction of the side sill and side sheathing trapped moisture, causing corrosion. Virtually every car remaining in service during the l940s and 1950s received patch panels along the bottom portion of the sides. At first, only damaged sections were patched (sometimes of different heights), but by the 1950s, cars were receiving a patch along the entire length of the car. The patch panels were typically riveted to the side posts; some patches were riveted along the top to the car side, while others were welded along the top. For cars with a side sill doorstop, it was remounted in the same location after installing the patch panel.

Doors: All cars built in 1924-1925 received 3-panel Creco doors. Early production cars of the 1928-1930 group received Creco doors; the first builder's photo showing a new car with a 5/6/5 Youngstown door was of PRR 52624, built in October 1929. All photos of cars built after that date shows Youngstown doors. Many cars built with Creco doors got Youngstown doors later in life, but some kept their Creco doors until rebuilding or retirement.

PRR 570862, unknown photographer/location, c. March 1931. Among the first Class X29 boxcars built in October 1924, this car appears as built (including 2D-F1 arch bar trucks) except for the CK paint scheme. Note the lack of patch panels. (Collection of Ben Hom)

Door Tracks: Cars built in 1924-1925 had a short upper door track that extended only to the first panel seam to the right of the door. Later cars had full-length upper door tracks. On the vast majority of the cars, seven pairs of triangular brackets supported the lower door track. In some cases, cars received rectangular brackets or had a mix of two different styles.

Door Stops: As built, the 1924-1925 cars had two rectangular doorstops, one mounted approximately 1/3 of the way up the car side from the bottom, and the second mounted approximately 2/3 of the way. Early production cars in the 1928-1930 groups had two wide mounted rectangular doorstops, with each one located at the ends of the top and bottom door track. Relatively few cars had this arrangement. The balance of the 1928-1930 cars and cars built in 1932 and 1934 had a single cast "triangular" doorstop mounted on the sill above the end of the lower door track. Many earlier cars with two doorstops were revised to this arrangement during shopping. A few cars reused the rectangular doorstop. The mounting holes of the original stops were simply closed up with rivets.

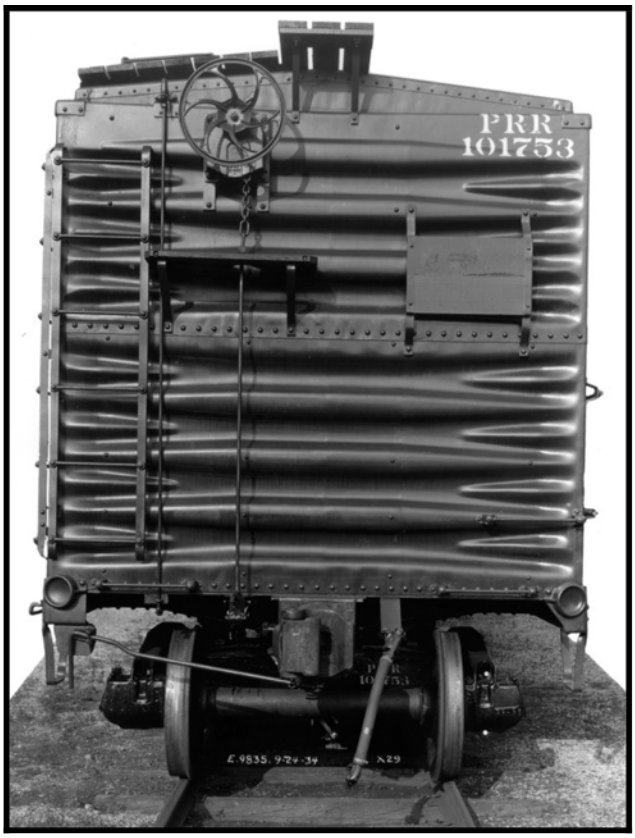


PRR 51580, built 10-29 with Creco door. PRRT&HS collection.

PRR 54565, built 12-29 with Youngstown door. PRRT&HS collection.

Ends: All cars except for those built in 1932 and 1934 had two-piece flat ends. Many cars exhibited a slight bulge in the ends as wear and tear caused by shifting carloads took its toll during the life of the car. The final two production runs in 1934 had 3/4 reverse Dreadnaught ends unique to the X29.

PRR 54565, built 12-29 with plate ends. PRRT&HS collection.



PRR 101753, built 9-34 with 3/4 reverse Dreadnaught ends. PRRT&HS collection.

Roof: All cars except for the final 100 cars built in 1934 had 11 panel "flat" roofs supported by internal carlines. This roof design had a tendency to leak after the caulking dried out, and the railroad experimented with Climax radial roofs for the final 100 X29s built. The cars had wooden running boards throughout their lives. (No photos of cars with steel running boards turned up during research for this article.)

Brake System: Cars built in the 1924-1925 and 1928-1930 groups were built with KD ("split K") brakes. Many of these cars later received AB brakes, reusing much of the original KD brake rigging. The reservoirs for the cars back fitted from KD brakes were mounted parallel to the center sill of the car. The majority of these cars retained their vertical staff hand brake after conversion to AB brakes; cars placed in express service did receive Ajax power handbrakes. Cars in the 1932 and 1934 batches were built with AB brakes with a transverse mounted reservoir. These cars had Ajax or Equipco power handbrakes.

Trucks: The earliest cars built in 1924 were equipped with 2D-F1 arch bar trucks. The vast majority of the cars were equipped with the familiar 2D-F8 trucks. Some 2D-F8 trucks were modified with snubbers in an attempt to improve the ride at higher speeds. Other trucks seen on Class X29 boxcars include 2D-F12 coil-elliptic trucks (freight and express cars) and at least one of the last cars built, PRR 100688, was equipped with GSC BX express trucks.

Cut Levers: Cars built in 1924-1925 and 1928-1930 originally had top operated Carmer cut levers. Many received rod-type bottom operated cut levers, but some cars kept the Carmer cut levers until rebuilding or retirement. Cars built in 1932 and 1934 had bottom operated cut levers.

Paint: With the exception of the first Merchandise Service scheme, Class X29 wore every post-1924 PRR boxcar paint scheme:

Revenue Boxcar Lettering Schemes Applied to class X29 Boxcars

Style of Monogram	Abbreviation	Application Period	Remarks
No Keystone, Phase 3	NK3	1924-4/1926	PENNSYLVANIA Car Number
No Keystone, Phase 4	NK4	1924-4/1926	——————— PENNSYLVANIA Car Number No monogram
Circle Keystone	CK	1/1930-1/1954	AKA "Ball Keystone"
Shadow Keystone, Phase 1a	SK1a	2/1954-6/1954	Script style ("Calendar") numerals
Shadow Keystone, Phase 1b	SK1b	8/1954-11/1957	Serif-style numerals
Shadow Keystone, Phase 2a	SK2a	11/1957-6/1960	Serif-style PRR & numerals
Shadow Keystone, Phase 2b	SK2b	6/1960-6/1961	Plain-style PRR & numerals
Plain Keystone	PK	9/1961-1/1968	

Banners and Slogans Applied to class X29 Boxcars

Banner/Slogan	Abbreviation	Application Period	Remarks
AMERICAN RAILWAY EXPRESS	ARE	1924-1929	Express service boxcars only
RAILWAY EXPRESS AGENCY	REA	1930-1954	Express service boxcars only
MERCHANDISE SERVICE, Phase 2[1]	MS2	1/1950-5/1954	Plain white band and CK
MERCHANDISE SERVICE, Phase 3[2]	MS3	5/1954-11/1957?	Plain white band and SK
BUY WAR BONDS		1942-1945	
S (Encircled by rectangle)		1961-1968	Yellow; Stores Department cars only

Data from "Lettering Schemes for PRR Boxcars 1876-1968," Brady McGuire, The Keystone, Summer 1988

Note 1: There doesn't appear to be dedicated number blocks for Class X29 boxcars assigned to LCL service. Known cars painted in MS2 are:

54342 92419 101393 505932 567427 568169
569209 57084? 571965

Note 2: Only one photo has surfaced of a Class X29 boxcar in MS3 - PRR 504087.

PRR 101393, Zanesville, OH, c. July 1954. Representative of the last group of Class X29 boxcars built in 1934, this car features AB brakes with a transverse reservoir and power hand brake. (Paul Dunn photo, John C. Larue, Jr. collection)

Coming Next Month

Part 2 of the series continues with some simple upgrades you can do to a model that many HO scale Pennsy modelers have that doesn't compare favorably with today's more detailed freight car models: the Walthers/Train Miniature Class X29 boxcar. We'll also cover the myriad of decal sets available.

Acknowledgments

Special thanks goes to Dave Soderblom, who provided much assistance in gathering data on car variations and making sense of them all.

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- "Lettering Schemes for PRR Boxcars 1876-1968," Brady McGuire, The Keystone, Vol 21, No 2, Summer 88, p 13.
- http://prr.railfan.net/freight/classpage.html?class=X29 Rob Schoenburg's X29 webpage

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Part 2 - Express Boxcars

PRR 2185, Builder's Photo, November 12, 1941. PRRT&HS Collection

Introduction

Over 1100 Class X29 boxcars were converted to express boxcars (AAR Class BX) during the mid-1930s through the early 1940s, making up the largest single fleet of express boxcars among North American railroads. Not only were these cars a common sight in Pennsy mail and secondary trains, they were frequently seen on mail and express trains on connecting lines such as the Santa Fe or Union Pacific, where they were used to ship magazines such as Time, Life, and Newsweek from printing plants in the east to cities on the west coast. Cars assigned to express service escaped rebuilding and were among the last Class X29 cars to be retired, with many cars going into stores and work service. One car, PRR 9495, has been restored at the Valley Railroad Museum in Essex, Connecticut.

Roster

Series[1]				Population						
Start	**End**	**Built**	**Converted**	**Qty**	**9/43 ORPTE**	**3/49 ORPTE**	**2/52 REA**	**1/55 ORPTE**	**1/57 ORPTE**	**1/61 ORPTE**
2000	2499	1924	1936	500	499	496	1037 (All PRR BX)	489	473	455
6200		10/24	1/42	1	-	-		-	-	-
9456	9594	1924	1942	138	138	138		132	123	117
49313	57643	1924	1943	293	224	223		239	232	28
97949	103324	1924-1933	1943	167	167	167		163	159	9
566091	574090	1924	1943	2	2	2		2	2	0
Totals				1101	1030	1026	1037	1025	989	609

Note 1: Individual numbers of cars in freight series 49313-57643, 97949-103324, and 566091-574090 equipped for and assigned to Passenger Train Service.

Freight Number Series Class X29 Boxcars assigned as Express Cars, July 1950										
Series: PRR 49313-57643, 241 express boxcars										
49422	49903	50823	51415	51603	52470	53266	54100	54847	55580	56766
49447	49907	50885	51418	51636	52506	53319	54114	54928	55653	56835
49462	49918	50937	51421	51765	52550	53346	54137	54990	55669	56902
49471	49977	50976	51422	51767	52566	53352	54162	55000	55681	56920
49484	49988	50983	51426	51789	52570	53381	54185	55075	55690	56970
49486	50049	51002	51427	51790	52571	53449	54229	55149	55763	57031
49489	50091	51011	51430	51798	52624	53489	54351	55246	55764	57035
49490	50155	51015	51431	51812	52669	53515	54361	55257	55790	57097
49512	50226	51045	51432	51830	52672	53523	54363	55261	55933	57106
49529	50298	51069	51434	51855	52735	53560	54420	55264	55936	57115
49573	50484	51098	51436	51874	52843	53569	54422	55289	55960	57136
49577	50495	51111	51437	51885	52909	53670	54502	55317	55991	57158
49599	50542	51112	51441	51904	52933	53808	54614	55344	56004	57183
49633	50545	51215	51444	51944	52948	53843	54625	55423	56143	57189
49645	50551	51226	51446	51971	52995	53868	54670	55425	56170	57206
49725	50595	51234	51449	52065	53049	53926	54673	55440	56230	57227
49734	50662	51249	51450	52169	53061	53957	54699	55443	56430	57271
49748	50674	51257	51550	52183	53064	53978	54752	55455	56506	57302
49837	50693	51289	51557	52228	53083	53991	54768	55457	56581	57358
49847	50756	51362	51561	52318	53112	54025	54769	55497	56593	57411
49854	50791	51387	51574	52387	53159	54059	54799	55536	56644	57442
49898	50816	51414	51580	52416	53185	54078	54826	55546	56708	

Series: PRR 97949-103324, 167 express boxcars									
100013	100185	100307	100477	100669	100824	101483	102015	102484	102864
100036	100193	100316	100485	100674	100830	101484	102054	102544	102901
100040	100196	100323	100490	100688	100831	101506	101116	102615	102914
100042	100199	100324	100496	100691	100832	101521	102121	102617	102935
100043	100207	100325	100523	100704	100833	101526	102168	102618	102955
100055	100211	100327	100534	100718	100837	101531	102205	102647	103056
100065	100219	100330	100540	100736	100848	101582	102241	102662	103063
100090	100220	100349	100542	100738	100858	101613	102244	102670	103082
100092	100221	100355	100564	100739	100867	101635	102266	102693	103083
100093	100227	100402	100567	100748	100891	101745	102288	102714	103100
100095	100250	100409	100574	100750	100901	101756	102303	102734	103131
100126	100256	100415	100576	100760	100906	101898	102326	102794	103165
100138	100270	100416	100577	100768	100908	101906	102372	102795	103199
100147	100274	100438	100582	100778	101354	101915	102397	102824	103220
100154	100283	100442	100586	100790	101371	101958	102437	102848	103317
100174	100289	100459	100607	100812	101386	101967	102473	102851	103319
100177	100294	100468	100642	100815	101444	101972			
Series: PRR 560091-574090, 2 express boxcars									
572042	573479								

A builder's photo of PRR 2518 taken c. 1927 shows that some cars were placed in express service in the late 1920s. The 500 cars in the 2000-2400 series were placed in express service in 1936; the remaining cars were pressed into express service in 1942 and 1943 as traffic dramatically increased during World War II. PRRT&HS collection.

Modifications for Express Service

To make these cars suitable for passenger train service, the following modifications were made:

- **Brakes:** All cars were upgraded to AB brakes and eventually received Ajax or Equipco power handbrakes. Some former freight service cars in the 49313-57643 and 97949-103324 series received a further upgrade to the AB-1-B brake system.
- **Steam and Signal Lines:** Added steam and signal lines to allow running at the head end of passenger trains.
- **Marker Light Brackets:** Rectangular marker light brackets were added at each corner of the car approximately 2/3 to 4/5 up the side of the car.
- **Grab Irons/Sill Steps:** Extra vertical grab irons were added on the ends of the car and to the left of each door. On some cars, an additional centered horizontal grab was installed approximately halfway up the ends. An extra sill step was added under the left side of each door.
- **Trucks:** Most cars kept their freight service 2D-F8 trucks. These gained a reputation of being rough riding at higher speeds, so the railroad experimented with trucks, including 2D-F12 coil-elliptic trucks and General Steel Casting BX high-speed trucks equipped with snubbers. One car, PRR 6200, received an experimental leaf spring truck.
- **Electrical Receptacle:** Cars remaining in service in the 1960s received an electrical receptacle to the left of the door.

PRR 6200, Builder's Photo, January 1942. PRRT&HS Collection

Paint/Lettering

Documented Lettering Schemes Applied to Class X29 Boxcars

Style of Monogram	Abbreviation	Application Period	Remarks
No Keystone, Phase 3	NK3	1924-4/1926	AMERICAN RAILWAY EXPRESS (to March 1, 1929)
Circle Keystone	CK	1/1930-1/1954	RAILWAY EXPRESS AGENCY
Shadow Keystone, Phase 2b	SK2b	6/1960-6/1961	Reporting marks only – no "PENNSYLVANIA"
Plain Keystone	PK	9/1961-1/1968	

The first express boxcars carried "American Railway Express," which was formed in 1917 when the USRA consolidated private express agencies. In 1929, 69 railroads, including PRR, organized the Railway Express Agency and purchased American Railway Express on March 1, 1929. After 1930,

express service boxcars were painted in CK and stenciled "RAILWAY EXPRESS AGENCY." Additional equipment data was stenciled on the car side, and the dimensional data was moved to the right of the car side next to the ladder. Relatively few photographs of express cars painted in Shadow Keystone schemes have surfaced, and those show cars painted in a modified SK2b scheme lacking the billboard "PENNSYLVANIA." The final paint scheme worn by these cars was PK.

Express cars became filthy quickly, and the lettering on many cars was hardly visible under a thick layer of grime.

PRR 100688, Builder's Photo, September 1950. One of the last 100 Class X29 boxcars built, this car features a Hutchins radial roof and GSC BX high-speed trucks. The white panel reads "MAIL STORAGE AKRON-COLUMBUS." PRRT&HS Collection

PRR 5391, Zanesville, OH, c. 1976. Note the electrical receptacle to the left of the door. Paul Dunn photo, John C. LaRue collection

Coming Next Month

Part 3 of the series continues with some simple upgrades you can do to a model that many HO scale Pennsy modelers have that doesn't compare favorably with today's more detailed freight car models: the Walthers/Train Miniature Class X29 boxcar. We'll also cover available models and the myriad of decal sets available.

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"PRR Class X29 Boxcars and Related Classes (X28, X28A, X30, K8)," Gary Rauch and Robert Johnson, The Keystone, Vol 9, No 4, Dec 76.

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"Lettering Schemes for PRR Boxcars 1876-1968," Brady McGuire, The Keystone, Vol 21, No 2, Summer 88, p 13.

http://prr.railfan.net/freight/classpage.html?class=X29

Correction published in *TKM* No. 10, May 2004

Corrections and Changes to *TKM* No. 9 –April

X29 Express Boxcar

Brian J Carlson of Cheektowaga NY wrote that he was reading Ben Hom's introduction to the X29 class and noticed an error. In the paragraph under Brake System he says "...cars placed in Express service did receive Ajax power handbrakes." Brain explains that he has a picture of X29 9495 taken in Hew Haven CT, on February 2, 1954, in REA Express service that still has a vertical staff hand brake. This car also has 2D-F12 coil-elliptic trucks and a Youngstown door. He purchased the picture from Bob's Photos at

29,000 Boxcars
Modeling the Ubiquitous X29

by Ben Hom

All photos are by the author except where noted.

Part 3 – Upgrading the Walthers/Train-Miniature X29

PRR 55650 equipped with Youngstown doors and retrofitted with AB brakes. Patch panels represented by scribed line.

Introduction

Originally introduced by Train-Miniature in the late-1960s, the Walthers Trainline X29 is an inexpensive, easy to assemble model that many Keystone Modelers have in large numbers on their HO scale layouts. Unfortunately, this model features details such as oversized cast on ladders, grab irons, and sill steps and an undersized working door with oversized tracks, once acceptable but now far from state of the art. However, this model is widely available on the secondary market, and with some modifications, can serve as a credible stand-in until you build enough Red Caboose X29s.

Why do this upgrade for a model that's only a stand-in?

- Many modelers already have a number of these cars.
- For modelers who haven't done freight car upgrades, this is a great way to get your feet wet and is a stepping stone to more advanced projects.
- You can get a bunch of these cars on the layout quickly, and with these basic upgrades, they'll blend in better with your more recently tooled Kadee, Proto 2000, Intermountain, and Red Caboose models.
- Even with the cost of replacement parts factored in, they're a lot cheaper than a Red Caboose RTR kit (MSRP $28.95).

Background

Train-Miniature offered three variations of this model: a flat end version; one with a 3/3/3 Dreadnaught end, and a third "AAR" version with a 3/3/3 Dreadnaught end and a 10-rib raised seam roof. Walthers acquired the tooling after Train-Miniature's demise and eventually re-issued all three models in the late 1980s. Until recently, the flat end version was available in Walthers "Trainline" series of RTR models.

Pros:

- All models feature the 1924-1925 side sheathing pattern (correct for the flat end version)
- Accurate lettering for PRR decorated cars
- Inexpensive (Walthers MSRP $7.98, can be found for less at train shows)
- Common on the secondary market

Cons:

- *Oversized running boards*
- *Oversized "TV antenna" brakewheel that is too tall (vertical staff brakewheel cars).*
- *Oversized brakewheel (Dreadnaught end cars).*
- *Door "claws" and oversized door tracks.*
- *Oversized sill ("stirrup") steps.*
- *Incorrect underframe (model reuses underframe from Train-Miniature double-sheathed reefer, which is a Rock Island prototype).*

- *Decorated cars are painted Scalecoat Tuscan Red, much too dark for any shade of Freight car color.*
- All models feature the 1924-1925 side sheathing pattern (incorrect for the Dreadnaught end versions).
- 3/3/3 Dreadnaught end incorrect (4/4 Dreadnaught end on prototype).
- Incorrect door stop.
- Roof seams are a bit overdone.
- Rivet strip along bottom of sides incorrect.

We'll correct the *italicized* faults. The following compromises were made to simplify construction:

- Rivet detail on Tichy running board does not match supports. (The Tichy running board is from their USRA single-sheathed boxcar kit.)
- Lateral running boards not correct for Class X29. (Boards should run lengthwise.)
- Athearn Youngstown door not 100% correct. (The prototype did not have rollers; however, the price was right. Use the Tichy Youngstown door if this bothers you.)
- Upper door track not shortened to match prototype. I felt that having a flat section along the top of the car side with no rivet detail was more noticeable than the full door track.
- Lower door track lacks paired triangular supports
- Bolsters and outer crossmembers not modified to match shape of prototype.
- Simplified brake detail.

Bill of Materials

A-Line
No. 29001 Stirrups – Style "B"

Athearn
No. 12022 40' Boxcar Door (1 pr)
No. 12026 40' Boxcar Underframe

Bowser
Vertical Staff Brakewheel (from H21A or GLA kit)
No. 74227 2D-F8 Trucks

Evergreen Scale Models
No. 112 .015" x .040" strip styrene
No. 153 .060" x .060" strip styrene
No. 189 .125" x .25" strip styrene

No. 8102 HO scale 1" x 2" strip styrene

Decals (CK)
Champ HB-303N
Middle Division HBX-6
C-D-S HO-312
(A more comprehensive review on decals will appear in next month's TKM.)

Floquil or Polly Scale
Zinc Chromate Primer

Kadee Quality Products
No. 5 couplers (or equivalent)
No. 517 Pennsylvania 2D-F8 50-Ton Trucks
No. 524 Wheelsets 33" Dia. Freight (Ribbed)
No. 2030 Ajax Brake Wheels, Red Oxide
No. 2031 Equipco Brake Wheels, Red Oxide

Life-Like

No. 21259 33" Ribbed Wheelsets

Plastruct
No. 90531 1/16" Styrene Channel

Red Caboose
No. RP-5013 2D-F8 Trucks (without wheelsets)

Tichy Train Group
No. 3029 40' Wood Roofwalk
No. 3018 Steel 6' x 8'6" Youngstown Door
No. 3013 Westinghouse AB Brake System
No. 3034 Brake Gear Split K (Westinghouse)

Walthers or Train-Miniature
X29 Boxcar

Train-Miniature HO scale Class X29 boxcar.

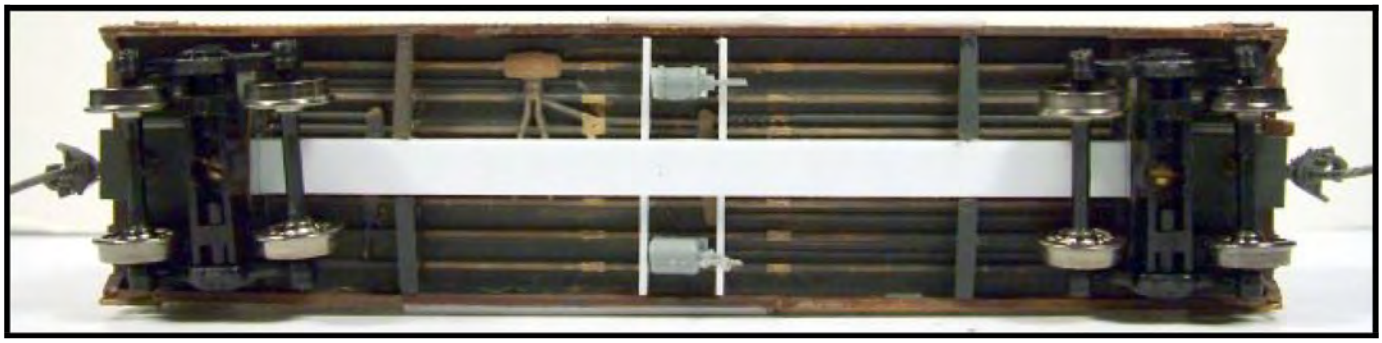
Upgrading the Model

1. Strip the model. (If you want to try to save the factory paint and lettering, I recommend that you pre-paint the detail parts and underframe Floquil Tuscan Red, then CAREFULLY overspray the model with your favorite shade of Freight Car Color after final assembly to lighten the paint. The lettering is sharp enough to take some reasonable fading and weathering.)

2. Throw away the running board and brakewheel. (I gave a bunch of the vertical staff brakewheels to a friend who models in S scale, as they're about the right size in 1:64.) Save the kit's trucks as they can be reused as 70-ton hopper trucks.

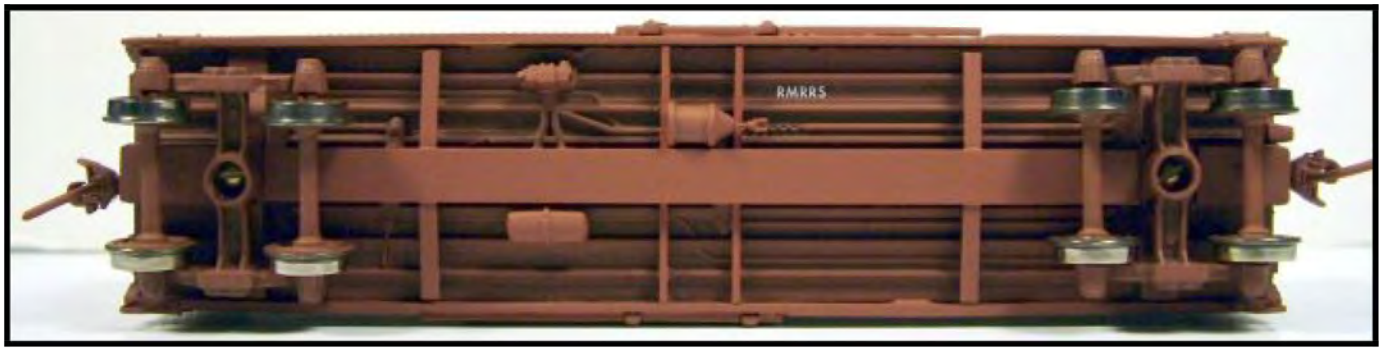

Original Train-Miniature underframe.

3. We'll rework the underframe next. Cut off the "triple valve" from the floor. Cut off the bolsters from the kit's underframe and the screw posts from the kit floor. Glue the screw posts into the bolsters. Cement the bolsters 6" closer to the ends, trimming away stringers to fit. (You won't see the gap in stringers while the car is on the track.) Replace the centersill with Evergreen 1/8" x 1/4" styrene. (It'll look good as long as you don't turn the car over.)



Underframe modifications, cars equipped with KD brakes. B end is to the right.

4. Cut four matching crossmembers from the Athearn underframe. These will form the outer crossmembers. Shorten them from the end facing the centersill to fit the more narrow X29 underframe, and locate them as shown in the underframe photos and diagrams. (They should fall just inboard of the second panel seam outboard of the door on both sides.) Cut four inner cross members from the 1/16" Plastruct channel and locate them as shown. Set aside the underframe to dry.



Underframe modifications, cars retrofitted with AB brakes.

5. Using a sharp No. 11 X-Acto blade, cut off the lower door track, taking care to avoid damaging the lower door stop.

6. Cut off the molded-on sill steps. Using a bow compass, mark the location for the holes for the A-Line stirrup steps and carefully drill out the holes. Work slowly and keep the drill bit nice and square; otherwise, you will accidentally drill out through the car side. Glue them in using CA.

7. Back to the underframe. Drill No. 50 through the car floor at the kingpins. Using double stick foam tape, attach the car weights to the floor. If you are using a Walthers kit, the final car weight will be in accordance with NMRA RP 20.1; if you're starting from a Train-Miniature kit, the car will be light and you'll need to add weight. Insert the underframe into the carbody.

8. If you're building a car with a CRECo door, cut off the "claws" from the kit's doors, and trim down the remnants of the "claws" as shown in the photos. If you're building a car with Youngstown doors, you can use the Tichy Youngstown door or salvage a pair of Athearn boxcar doors. To salvage the Athearn doors, carefully trim away the "claws" and extra web of plastic (including the tab at the top of the door where it fits into the door guide on the Athearn boxcar) around the door as shown in the photo.

Glue the doors in place. If you're using the Athearn doors, measure and cut a length of .060" x .060" styrene to fit inside the left side of the door opening and cement in place. This provides additional gluing surface and some extra rigidity to the door.

9. If you choose to add patch panels, do so now. For the lower door track, measure and cut lengths of .015" x .040" and attach them to the carbody along the narrow edge. If you're using the Athearn Youngstown door, make sure you cut notches for the door rollers.

10. Now we'll install the Tichy running board. Remove the molded-on end supports from the carbody (if desired). Next, take the lateral running boards and cut off the support. (It's designed for the USRA SS boxcar and will not rest properly on the roof of an X29.) Drill and install the corner grab irons. Next, cut four lengths of scale 1" x 2" strip and mount them as shown in the photo. These will serve as the lateral running board supports. (Don't worry if they're a little long – we'll trim them down later.) Assemble the lateral running boards to the roof walk, and glue it to the running board supports on the carbody. Do not glue the lateral running boards to the car at this time.
Let dry.

11. Once the glue is dry, carefully bend the lateral running board to parallel the roof. Next, soften the 1" x 2" strips with solvent and bend them down 90°. Trim off the excess with a sprue nipper and cement the supports to the roof.

B-end detail of model showing brake staff modifications.

12. For cars with vertical staff brakewheels, use the Bowser H21A/GLA brakewheel. We'll recycle the kit's brake platform. Cut down the kit's brake staff so that the brakewheel will be 8" above the running board. Install the brake staff assembly. For cars with Dreadnaught ends, simply glue the Ajax or Equipco brakewheel to the kit's handbrake gearbox housing.

13. Add brake details to taste using the Tichy KD or AB parts. Since these models are intended as stand-ins, I chose only to mount the major components, leaving off the rods, levers, and piping.

14. Wash the car with warm soapy water, taking care not to totally immerse the car to avoid getting water inside the carbody. Let dry.

15. Assemble the 2D-F8 trucks, replacing the supplied wheelsets with metal wheelsets (if desired).

15. Paint and letter the car. Weather to taste.


"Naked Kitbash" of Walthers X29 before painting showing the modifications made to the model. Patch panels are Bare Metal Foil.

PRR 568623, equipped with CRECo doors and KD brakes. Model has patch panels represented using Bare Metal Foil, which doesn't show up very well in the photo.

The Landscapes of the PRR
Part 5-1 PRR Stonework Masonry (Part 2)

by Jack Consoli

All photographs by the author, unless otherwise noted.

We will now continue with more projects to be built from the stone blocks and wall sections described in part 1, last month.

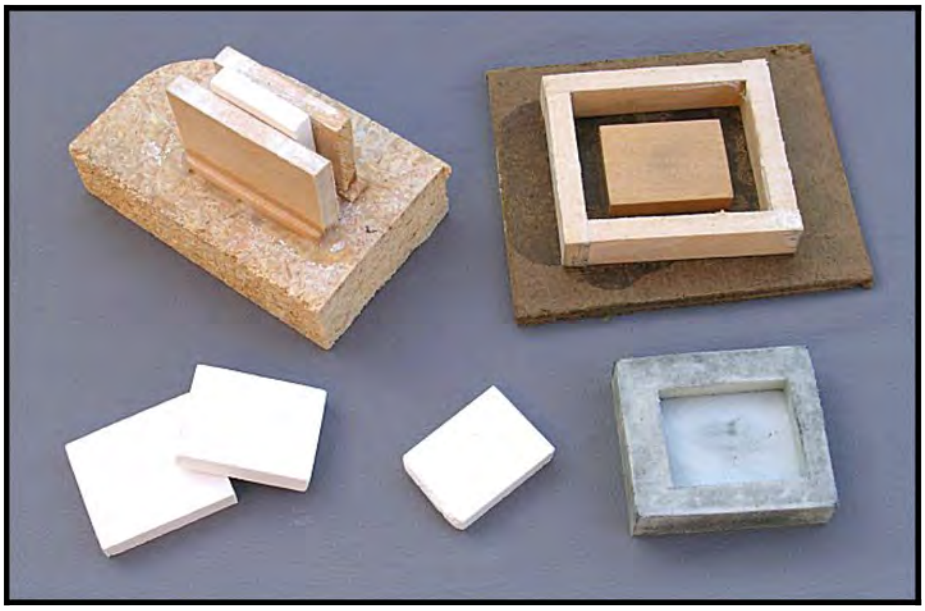
Running the gamut from large to small, bridge piers were commonly constructed with similar stonework. The acute angle of the leading edge of the current break (upstream) side of these piers would require handwork to fabricate and might warrant an additional mold for special stone if modeled. This is the west end of the former PRR McKeesport Branch bridge, June 1984.

Free-Standing Bridge Piers

Modeling free standing piers requires more hand work than one sided walls, but it is not difficult. I took two of the rectangular wall sections and glued them back-to-back. Rather than have to sand down the thickness of my standard wall sections, I cast a couple special parts and under-filled the mold, resulting in thinner parts to get the desired overall

depth of the pier. Stand them upside down (on their top surfaces) when gluing to insure the courses line up. Cut and add individual stones to get the exact overall length needed. Utilize corner stones for those that will be the last in a given course. Alternate the short and the long side of the stones at the corners, such that the joints along the ends of the piers are staggered. The prototype piers for the single track Ellsworth branch through truss bridge were 5' deep and 22' wide, just below the cap stones (for 104' long trusses, on 16'-6" centers). The piers have a single row of comparatively large, flat cap stones on them. I cut out a block of stripwood 7' x 5'-9" x 16" and made a simple mold of it. I cast plaster blanks and chipped the faces as necessary to get a cap that overhung the pier by a couple inches all around. Glue on the caps and mount the piers on a solid base.

Even these very small cross-section piers still retain the family appearance of the stonework. They support the former Axle Works Branch bridge over the P&LE main line at MP 4.6 on the Monongahela Division. Note the almost solid black patina deposited on this stone, not surprising as it is situated between two multi-track Class 1 railroad main lines and within sight of several steel mills. October 1991. These piers might be easiest to model just by building them up from loose stones.



The stripwood master and frame, silicone mold, plaster blanks, scoring fixture and final cut cap stone are shown. These were required to make the large custom-sized pier cap stones.

Completed Ellsworth Branch sandstone pier in place along the bank of what will be Pigeon Creek. Note the staggered joints on the end where loose stone were cut to fit.

The real north pier of Ellsworth Branch bridge No. 1, April 1990, Mon City, PA. The weathering on piers and support walls was not always uniform as the bridges could provide some shielding effects on the stone below. It is common for the stone to be cleaner and or muddier colored near the water level due to high water exposure and the cleansing action of the water. This pier is a good example of differences in appearance of the stonework due to specific local conditions.

Stone Arch Bridges

Not the Rockville bridge by any means, but all the same, a stone arch bridge that exhibits construction details typical of the PRR's masonry. This one on the Main Line in Portage, PA spans a secondary road and features a modern concrete extension. August, 1982.

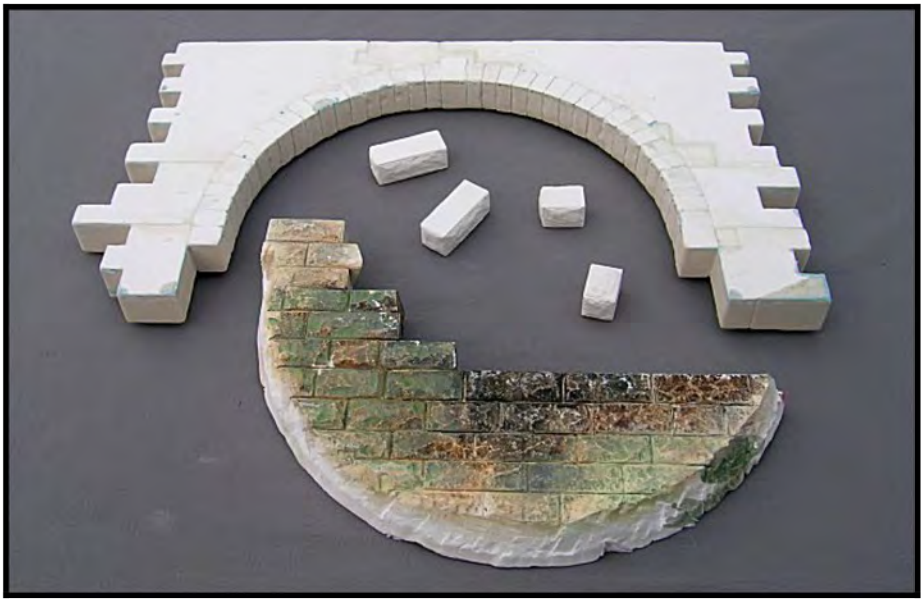
Undoubtedly the most challenging modeling project of the bunch, the arch bridge also yielded the most impressive results that screamed “PENNSY”. First step was to build a simple rectangular wall a little larger than the anticipated arch wall. Determine the size and location of the arch desired. Since a row of stone will line the arch opening, mark a half circle for the arch that is 24" larger than the required final radius.

Completed model double-track stone arch bridge over Mingo Creek mounted in place, ready for the surrounding scenery to be added. The large space under the walls was necessary to allow the completed bridge to be slid in under the sub-roadbed in one piece and then lifted up and blocked to properly position the top of the bridge near track level.

The prototype Mingo Creek stone arch bridge #27.58 at Riverview, PA, on the former Monongahela Division. Originally built for a single track, it was later widened to accommodate two, then three tracks (two mains plus a middle siding, shown here holding hoppers). On March 27, 1959 one row of ties had been placed atop the wall behind the railing, to retain the ballast. Jack Hahn photo.

Same view, thirty-one years later and not much has changed. The siding has been removed and weathering has taken its toll on some of the stone. Repairs in the form of concrete re-facing became commonplace on these structures in the latter decades of the 20th century. By this date, two rows of ties were needed to hold back the ballast of the slowly rising track structure. April 1990.

To cut the arch semicircle out of the wall I used a set of sharply pointed metal dividers. Place one point of the divider at the center point of the arch and use the other point to scribe a semicircular cut into the arch wall rotating it back and forth. Work slowly to get a clean cut. As the scribing progresses, relieve material with a knife from along the scribe on the inside of the semicircle. This will allow room for the point to cut down through the wall. Below the arch make vertical cuts in the remaining stone, tangent to the arch semicircle. Clean up the cut if necessary and chip the edges of the stones around the cutout. Pick a large individual stone to use as the keystone and sand a slight taper on what would normally be its top and bottom surfaces. Cut a recess into the top center of the arch to receive the keystone and glue it in place on edge. (Congratulations, you are now literally a *Keystone Modeler*…..) Get a pile of loose 16" thick stones and prep them for use. Note that the bridge I was recreating had arch stones with smooth, not cut faces, around the inside of the arch – no doubt to make construction with a wood support form easier. Make a fixture to cut down their depth to a uniform 24". Then sand slight tapers on them as on the keystone. Begin at the keystone and glue the arch stones in place around the edge of the semicircle down to the vertical tangent point. Then add one stone below the last arch stone on each side of the necessary thickness to line up with the next wall course joint. The vertical edge below this last stone will be left exposed so corner stones can be added here when the mating cross wall from inside the arch joins the front wall here. Since this requires special reduced depth corner stones, I made a couple masters of the 21" and 24" height cut, to the 24" depth. One of each was left full length; one of each was cut to a length equal to the thickness of the arch. As I was building the arch, it became obvious that it would be less work to make a mold of the arch using this part as the pattern than it would be make a second arch by hand to complete the bridge. To this end, sand the back of the arch flat to allow it to sit on the mold base with all the stones around the edges sitting flush against the base and make a mold as before.



View of the back of the arch master. It is built of one set of top sections on two sets of bottom sections. The individual keystone and arch stones are visible. The special corner stones are at the center and the arch cutout, later used for staining practice, is at the bottom. If you need to build a multiple arch bridge, make the arch wall ends mate able with each other and of the proper length to get the desired arch-to-arch spacing.

Incorporated into the arch mold were the special corner stones. On molds with large casting areas compared to the surrounding mold perimeter, the stripwood form helps to retain the shape of the mold and thus the part when casting, as the volume of plaster is surprisingly heavy. The molds will tear eventually as at the lower left, but with a little tape and support from the frame, they are still usable. If plaster fills the tear and appears on the face of the part, just scrape it off when dry. The blackness on the mold is from graphite powder I applied to the master as an alternative mold release agent. The first part or two you cast are usually scrap as they absorb all the mold release material remaining on the silicone surface.

To make the bridge, cast a pair of arches and build up the appropriate size wing walls from the regular wall sections. Make them overly long at the end where they will join the arch to have sufficient material to cut. Apply the separate corner stones atop each step of the wing walls. The arch I modeled had the wing walls adjoining the arch such that their front faces were almost flush with the inside edges of the bottom arch stones. Mark a line on the front face of the wing wall where you want the edge to end up. Score the faces of all the stones along this line with the razor saw down to the depth of the joint lines

between the stones. Chip off the edges of the stone along this line now because if you wait until after trimming the section to the final length, the ends will break off, rather than chip controllably. Make the appropriate angled, miter cut along the end of the wing wall for your situation. Cut it a little long and file or sand the angled end to be flat and smooth. The hardness of the Hydrocal allows amazingly sharp corners to be achieved that result in great looking joints. Draw vertical lines on the face of the arch wall where the faces of the wing walls are to meet it. Clamp or hold a straight-edged piece of wood along this line, covering the "good" side and then file or sand the face of the arch wall down outside the lines, until flat, smooth and flush with the joint lines. Chip off the little exposed ends of the stone faces left along the line. This flat surface allows the wing walls to mate flush. Stand the parts upright and glue the wing walls to the arch face.

View shows attachment of wing wall to outer part of arch wall that was first sanded smooth. One of the formers and the bottom anchor strip for the brick arch is visible under the sub-roadbed, atop the cross wall.

Glue a course of 24" cap stones along the top of the arch, overhanging the wall slightly. Drill holes along the top course for the handrail stanchions you plan to use. For the handrails I assemble the plastic Lehigh Models* flat-bottom stanchions onto sections of brass rod. The upper 1½" pipe scales out close to .022" and the lower 1¼" pipe, close to .019". I set the stanchions into the holes in the cap stones and glue the railings to the stanchions. Once dry, spray paint them the appropriate color for your time and place – most likely black or silver. Glue them to the stone only if you really need to, once all the track and scenery work in the area is complete. I prefer to just

sit them in the holes in the stone – that way if they get bumped, they just fall off rather than get mangled.

* A note on page 9 of *TKM* issue 21, April 2005, provides details for a current source for these stanchions.

Cap stone detail on arch bridge showing overhang, mitered joint at corner and standard PRR railing applied.

When both arch assemblies are complete, determine the necessary spacing between them and cut and fit wall sections for the cross wall that runs between them, below the arch on both sides. In my case, only three courses were needed. Fit the joints with the arches using the special corner stones. The Mingo Creek bridge employed brick to form the center section of the arch, between the outer walls. Some bridges used flat-faced stone, so a different material would be required for such a model bridge. I cut a sheet of embossed plastic brick sheet to fit between the arches and rolled it up to take on a curl. Glue a hefty piece of stripwood along the top of each cross wall between the arches. It should be spaced back from the front face of the stone just enough to position the brick sheet about flush with the stone joints. It will anchor the brick sheet in the correct location atop the stone and provide a gluing surface. I next cut out formers from foamcore to help hold the brick sheet in its proper arch shape. With these parts all prepared, I moved on and did the staining of all the stone as described below. I also weathered the

brick sheet used a variety of acrylic paints. I concentrated my efforts to make the myriad of proper looking seepage stains mainly near the front edge of the sheet as that is realistically all that would ever be seen once the bridge was in place. When all parts are completed and dry, assemble the brick sheet to the stone. Run a bead of glue along the vertical face of the stripwood anchors, curl the brick and let it expand outward into the glue. Now glue a foamcore former to the backside of each arch wall and as many as needed in the center, to the top of the stripwood anchors.

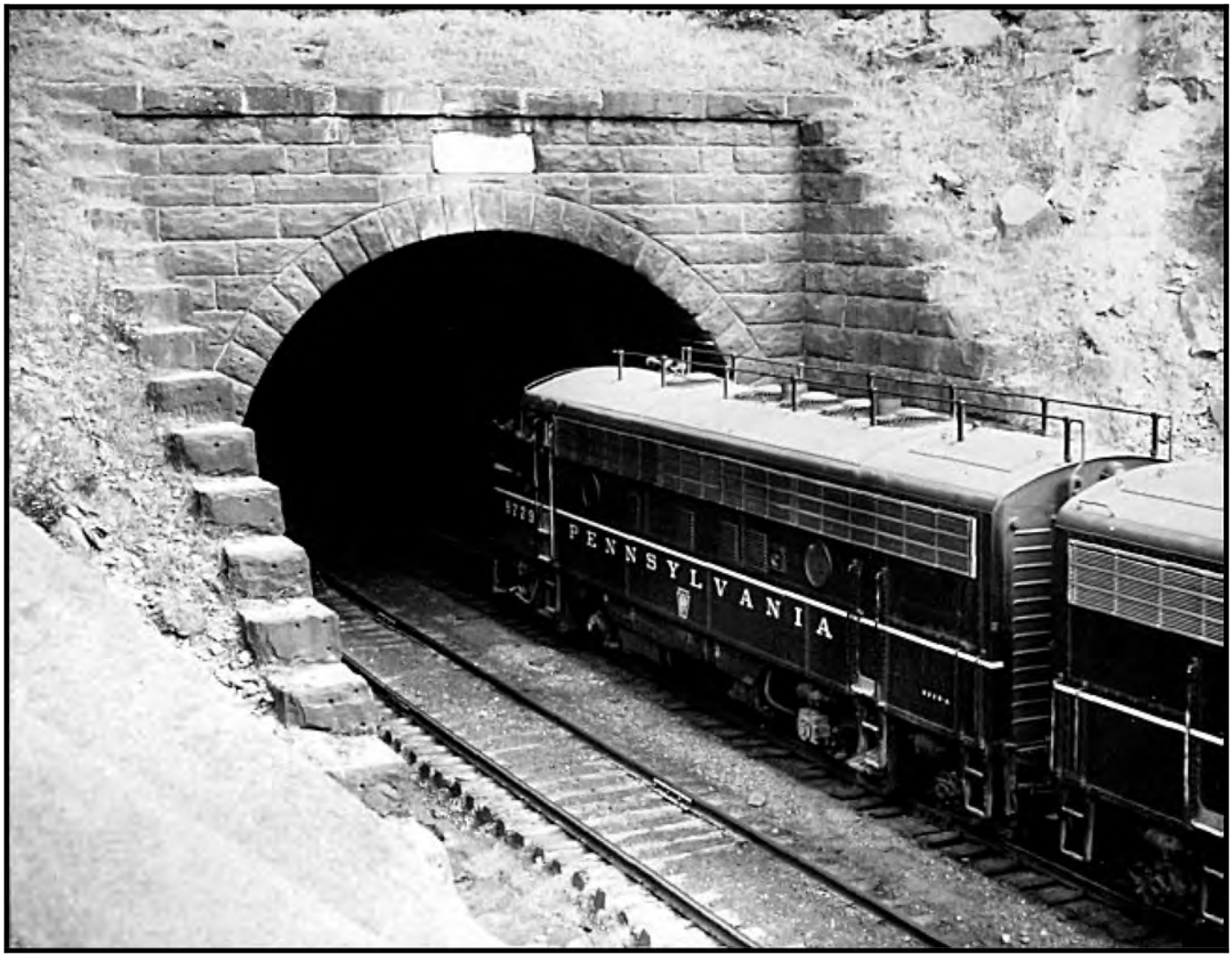
Detail view of wing wall joint and underside details of arch. Brick should be weathered to display the characteristic seepage stains.

The real Mingo Creek bridge was expanded from one track to three. What appears to be an intermediate stone support wall in the brick arch was actually one of the original outside arch walls that is now buried within the widened bridge. August 1991.

Cross walls through the arch are made of bottom sections and plastic brick sheet forms the arch. I skipped the complexity of recreating the intermediate stone arches of the prototype for simplicity's sake.

Tunnel Portals

View of the western end of the Main Line stone tunnels at Spruce Creek, PA, August 1982.



West portal of the Port Perry Branch tunnel near Braddock, Pa. Note the cut ends of the wing wall stones. Ralph W. Hallock photo, October 11, 1953.

The P&WV's short Blackburn tunnel at Clairton incorporates nearly identical stonework as nearby PRR structures. April 1990. Note that the soot deposits are heavier above the portal opening than off to the sides.

From the modeling perspective, a tunnel is essentially the same as a stone arch bridge, except that the trains run through it instead of over it, so no additional in-depth construction discussion is necessary. I will require one tunnel on my layout and am very fortunate in that the stone arch wall I built for the Mingo Creek arch bridge is almost a perfect fit for the tunnel portal I need to recreate. The funny thing about this tunnel is that it is not even a PRR structure – it is on the Pittsburgh & West Virginia Railway's Clairton Branch. It is only a stone's throw across Peters Creek from the PRR's Peters Creek Branch, just a short distance from where it joins the Monongahela Division main line at Clairton. This similarity just points out that the factors at work in forming the "Landscape" of the PRR here, had similar influences on other railroads in the area as well.

Finishing

The raw stonework structures are ready to color and weather and frankly, this step can make or break the projects. One of the great features of plaster is that it is absorbent and allows you stain it with washes, rather than using opaque coatings. This is particularly well suited to weathering this simulated sandstone as the real material is porous and absorbs materials that settle upon or run over it. Multiple layers of stain also add depth to the appearance of the surfaces. Since most of these structures have been in place for many decades and have been continually washed with various natural and man-made weathering agents, slapping a single color coat of paint on the stone is usually doomed to look unprototypical.

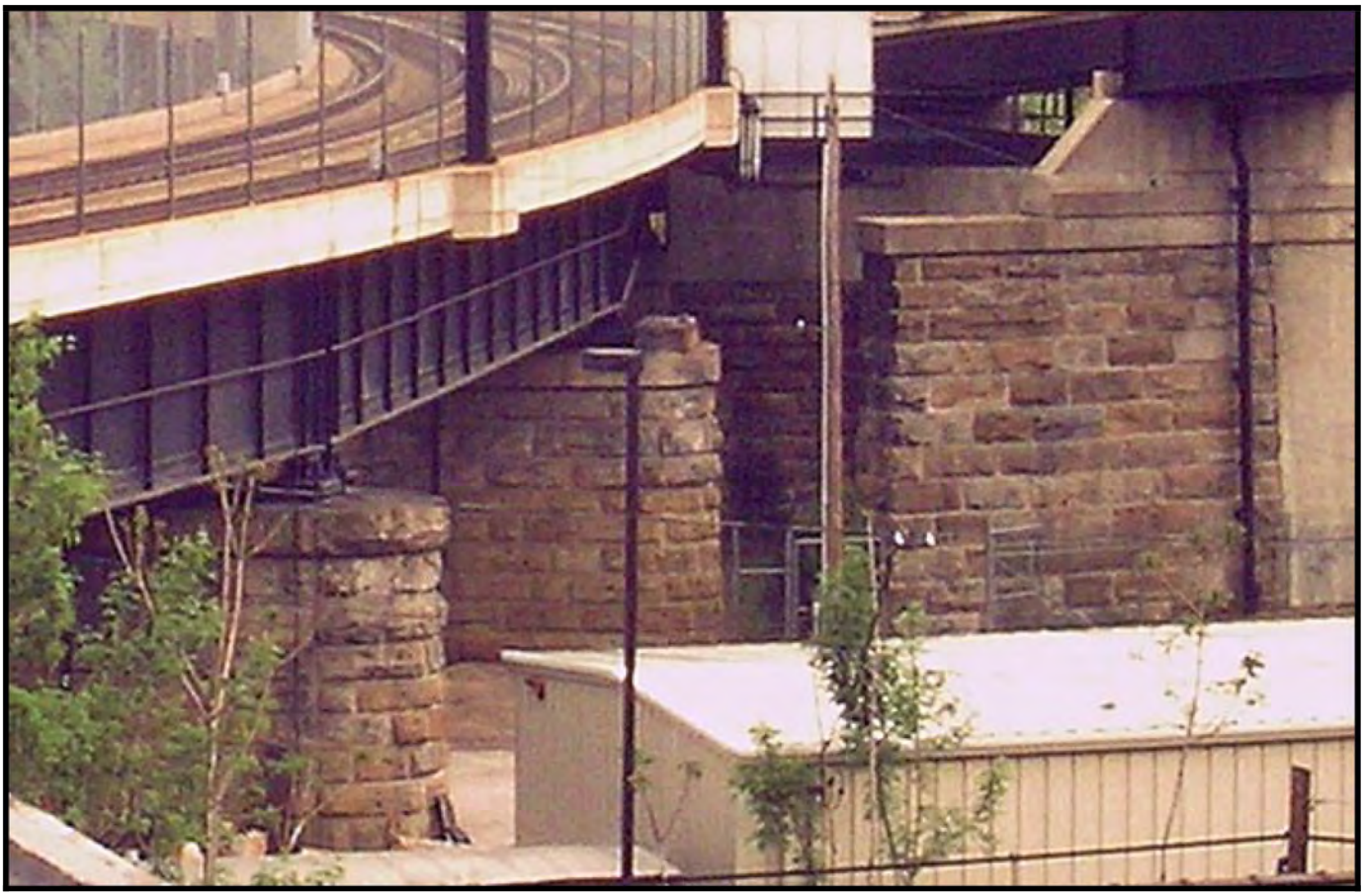
This small, twin stone arch bridge illustrates how almost totally black typical structures on the main line areas of this division could become. This bridge at MP 18.1 in Wilson, PA, swallows Peters Creek where it disappears under the main line and the former U.S. Steel Clairton Coke Works facility, exiting some distance removed, at the river's edge. May, 1995. Evidence of recent high water can be seen in the light, muddy color of the lower stones and the log jam of debris.

So, where should you start? Quoting the previously referenced article, "Landscapes of the PRR, Part 4-1, Geology of the Region": "When constructed, the exposed surface of the rock was often light grey or tan, but upon lengthy exposure to the elements, particularly the soot generated by close proximity to countless steam engines and their smoke-laden exhaust, these rocks rapidly took on a black patina that exists even today. Certainly the light-colored sand stones used in building stone walls, viaducts, bridges and culverts, often weathered to a deep, sooty black." The area I model undoubtedly has had additional weathering impressed on the stone due to the heavy industrial concentration and the associated expulsion of coal smoke and other pollutants from the factories and homes in this section of the Monongahela River valley. Since other local conditions can also contribute to the appearance of the stonework, the specific location of the structure should be considered when recreating the finish on any given structure.

A bridge abutment at MP 24.96 on the long-abandoned Peters Creek Branch. Note how much less black these stones appear than the above wall and in fact, the veritable rainbow of colors actually present on them. The difference is probably attributable to different exposure to weathering agents: this bridge is in a fairly rural area, about seven miles out the branch away from the culvert above and the Mon Valley industrial complex in which it was located. Additionally, it was on a single track branch that saw considerably less (steam engine) traffic than did the main line structure above. So the point that, "where you are has a big effect on what things look like," applies even over very small distances and is graphically illustrated here. Note the use of small Broken Range stone on this non-main line structure. Snowden, PA, December 1982.

To stain and wash the plaster parts, I have used both artist's tube oil colors thinned in turpentine or tube acrylics in water and/or alcohol. I start with an overall wash of the lightest color found on the stone in its natural state – I use dilute raw umber. The stain soaks in immediately, so you can keep working

without having to wait for any previous application to dry. Additional washes of raw umber and burnt umber yield darker tones. It is much more manageable to use many applications of very light washes than fewer denser ones. It is also true that a multitude of washes better simulate the subtlety created by nature.



Southern end of the former PRR Panhandle Bridge, South Side, Pittsburgh, April 1994. Long idled following the discontinuance of passenger service, this bridge was transformed into the modern subsurface entrance to the downtown area for the Light Rail system. When changes were made to the approaches, the original piers were retained, but were cleaned in the process, revealing more of the natural colors of the stone. They had been as black as the neighboring retaining walls shown earlier.

An assembled slab bridge support wall has had its base raw umber stain coat applied. A uniform application is not required.

Where the heaviest, darkest coloration is required apply burnt umber, Van Dyke brown and/or a little black. Use photographs as your guide as to how it should look. They illustrate how at some points in the stonework very dark stains emanate from the joints where water seeps through carrying dirt, soot, slime, etc. The joint lines themselves sometimes tend to be lighter in color than the rest of the stone. Possibly

since the stone was actually cut along the joints, a less porous surface was created that tended to absorb less weathering than the surrounding, rougher surfaces created when chipping the faces. Additionally, the joints are recessed and thereby have fewer pollutants landing directly on them. To achieve this effect I scraped some joints lightly with the tip of a hobby knife after applying the dark washes and then rewashed them with a light tan or gray wash. Burnt sienna works well to simulate rust streaking which usually appears as more distinct stains starting at seepage spots and points of hardware attachment such as the railing supports, and runs vertically downward. In shadowed or damp areas, light washes of a pale green such as green earth (terre verte) or phthalo green mixed with a little black can be applied to simulate moss and lichens. Normal handling of the parts tends to lighten the colors along the protruding sharp edges of the parts, creating highlights without any special effort. The best advice here is to look at close-up photographs of the real stonework to pick up the subtleties of the colors that are there. It might seem like it is uniform color from a distance, but it isn't, and reproducing the color variations helps to produce much more convincing models.

Detail view showing seepage effects and rust staining, biological growth and light areas along some joints. Note also the differences in appearance of wet and dry areas. If you do get some small air bubbles in the castings, do not fill them as they will just look like the characteristic holes in the prototypes.

Although only a few examples have been illustrated here, stonework masonry structures on the PRR appeared in virtually infinite varieties. The modeling techniques presented should be applicable for any similar stonework structure needed to help accurately create your model Landscape of the PRR.

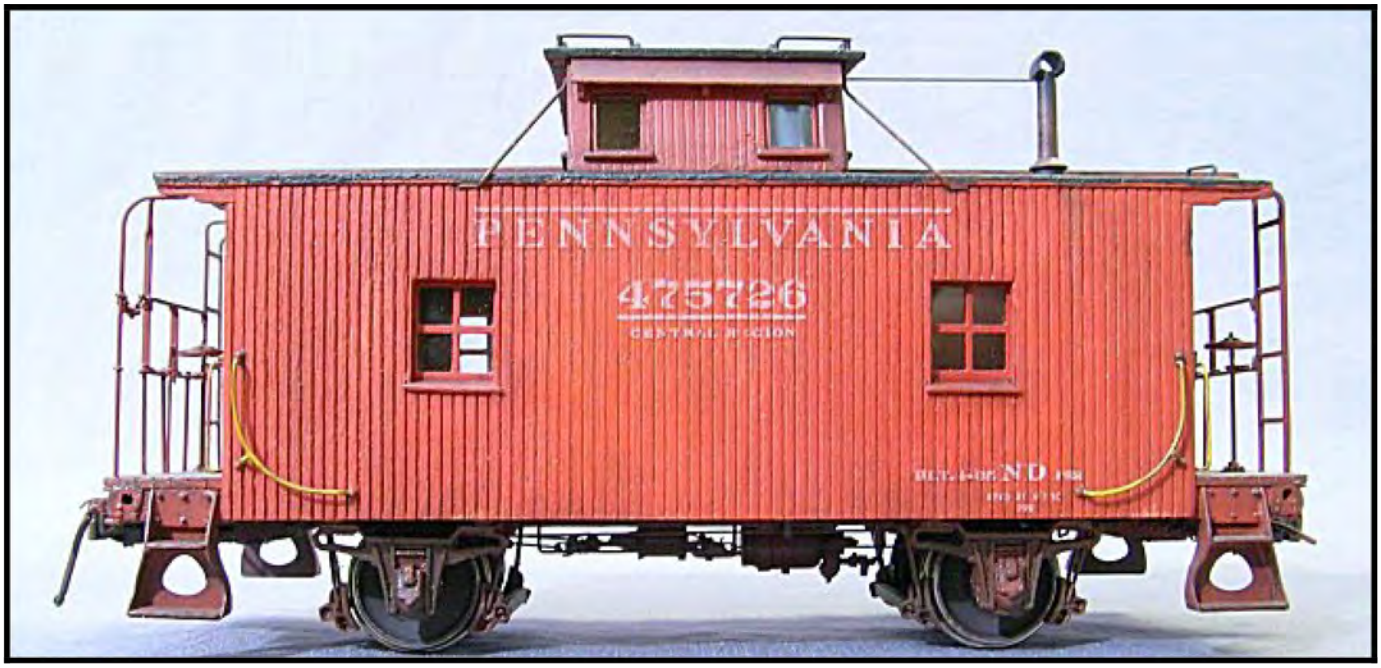
Limitless coloration and pattern variation on model stone structures is easy to achieve by applying light stain washes to the porous plaster base material.

Modeling an ND and NDA Cabin Car

by Jack Consoli

All photos by the author unless otherwise specified.

Jack won first class for cabin cars with this model at the PRRT&HS annual meeting in Lancaster in 1998 – Ed.



Class ND model from an HO scale wood craftsman kit.

Although I model the early 1950s, I have always been intrigued by the smaller, simpler rolling stock and locomotives designed, constructed and in use on the PRR in the early part of the 20th Century. I therefore welcome the opportunity to model the occasional ancient piece of equipment that somehow managed to survive and still be prototypically "correct" in my period. Such is the case with the ND cabin car.

The Prototype

Approximately 1,125 of these Lines East cars were built between 1903 and 1914. Although they appear toy-like in later eras, they represented a significant step in the timeline of cabin car development and technology on the PRR. They superceded the earlier wood underframe NA, NB, NC, NE and NEA classes by being larger and stronger and were the first PRR class with a steel underframe and end sills. The underframe was reportedly designed to withstand the stresses of two H6-class locomotives (the large road freight locomotives of the day) pushing behind the cabin car. The ND was a comparatively long car at 26'-0" over the platforms. It still featured a wooden superstructure but was better equipped for road service than the earlier cars. Many of the specific details of the car were similar to the earlier classes as well as the later wood N6A and N6B classes, particularly the windows. Although an advanced design over the earlier cars, the ND also represented the end of an era as it was the last class built as a four-wheel "bobber" caboose. The car rode on two fixed axles mounted in sprung pedestals and featured very prominent outside and inside mounted brake beams. The PRR converted a single ND car in 1915 by adding four-wheel trucks and lengthening the body by three feet and reclassified it as the one and only N4, 488251. In 1916 a small number of ND cars were converted to class NDA by the addition of four-wheel 2A-F1 trucks: it is believed that the rest were built new. Other than the trucks and the adjustments required on the steps and underbody details to accommodate the trucks, it was essentially the same as the ND; the body was not lengthened. The ND were built with brake gear and safety appliances (or lack thereof) commensurate with their time of construction, and this equipment underwent various changes through the years. Some of this detail is covered in the *Keystone* articles (now available on CD).

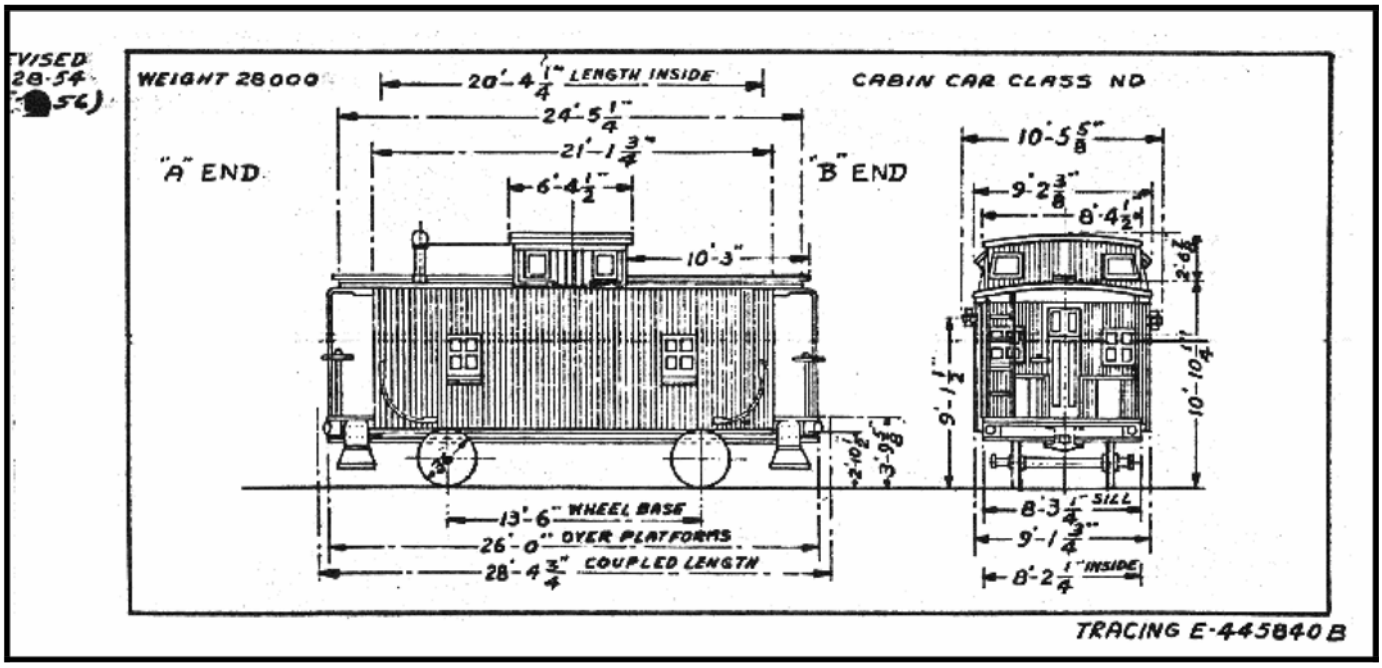
As with other small, wood-construction rolling stock, the ND's numbers dwindled as the century progressed. Unlike freight cars that became obsolete much earlier because of insufficient capacity, the ND was still able to serve its intended purpose for over 50 years, with the last of the cars disappearing from the roster by 1964.

QUANTITY OF CARS IN REVENUE SERVICE

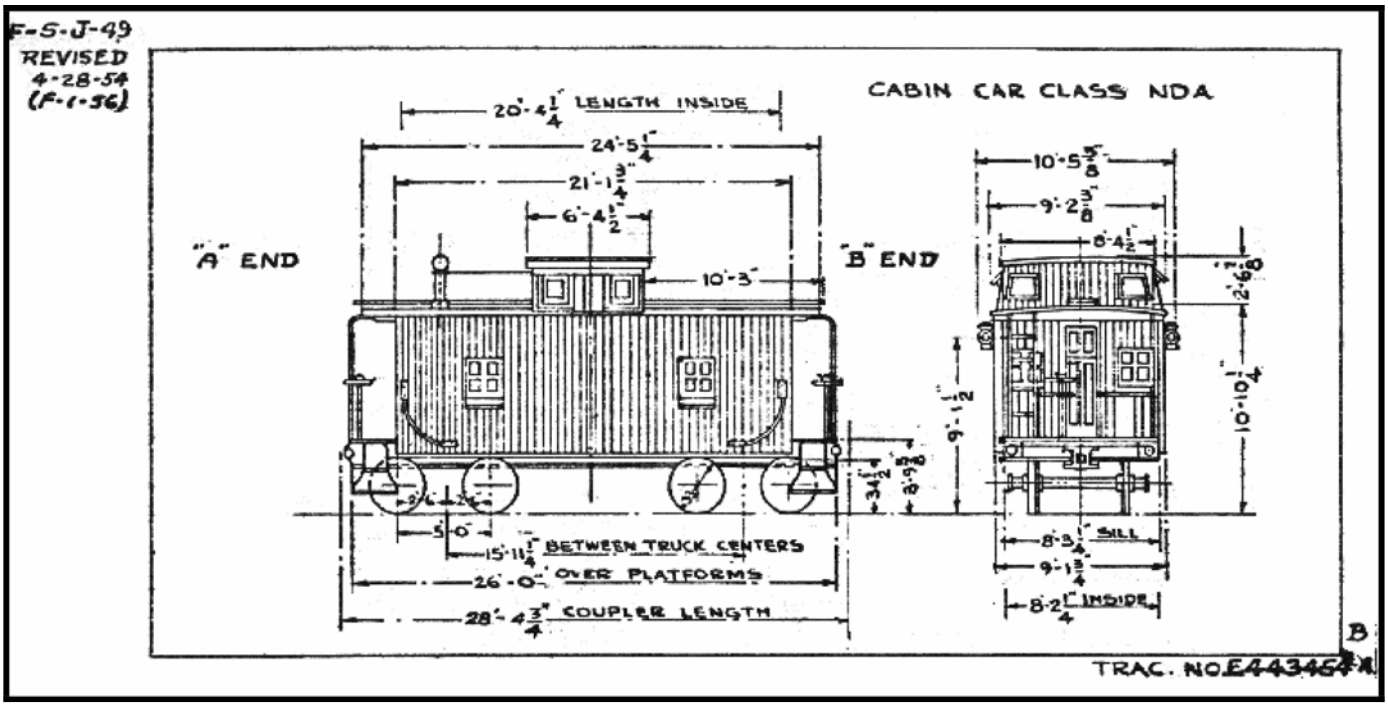
Year / Class	1930	1935	1940	1945	1950	1955	1960
ND	1021	960	451	343	225	24	2
NDA	13	13	13	13	12	4	1

The May 15, 1957 cabin car assignment roster shows four class ND and one NDA cars in service:

- ND 476039 Pittsburgh Region, assignment: Supervisor #52 - Tyrone
- ND 476087 New York Region, assignment: Greenville Shop
- ND 476419 Pittsburgh Region, assignment: Supervisor #44 - Huntingdon
- ND 476460 Chesapeake Region, assignment: St. Helena local - Baltimore
- NDA 479815 Chesapeake Region, assignment: Ft. Wayne



ND Cabin Car diagram, revised to 4-28-54. Rob Schoenburg collection.



NDA Cabin Car diagram, revised to 4-28-54. Rob Schoenburg collection.

ND 475807, assigned to the Baltimore Division prior to having the end railing modifications applied. Jack Consoli collection.

NDA 479815 assigned to the Del Marva Division at Delmar, Delaware in 1940, displays the unmodified end railings, K-brakes, archbar trucks and side window screens. Note the difference in the location of the end steps between the NDA and the ND to which it is coupled. George Nixon collection, courtesy Bob Johnson.

The Model

I started with the wood "craftsman" kit that has been available for the ND/NDA for many years under several different manufacturers' labels: Ambroid, Quality Craft and, most recently, Gloor Craft Models. The kit is a step up from the old "box of sticks" kits and contains precut, scribed sheathing ends and sides, floor, roof and cast white metal detail parts. Not a terribly daunting project if made according to the instructions, but I went beyond that, although it wasn't premeditated…. I was just trying to make it correct.

There were two factors that contributed to the level of detail I put on the car. First, with the pedestal mounted axles and the lack of overhanging side sheets, all the underbody detail is just hanging out there in space. As I looked at the photos I knew that whereas with most cars, the underbody detail is pretty much hidden when the car is sitting on the rails, this was most definitely not the case with this car. So I figured that if I was ever going to do the complete underbody detail on a model, this would be the one on which to do it. Second, I had the luxury of having all the prototype information I could use as there were six preserved ND cars I was aware of in Pennsylvania. There were two ND in Strasburg, PA: Strasburg Railroad 10 and another car on display at the Red Caboose Motel. Additionally, Strasburg Railroad 11 was on display in New Oxford, PA. In the Pittsburgh area there were three cars. #476199 was in the Pennsylvania Trolley Museum along the old Chartiers Branch of the PRR, just north of Washington, PA. The second was on display with an assortment of other railroad and traction equipment at Station Square (the former headquarters and station of the Pittsburgh & Lake Erie Railroad) on Pittsburgh's South Side. This car is reported to have come off the Pittsburgh, Chartiers & Youghiogheny, a local switching railroad that was jointly owned by the PRR and P&LE; obviously a hand-me-down from parent PRR.

Strasburg Railroad 11, ex-PRR ND 476582 at New Oxford, PA, May, 1983. Car has unmodified end railings and AB-brakes.

Ex-PC&Y, ex-PRR ND at Station Square, Pittsburgh, November, 1983. Car has modified end railings and AB-brakes.

Strasburg Railroad 10, ND at Strasburg, PA; May, 1983. Car has unmodified end railings, AB-brakes and the cupola awnings have been removed.

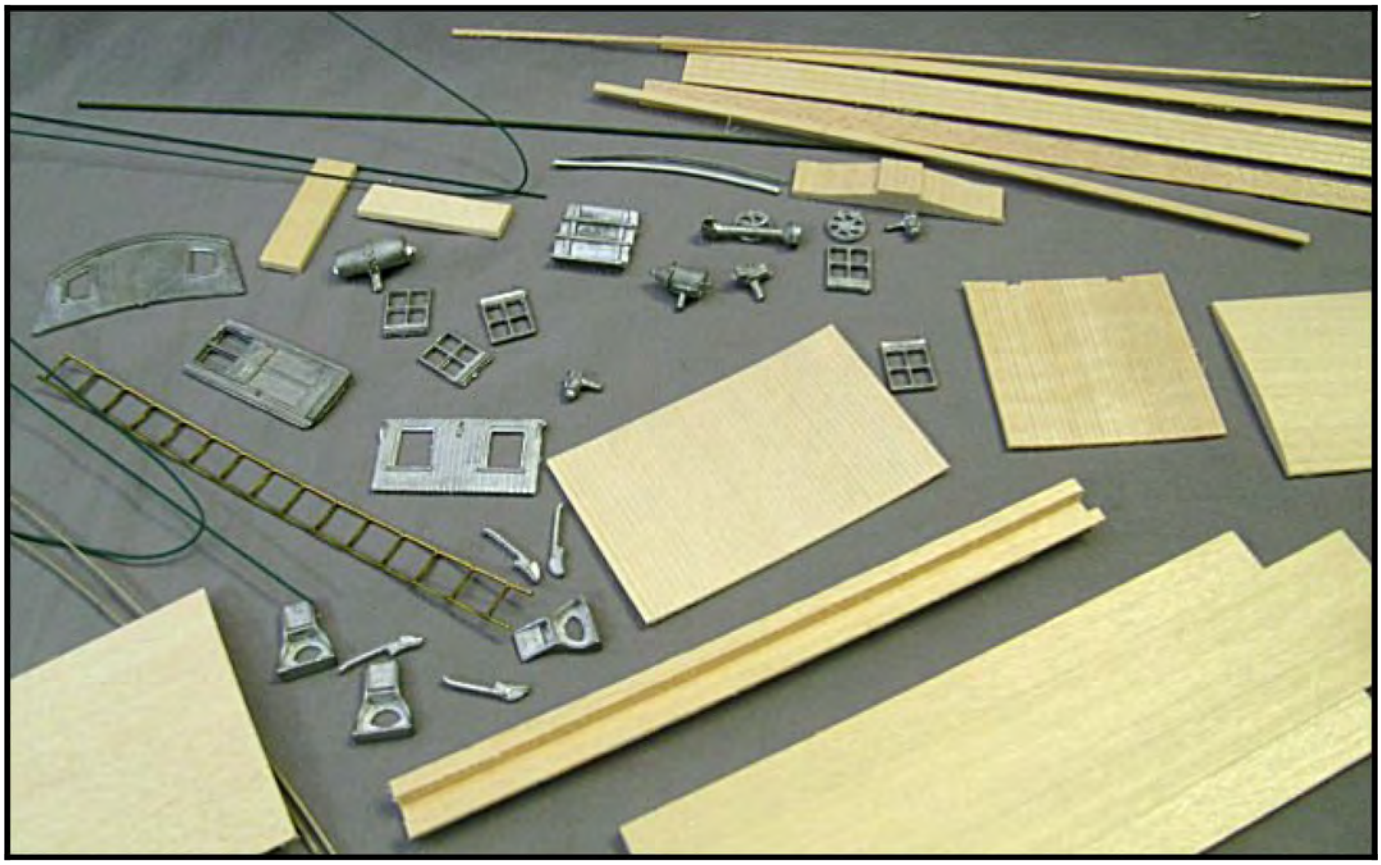
PRR ND 476199 at Arden, PA, August, 1982. Car has modified end railings, K-brakes and a number of parts missing. The side is possibly still wearing its final coat of PRR FCC. Car was purportedly acquired in 1956 from Lines West.

ND at the Red Caboose Motel, Strasburg, PA, May, 1983. Car has modified end railings, K-brakes, non-standard side window awnings, a missing end step and roof walks.

PRR ND 492063 at Elizabeth, PA, November, 1981. Car has modified end railings and K-brakes.

The third car, 492063, was on display out in the middle of nowhere in the front yard of a farm in Elizabeth Township, south of Pittsburgh. At some time since I photographed it in 1981, it disappeared from that spot and its current whereabouts are unknown to me. Although all class ND, there were differences in the details on these cars.

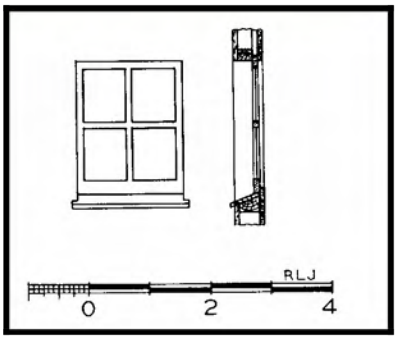
I have provided photographs here that cover reason #2 above; you just have to come to grips with #1 for yourself and we can get started sprucing up this simple little kit. These same techniques apply directly to the similar kits made for wooden N6B cabin car kits as well; they just require less underbody detail.



Similar N6B wood "craftsman" kit illustrates starting point.

The Windows

To start, cut the door and window openings in the end and side sheets, I made mine 1' 10" wide by 2' 5" tall: slightly larger than the instructions. The kit comes with soft metal castings for the body side and end windows, eight in all. These are probably the weakest part of the kit. Being soft metal castings, they are predictably gross and oversized compared to the prototype. Additionally, they do a poor job of representing the sloping bottom sills. I experimented a bit and found the easiest way to replace them was just to build them in place, from scratch. A drawing of this window, by Bob Johnson, appeared in the December 1972 issue of the *Keystone* in his review of the similar N6B kit.



PRR Wood Cabin Car window, used on the ND, NDA and other classes.

One of the distinctive features of the windows is how deeply recessed they are (about 4") into the sides. To replicate this, first glue pieces of 1" X 10" wood strip around the perimeter of each window opening on the inside of the scribed sheathing side and end pieces. Then use 1" thick strips of scale

lumber to frame the openings in the body sheets. Cut and apply a full width piece across the top, then fit a piece along each side from under the top piece to the bottom of the opening. All three of these should be applied flush to the outside of the opening and should be deep enough to protrude inside the body a small amount. Next cut a piece of 1" strip for the lower sills. These pieces need to fit in between the side pieces within the frame, but then outside of the frame, they are wider than the window frame by about 1.5" and protrude farther than the rest of the frame by about 1.5" also. They should also protrude inside the walls slightly. Cut and fit these pieces individually to get a good result. Note that for drainage, these sills angle downward noticeably so apply them at an angle. By sanding all the pieces flush with the inside filler strips once the glue dries, it isn't so tedious to get a good fit.

For the sash parts, I was afraid they would be too fragile if made from wood so I used .015" thick styrene sheet. On the styrene sheet draw the sashes: make four rectangles .100" wide by .121" tall with one .020" vertical and one .020" horizontal cross piece between them. Take two sharp, new chisel-type hobby knife blades and grind them down on a grinder (use eye protection), one to match the height of the window opening, the other the width. Holding the knife vertically, cut out all the window openings in the sashes on the sheet. Lay out a number of them, and plan to ruin a few along the way. With a little practice, it isn't as difficult as it might seem. Once you have eight good sets of window openings, cut the sashes out of the sheet. They attach flush behind the filler strips added earlier so they should be roughly 20" wider and taller than the body openings. Use slightly thick CA adhesive to attach the sashes. (Maybe we could talk Burl Rice into adding these window sashes and sills to his fine line of etched brass PRR cabin car window detail parts. That would simplify this process.) Clean up the metal end door castings, filing them smooth and a little thinner on the inside. Glue these into the end sheets.

ND model showing upgraded side windows properly recessed and with sloping sills.

Plan Ahead

This is the point of construction of a cabin car when decisions have to be made as to how to get the rest of the car assembled, painted, weathered and apply the window glazing without painting yourself into the proverbial corner. With a fragile, small, detailed, wood car such as this I saw no hope for the removable roof or floor approach, so I took the "sealed box" route. This basically means adding all the interior details and windows, completing construction of the car, masking the windows off,

painting and weathering. You also want to try to add the most delicate details last, whenever possible.

With this roadmap in mind, first, hand-paint the inside surfaces of the window sashes (including the door windows) with the interior buff color. To simplify the eventual masking of the windows, now (spray) paint the window frames and sashes on the car sides and ends as well as the end door windows from the outside with PRR Freight Car Color. Also spray a small area around each window. You should also apply your choice of weathering to the window frames, sashes and sills at this time, since you don't want to have to do it after the glazing is installed.

When dry, apply your choice of window glazing material from the inside. Cut the material a little larger than the opening and glue to the inside filler strips around the window. When I can, I like to use real glass for glazing windows as it never scratches and it is easy to clean if you happen to get paint or glue on it. Even better than that, it just looks so much more like glass that anything else, because it is truly flat and gives off the correct reflections when light hits it. I use microscope slide cover-slips for model window glass. They are thin glass sheets, about .006" - .010" thick, and about an inch square, intended to cover samples you want to protect when making slides for use with a microscope. They are sold at scientific supply stores and are not terribly expensive or difficult to find. I use a pencil-shaped diamond tip scriber I got from Micro-Mark to score the glass. After scoring, just place the glass on a piece of metal with a nice square edge and tap the glass to break along the score. Since exact-size pieces are not required – just something somewhat larger than the window, they are easy to cut. Glue them to the inside body filler strips with a thin and somewhat pliable glue: water-based contact cement works well or model airplane "canopy cement" is a good choice. You don't want something brittle that will let go someday when the car experiences a significant "thermal excursion" and leaves your glazing rattling around inside this tiny little sealed box. Paint the excess glazing outboard of the window frame the interior color to help hide it.

Realistic reflections result from the use of real glass for the windows.

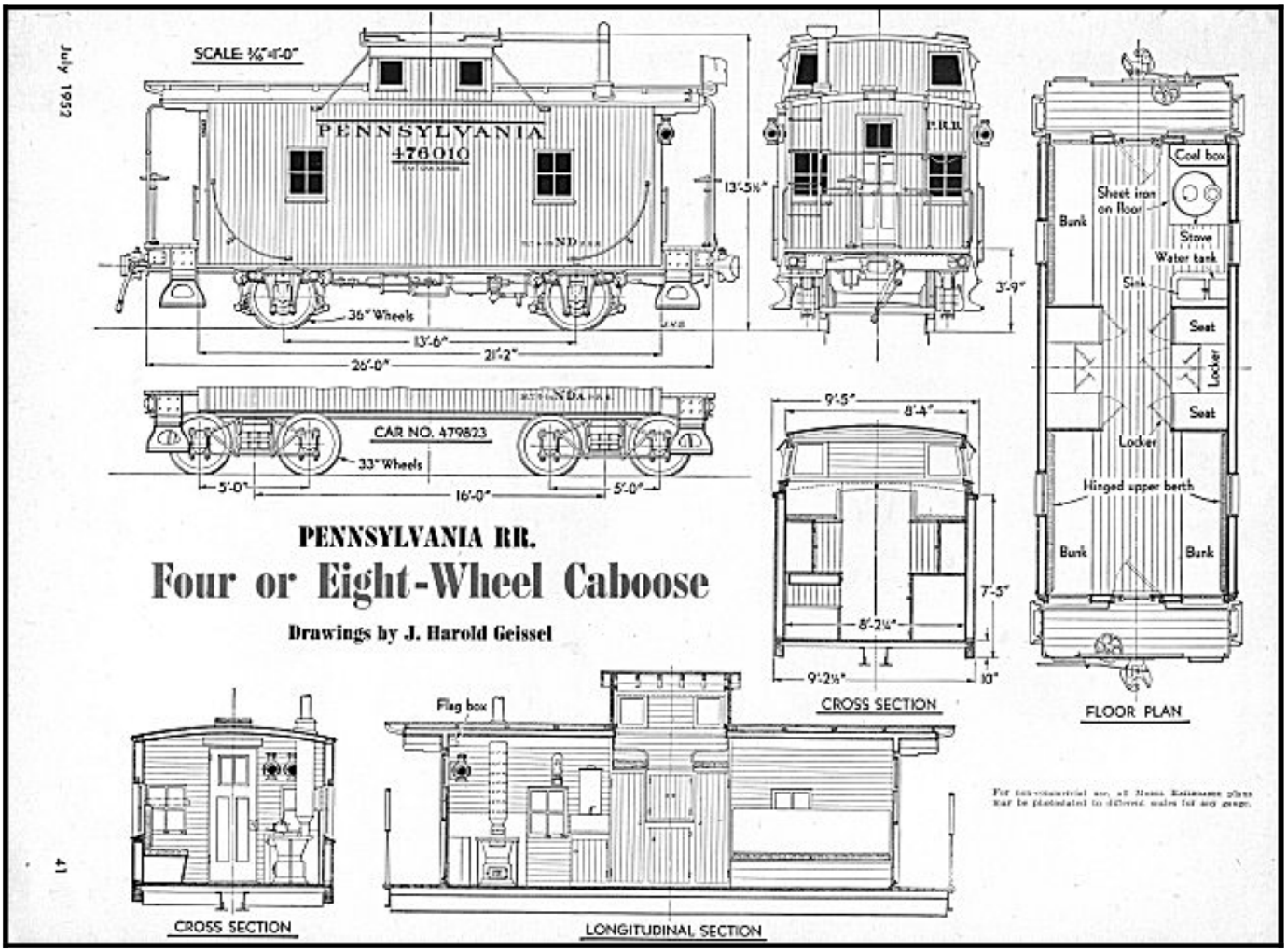
Now mask the body side and end windows with small pieces of cardstock. Cut a single rectangle that fits down into the full window opening, against the sash. Paint around the edges of the cardstock masks with a liquid masking fluid, such as Microscale's Micro Mask to seal them to the window frames to prevent paint from getting to the glass. Alternately you could just skip the cardstock and paint the liquid mask right onto the windows, but I found it gets behind the sashes and is a bear to remove. Although

it may seem premature, it is easiest to do this step now and it also protects the windows throughout the remainder of construction.

The Body

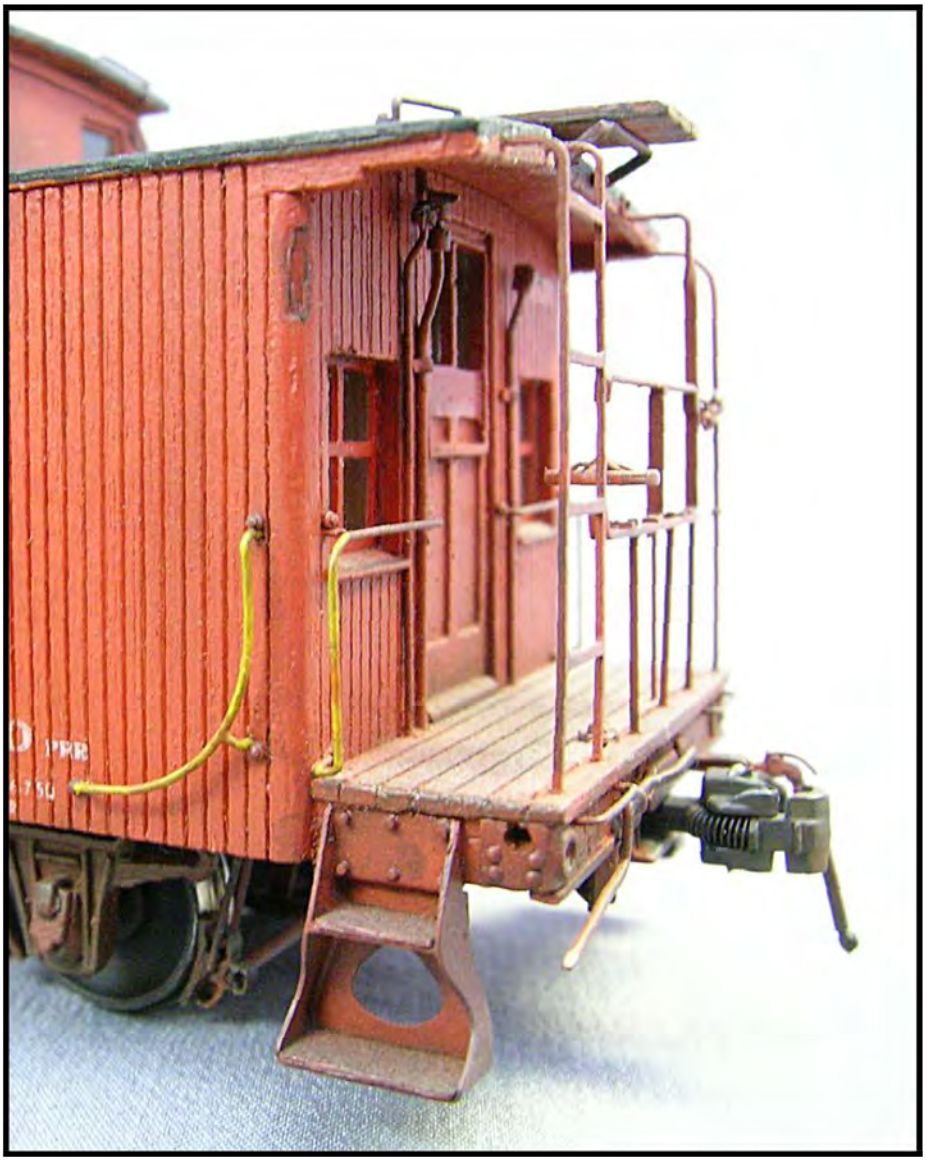
The kit body itself is well done and does not require much work. First scribe the inner floor piece to represent wood boards along the length of the floor. Next, build the basic box frame of the car per the kit instructions. Cut a hole in the inner roof piece for the cupola before assembling. For all the wood-to-wood joints I used white glue. Glue on the end sheets and the one side sheet closest to the stove. Paint the floor, the underside of the roof and the insides of the ends and sides buff color.

Prepare the bits and pieces to represent the interior furnishings of the car. They don't need to be highly detailed, just basically blocks the approximate size of the bunks, sink, coal box, seats and lockers such that they effectively block your view when looking through the car. To save a little work, use a commercial caboose stove casting, such as Grandt Line part #HO-7. Since the seats on top of the lockers are fairly visible through the cupola windows, add bent wire arms/railings along side the seats. Paint all these pieces as desired. Working through the one side still open, glue in all the interiors details: a step somewhat akin to building a ship in a bottle. Double check that you haven't forgotten anything and then glue on the second side sheet. Put masking tape over the roof opening to keep out unwanted debris until ready to add the roof sheet and cupola.



The corners of the ND body were constructed with a rounded corner post. Once the body box is dry, carefully sand the corners of the body to match photos. The cars had an attachment bracket for marker lamps up near the top of each corner post. They were a metal plate with a "T" slot cutout that was inset into the corner post over a recess cut into the post. This allowed the marker to be easily hooked onto the plate or removed. Sand a flat area into the corner posts where the plates should appear. When

thinking about how to simulate the "T" slot, memories of my childhood wood-burning set popped into my head. Take a small section of rectangular brass strip and file the very end of it into a "T" profile resembling slot in the photos. Lash this strip along side the tip of a small soldering iron with some (bare) wire, turn on the iron and burn the "T" slots into the flats on the corner posts. Cut a hole in the outer roof sheet for the cupola opening and then assemble it, the roof corner braces and the end platform deck sheets to the car per the instructions. I substituted wood strips for the soft metal end eave strips as it resulted in stronger glue joints. Add the mounting blocks for the ladders to the roof ends.



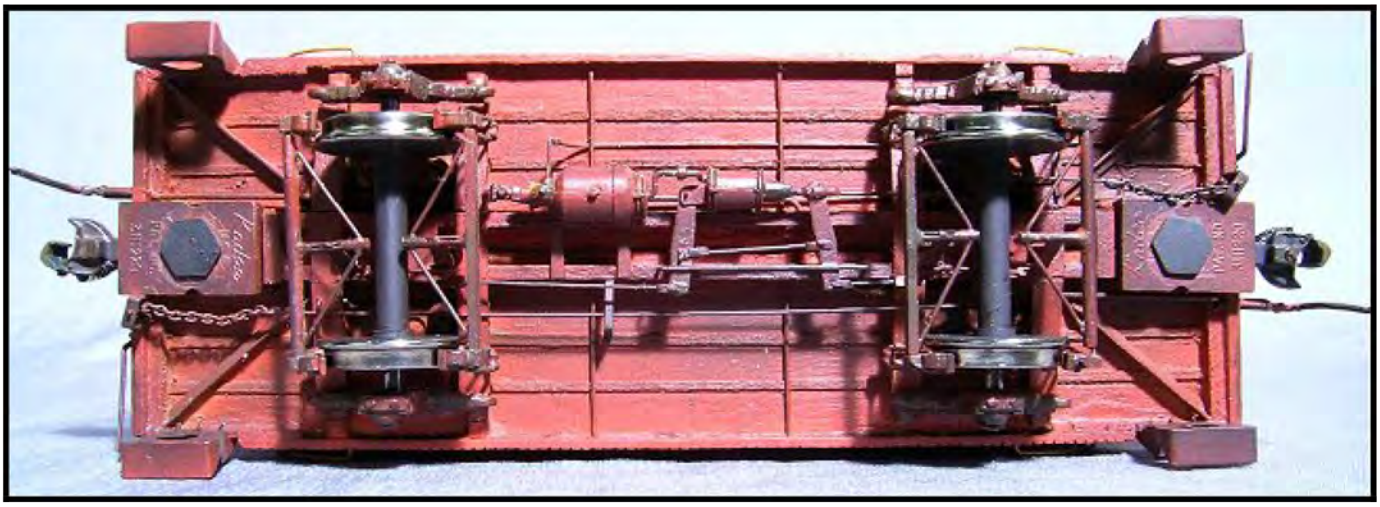
ND corner detail showing rounded posts, marker bracket slots, scratchbuilt steps and end details.

The Underframe

Assemble the underbody structural parts and air lines supplied per the instructions. I did not build the four axle pedestal support bolsters from wood as instructed because I wanted the pedestal attachment to be robust enough to endure running the model and to be able to allow for removal of the wheelsets, if necessary. Instead, I built four pedestal brackets from brass shapes. For each bracket cut two lengths of 1/16" square brass tube about .380" long and a piece of .015" thick sheet .200" wide by .400" long. Set the tubes parallel to each other on a flat surface with the plate lengthwise between them, flush with the tube ends and solder them all together. The tubes will represent the bolster members and the pedestals will be soldered to them for a strong joint. Drill two clearance holes in the plate for 0-80 screws. Place the brackets on the underframe with the plate inboard near the centersill and mark the locations of the two screw holes. Carefully drill and tap the wood floor for 0-80 screws and screw the brackets in place. Now locate and mark where the pedestals should be

located side to side on top of the brackets to properly accommodate your choice of wheels. I used ReBoxx narrow tread (.088") wheelsets. Note that the wheels are 36” diameter, not the standard 33” freight car wheels. Remove the brackets from the car and very carefully solder the pedestals to the brackets. This is most safely done with a low wattage iron: first tin the tubes at the mounting points, set the pedestals in place and then apply the heat to the brass tube and watch for the first sign of the pedestal/solder reflowing. Let cool and check the joint. They are soft metal and will melt if you are not careful, so better to err on the side of undercooking the joint and having to try again. Once all are successfully soldered, remount to the car and fill in beyond the ends of, and on top of the tubes with pieces of wood strip to make them look more like bolster beams. Apply two pieces of 1" x 3" wood strip lengthwise to the floor on each side of the centersill to represent the floor stringers. Add two .010" wires across the underframe to represent the body tie rods. Add the diagonal corner braces and mount KD #5 coupler boxes: shim as necessary to get them the correct height. I like to drill and tap the boss in the coupler lid for a 2-56 screw and then glue it to the car. To help hide the screws, I used screws with hex heads that I filed down until very thin.

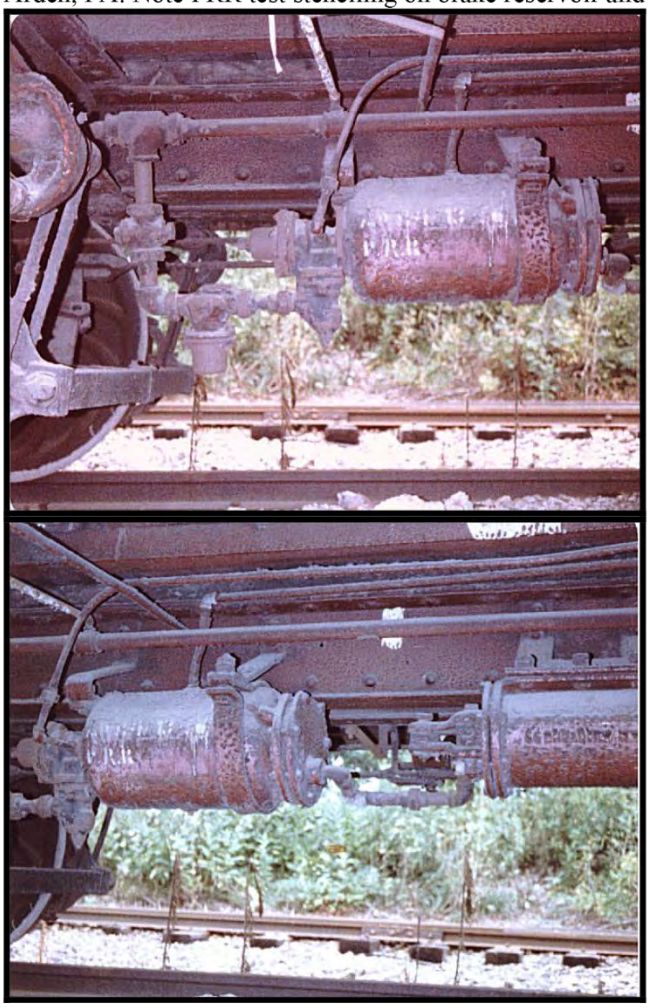
Alternately, if you are building an NDA, simply apply standard truck-type bolsters to the underframe spaced 15'-11¼" apart and drill and tap for your truck mounting screws. The trucks had 5'- 0" axle spacing and 33" wheels.

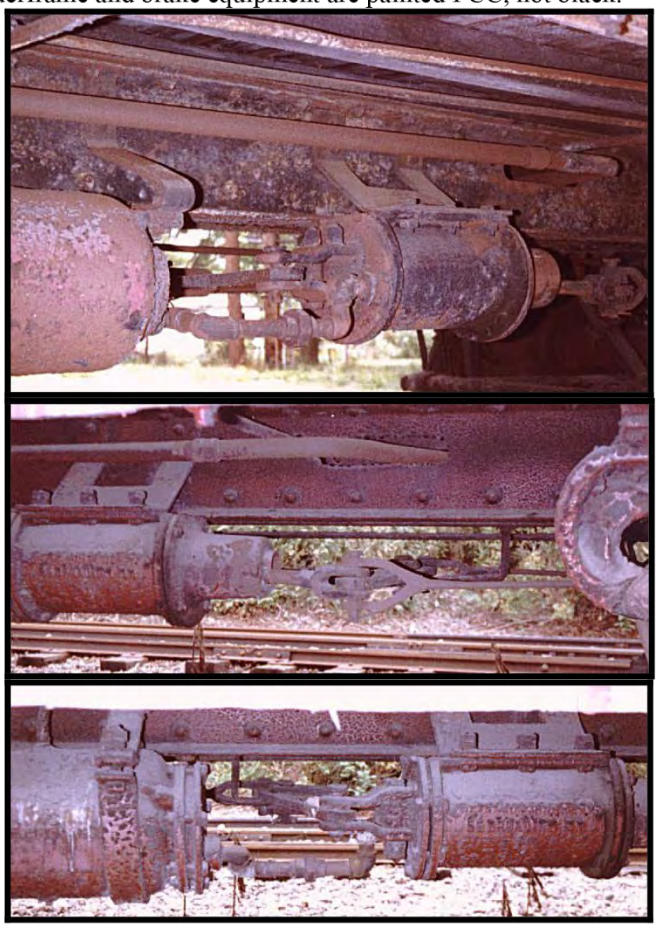


ND underframe view, front of car is to the right.

At this point you can choose to add as much or as little additional underbody detail as desired. Since I felt part of the interest of this car is the visible suspended brake equipment, I chose to put most of it on the car. Some of the prototype cars I photographed still had the older split K-type brake gear and others had the more modern AB gear. I liked the look of K-type, so that’s what I modeled. I used a Cal-Scale freight car “KC” airbrake set #AB-290 and cut apart the cylinder from the reservoir and valve. Assemble the components, air lines, levers and rods to the car as they appear in the photographs. The hand brake rods and chains from both ends of the car connect to a single lever under the front axle.

Then following photo sequence (five photos) of a K-type brake gear is from rear to front on left side of PRR ND 476199 at Arden, PA. Note PRR test stenciling on brake reservoir and that underframe and brake equipment are painted FCC, not black.



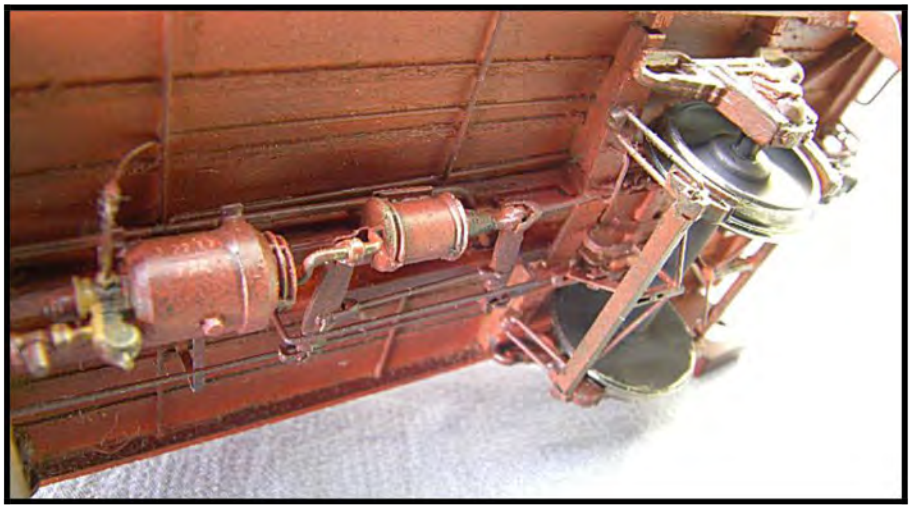


The following two photos are right side views of K-type brake gear on right side of PRR ND 492063 at Elizabeth, PA.

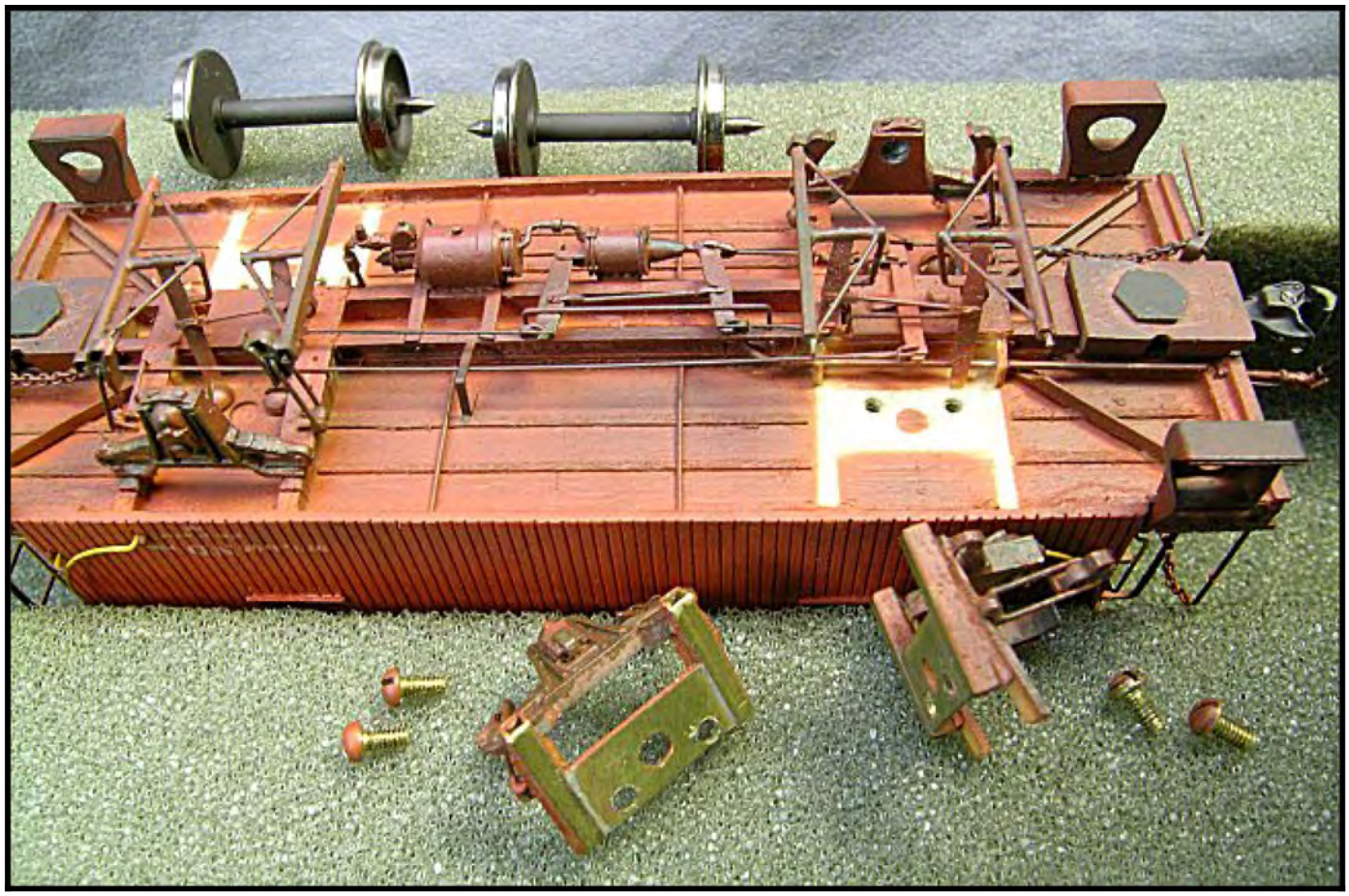
Recreating the brake beams and hangers was a little messy, since I wanted to be able to remove the wheel and pedestals, yet having everything connected as on the prototype. Since the real brake shoe hangers were dual rods, I threw away the single-support cast metal kit parts. Take Central Valley #524 plastic brake shoes and file off the excess bits of plastic until they resemble the shoes in the photos. For the hangers, bend pieces of .013" music wire into narrow "U" shapes and anchor them into holes drilled into the brake shoes. Wrap pieces of soft brass wire or strip around the top of "U" for the anchorage. Drill a hole through the pedestal support bracket tube, insert the ends of the anchorage wire, solder to the tube and file off any excess protruding through the tube. Position the brake shoes where you want them and solder the top of the "U" support wire to the anchorage to rigidly secure them.

View of ND axle pedestal, brake shoes and hangers on the Station Square car.

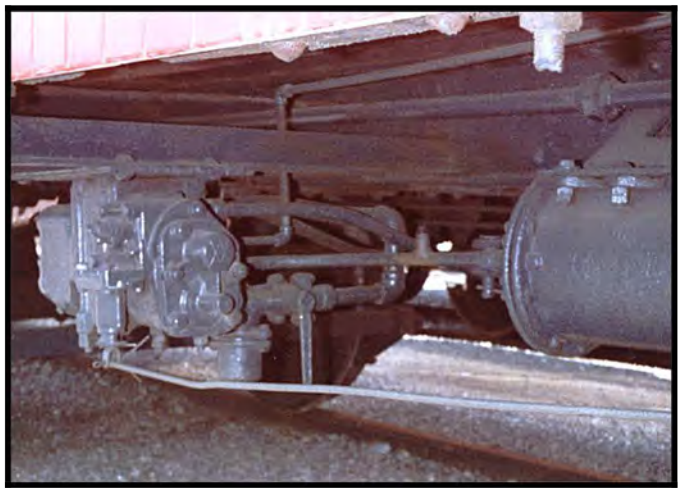
The two styles of brake beams in the photos appear to be either approximately 1.5" x 3" channels "C" or 2.5" diameter tubes "O". The four cars I noted had beam arrangements of O-C-C-O, C-O-O-C, O-C-C-C, C-C-O-C. Cut the beams from brass stock to length to fit between each pair of shoes. Form their triangular truss structure with .032" brass rod and .012" wire soldered together for strength. Saw a slot in the rods to accept the brake levers, prior to assembling. Bend the ends of the wire tension member to extend beyond the ends of beam, coaxial to its length. These extensions will telescope into the holes in the brake shoes without being glued and thereby keep the parts together, yet will remain the point of separation between the pedestals and the rigging permanently affixed to the car. For the channel section brake beams, the ends of these wires can sit inside the channel: for the rod style beams saw a slot near their ends to slip the wires into. Form the various other rods, clevises, levers, spring supports and links visible in the photographs from bits of brass and solder together. The "C" shaped spring supports are pieces of soft wire with a section flattened and bent into a "C" shape. The ends of these wires are glued into holes in the floor. The main idea is to have all this hardware remain firmly attached to the underbody when the pedestals are (very carefully) removed.

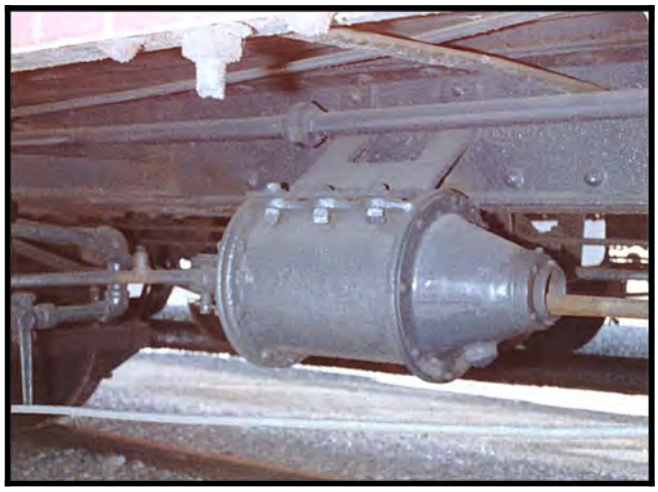


Right side view of underbody K-type air brake gear, pedestals and brake beam details.

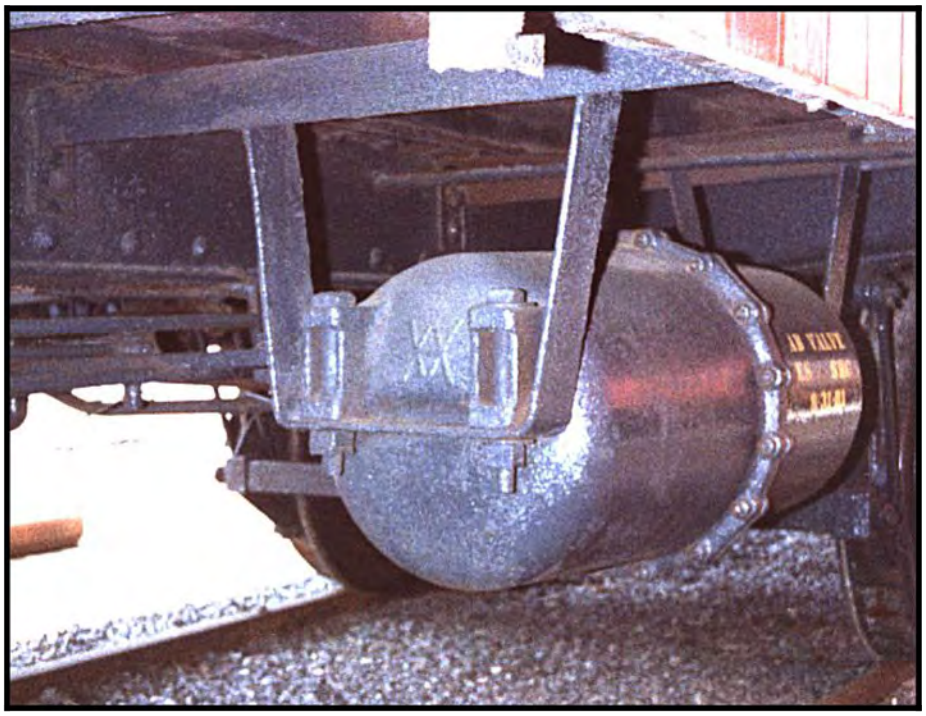


Full underbody view showing pedestal bracket assemblies removed. Pins on exposed ends of brake beams engage holes in the brake shoes when the pedestals are mounted. The brake lever under the front (right) axle joins the two hand brake chain/rods together and then connects via a third chain to the main brake lever.





Photos of AB-type brake gear on left side of Strasburg Railroad ND 10.

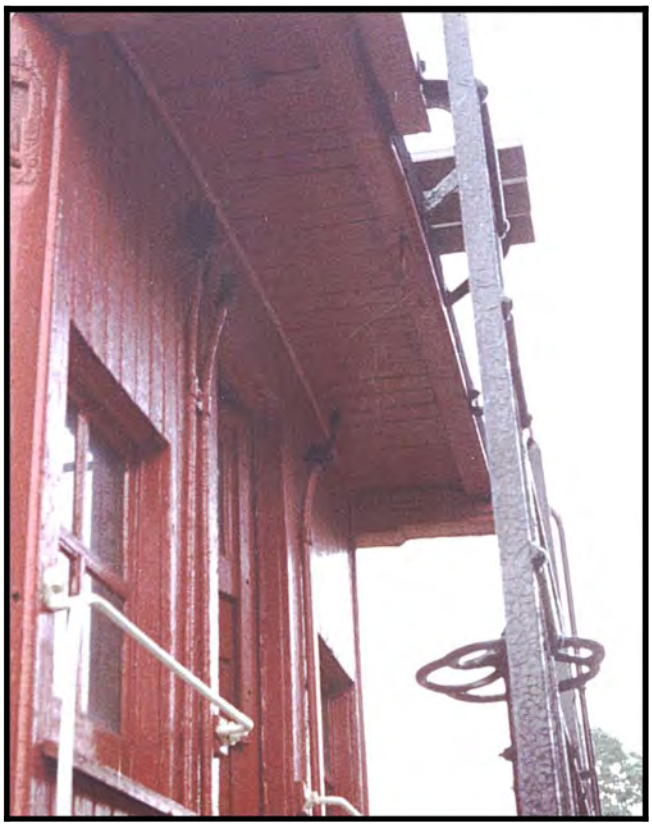


Right side view of SRC 10 showing AB-type brake reservoir.

Body Details

Now that the work on the underframe is complete, return to detailing the body of the car. I felt that the soft metal step castings also left something to be desired and so I built replacements from scratch. For each step cut out a back, an upper step and a wrap-around side/bottom piece from .010" brass sheet. The back piece needs to have a "Z" bend put into it where it mounts to the end platform side sills. Solder all these parts together and clean up any excess solder. Drill six holes in the upper section. Hold the steps in position on the side sill and drill through the six holes into the sill. On the ND the steps butt up against the end of the body, but for the NDA they are located out at the end of the sills. Drill similar holes in a scrap block of wood and cut six short sections of .012" wire and insert them through the holes in the steps and into the holes in the block. Carefully solder the wires to the step and clean up any excess solder. Trim the outside ends of the wires off with a cutoff wheel so they only protrude about .020" through the front side of the step. Push the pins into the holes drilled into the sills and glue the steps and pins to the sill. These "bolts" will help hold the vulnerable steps to the car. Finally, cut and glue pieces of 1" stripwood for treads onto the top and bottom steps.

Glue on the end sills and notch to fit around your coupler box. Add the corner brace/poling pocket castings, straight grab irons, Carmer cut levers and air hoses if desired. At this point, add the details to the car ends while they are still easily accessible. Drill three holes for each grab iron. Form the curved-corner "L" grabs and apply. Insert a separate short piece for the middle support into its hole and solder or glue to the main grab. Drill and insert nut/bolt/washer castings at each attachment point. Bend and apply wires and use commercial or scratch-built pieces for the various valves mounted against the end walls on both sides of the door.



Front end view of 492063 showing valves and under-eave grab iron.

Rear end view of SRC 10 showing valves and under-eave grab iron.

The end railing assemblies on the car like many other details are quite delicate if made accurately to scale and could be easily damaged. I chose to fabricate all the component parts from brass and solder them together to maximize their robustness. For additional strength, all the parts that attach to either the platform floor or the roof end are mounted in holes drilled into the wood parts. If you build them in place, these points of attachment help to hold the parts while you solder them together. Use ladder stock, chain, wire and rectangular strips where appropriate to fabricate the components. Drill holes in the lower horizontal railing to engage the vertical round posts. Use a brass brake wheel and solder it to the vertical staff. Fabricate the hand valve and its feed pipe from small pieces of wire and strip. Once you complete soldering together the approximately 19 parts, clean up all the excess solder from the joints with a #11 hobby blade and small files.


ND end details including railing supports and hand valve: Station Square car top, Arden car bottom.

Model rear end. The end railing configuration revisions were begun by 1946, adding the upper horizontal railing.

Roof Details

Next assemble the cupola. Clean up the metal castings for the sides and ends and test fit to the roof, filing the bottoms of the parts as necessary for a good fit. Glue the parts together and when dry, glue on the cupola roof. Apply 4' wide strips of a single ply of facial tissue (or your favorite material to represent canvas roofing) to the cupola roof, making the joints overlap from the center outwards towards the sides. Form the four cupola roof corner three-legged grab irons from wire, drill the roof and glue in place. Also drill for and add small nut/bolt/washer castings at each grab iron attachment point. Attach 1" x 10" wood strips as sunshades on each side to the brackets cast into the sides above the windows. Drill holes now for the .010" bracing rods and smoke jack support. Mask the window openings from the inside and then paint the exterior sides and ends FCC. When dry, hand-paint the roof black, I used Engine black, cut with a little white. Weather the cupola window frames. Cut out window glazing to fit and apply. Hand paint over the excess glass and the rest of the interior your buff color and set aside. Painting this in its entirety now avoids difficult masking problems later. Similar to the body windows, mask over the glass. Since there are no muttons or mullions in these windows, you can either use the cardstock pieces or simply just apply the liquid masking fluid directly to the glass. Glue the cupola to the roof.

ND cupola detail showing braces, sunshades and grabs.

Similar to the cupola roof, apply the simulated canvas roofing to the main roof and paint black by hand. Cut the roof walks from the wood provided and glue wood strips to their undersides as instructed. Once dry, sand the supports to match the roof contour such that the roof walks sit properly. Paint the roof walks FCC and, when dry, glue in place. Add supports bent from flat strip underneath the overhanging ends of the roof walks. Apply a grab iron with nut/bolt/washer castings to each end of the roof above the ladders. For the cupola brace rods, flatten the ends of .015" pieces of wire and make the compound bend where they reach around the roof edge overhang to sit flat against the body sides. Cut to length and insert into the predrilled holes in the cupola. Clean up the smoke jack casting and thin the rain hood as much as possible. Drill a small hole in one side of the pipe just below the hood. Drill a mounting hole partially through the main roof. As you insert the casting into the roof hole insert a length of .008" wire into the holes in the cupola and the pipe for the smoke jack support and glue both parts in place. Hand paint the smoke jack, support wire and roof grabs black and the cupola braces and roof walk support braces FCC.

ND 492063 showing cupola sunshades and supports, braces and corner marker brackets.

.D roof details

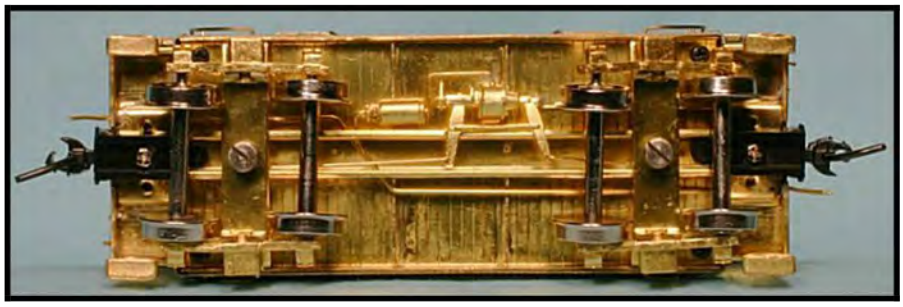
ND 475849 assigned to the Eastern Region with unmodified end railings sits at Clearfield, PA on July 25, 1946. PRRT&HS Collection.

ND wood kit with upgraded detail parts.

Class ND HO brass model imported by The Brass Works, circa 1998. Shortcomings of this model include: minimal underbody detail, undersize end steps, incorrectly shaped cupola braces and eave supports, missing center supports on curved grab irons, lack of rounded corner posts, insufficiently deep window recesses and non-sloping window bottom sills. Gary Mittner photo.

Class NDA HO model conversion from the Gloor Craft ND kit. Gary built this about 15 years ago using the stock white metal detail parts. Note that not as much underbody detail shows on this class with the trucks and tool box still in place. On the prototypes, the tool boxes started to be removed in 1931. Gary Mittner model and photo.

Class NDA Railworks HO brass model. Shortcomings of this model include: main roof profile with too much curvature, missing center supports on cupola grab irons, undersize end steps and non-sloping window bottom sills. The need to move out the end steps to accommodate the trucks on the prototype is obvious in this broadside view. Bruce Smith photo.



Class NDA Railworks HO brass model underbody view. Bruce Smith photo

Finishing

With construction complete, the remaining areas of the car can be finished. Mask off the entire roof and cupola area. Remove the wheelsets and couplers, but replace the pedestals and coupler boxes on the car for painting. Spray the car body, ends and underframe with your favorite mixture of PRR Freight Car Color. For this car I used a base of Floquil Zinc Chromate Primer with a light overspray of faded Caboose Red. I prefer to use flat finish paints for models with so much open and intricate detail – it avoids having to cover the gloss later with flat finish. Paint the wheelsets and couplers separately your favorite dirty, rusty colors. Hand paint the curved side grabs and the vertical portions of the "L"-shaped end grabs chrome yellow: I used Floquil Reefer Yellow cut with a little white for a faded appearance. (The PRR started this practice in January, 1949.) Spray clear gloss just over the areas of the car sides where the lettering will be applied. Brush paint gloss on a small area of the centersill where the road number will be located. You can now remove the masking covering the roof and cupola. If necessary, the black edge of the roof canvas can be touched up by hand and it won't show due to the roughness of its surface.

To be period appropriate, only the curved side grabs and vertical end grabs were painted yellow; reporting marks without the car number were applied to the ends.

The best choice of decals is the Middle Division ball keystone set #HCA-2 that has everything you need included. Prior to their availability, I pieced mine from parts of several Champ sets, having to spell out "CENTRAL REGION" from individual letters. End numbers on the cars were removed in 1930. After applying the decals over the sheathing with setting solution, let dry. Using a sharp knife, slice through any decal film bridging the board joints and reapply setting solution until they conform to the sheathing.

Weather the car with your favorite combination of techniques, except that you SHOULDN'T use any sort of liquid washes, as they can either cause the wood to swell, dissolve the glue and/or find their way inside the car or around the window masks. I used mostly weathering chalks along with some localized applications of colored pencils and paint to get specific areas of rust, dirt and grime. Stains emanating from the corners of the windows were common. Overspray with flat finish to seal the decals and weathering. Now carefully remove the window

masks. Hopefully your earlier applications of paint and weathering to the windows and cupola now match the body. Reinstall the wheelsets and couplers and tell your scale crews to hang on, its going to be a bumpy ride!

Gloor Craft NDA bringing up the markers. Gary Mittner model and photo.

Class ND 476042 at New Egypt, NJ on Union Transportation Company track, November 4, 1952. This photo was taken by John Dziobko, Jr. and is just one of 300 of his color photographs taken during the 1950s that will be featured in the Society's new book – *The Pennsy in the 1950s – The Last Great Decade*, which will also feature an historical overview of the PRR by Chris Baer. The book will be offered for sale during the 2006 annual meting at Camp Hill. See ad elsewhere.

References

- *The Keystone,* December 1973, page 3; article, diagram and photographs.
- *The Keystone,* December 1974, page 3; painting and lettering article, diagram.
- *The Keystone,* December 1972, page 13; window drawing (N6B model review).
- *Cabin Cars of the Pennsylvania and Long Island Railroads.* N.J. International, Inc., ND photos.
- *PRR Color Guide to Freight and Passenger Equipment Vol 1,* Morning Sun Books, Inc., page 96, photo NDA 479815.

Modeling the Pennsylvania Railroad's Gondola Fleet

Part 18-2 – The G28 Class Gondola Variants

by Jack Consoli

All photos by author unless others specified.

The basic as-built, open top steel G28 with wood floor and drop ends was covered in the previous installment of this series in *TKM* issue 53, December 2007. This month covers three of the later, modified versions of this car.

Since writing the first installment of this article, I found the tracing for the G28 car details and it cleared up some confusion on a couple points raised in that article. First, the tracing noted that as of November 27, 1940, the corner step arrangement had been changed from all four rectangular style steps, to replace the two at the "B" end of the car (with the deeper end sill) with the angled style steps to provide clearance for the journal box lids on curves. This explains the differences seen in the prototype photographs. Second, another changed was noted that the cut-out in the flange of the corner posts was removed October 31, 1940. The PRR photo of G28 342600 shown new in October 1940 shows a car built just before this change with the cut-outs in the corner posts. Since the 1900 G28 were constructed between October 1940 and May 1941, most would seemed to have had these changes incorporated when new.

Modeling the "Covered" G28

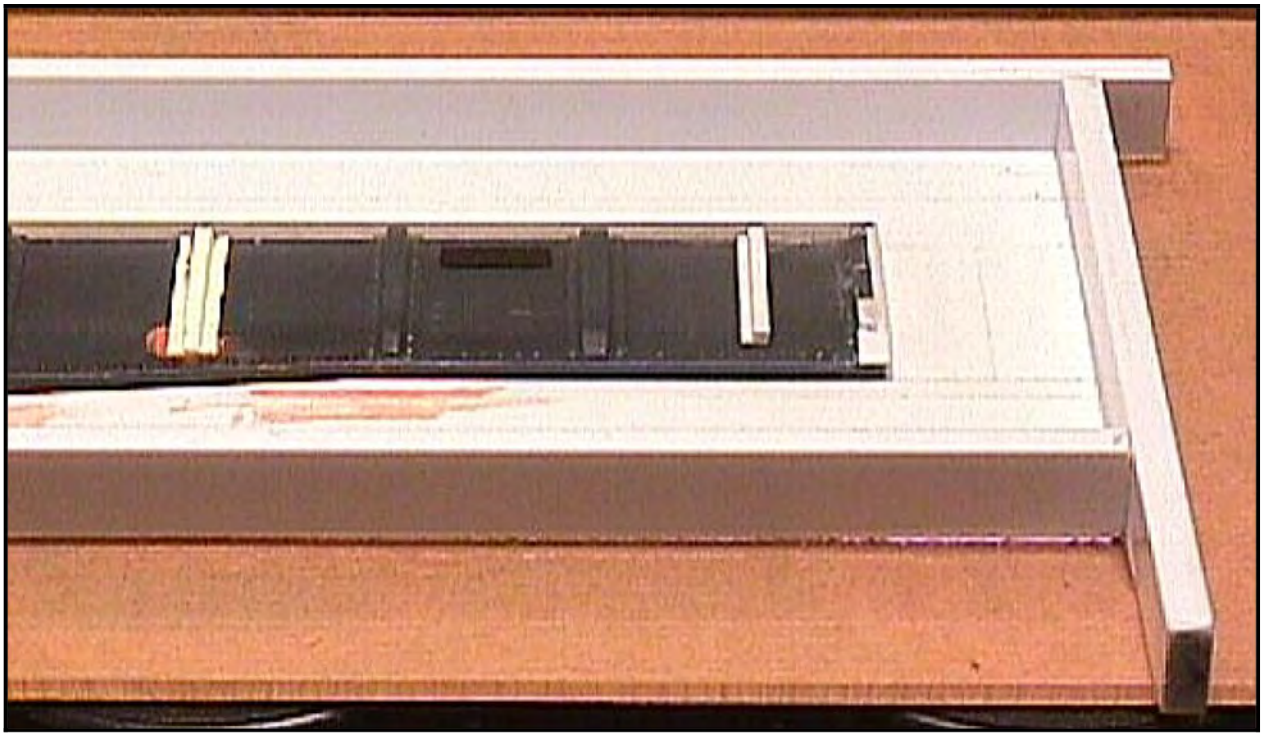
Kitbashed/cloned plastic G28 experimental car with three-piece removable roof.

One drawback to modeling the early 1950's for the gondola aficionado is that most all those interesting covered car variants came along later in the equipment development timeline. The lone covered G28 converted in early 1953 was one of only three cars even close to being appropriate in my modeling time period. With the desire to build this covered G28, as well as more than one regular G28, and not being a complete glutton for punishment, I decided to clone the side of the first car constructed to reduce the work required. This course of action was decided before even starting the initial project detailed in the first installment.

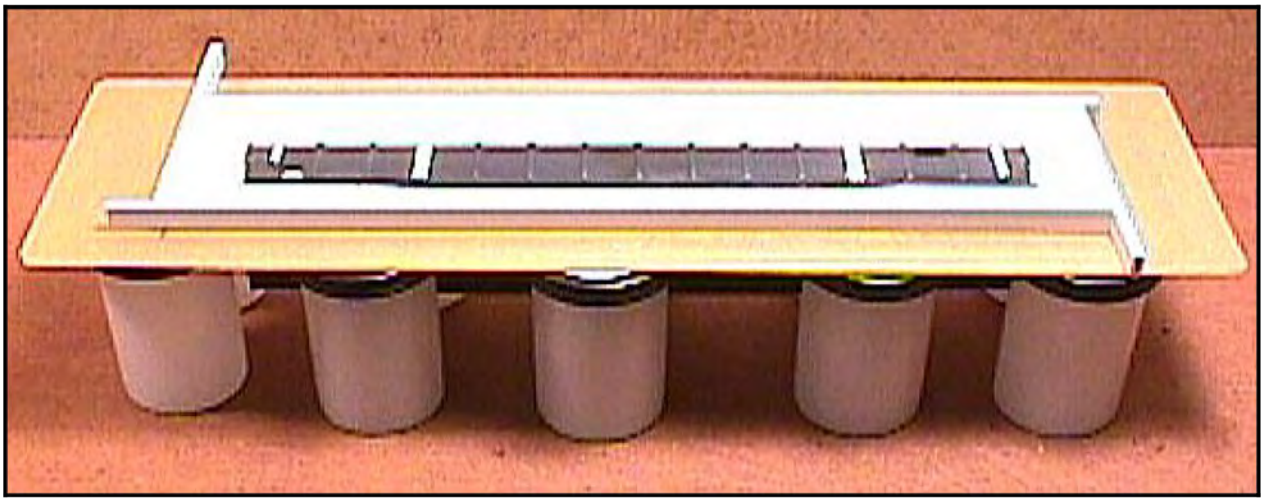
Cloning

Cloning, as I refer to it, is simply the process of making a silicone rubber mold of the item or pattern desired to be duplicated, and then casting clones of it in two-part resin material. This is the same basic process the commercial Resin Kit manufacturers use to produce their product, except on a "kitchen table" scale.

One trick for saving yourself work in this process is choosing the correct moment to clone the pattern i.e., when as much detail as possible has been added to the master that doesn't inhibit your ability to remove the parts from the mold. This way, you have the least amount of work to build the clone models later. For the G28 this point was after I had: modified the fishbelly contour, corner posts and top bulb angle; replaced the rivets, two side ribs and tack boards; added the Trust plates and ladder stiles. An additional help when cloning is to make small center punch impressions in the ladder stiles and corner posts where the holes will later be drilled for the grab irons so you only have to spend the time locating them once. Although trying to build a mold using the car side while still attached to the rest of the car isn't ideal, it was still less difficult than building the car side separately in this particular case. Basically, I built a styrene open-top box around the car side. The mold pieces were glued to the model with glue I could remove later since I wanted to use the master as the first model – so I used white glue. Small holes resulting from building the box around the car can be filled with modeling clay to prevent the mold rubber from leaking out. Since these molds would only be used to make a few parts I didn't go to great lengths to make them high-volume production capable. In fact, for the narrow rib mold shown in the previous installment, I simply encircled a suitable rib on a stock Con-Cor body with a rope of modeling clay – just enough to contain sufficient silicone rubber to cover the rib "pattern".



Detail of pattern in the mold frame. A plastic sheet was slotted to fit inside the car so as to end up flush with the inside back of the car side. The surrounding fence contains the rubber during curing and dictates the thickness of the mold.



Completed car side mold frame ready for pouring the silicone. (The film canisters were used to support the plate around the rest of the car protruding out the bottom of the mold.)

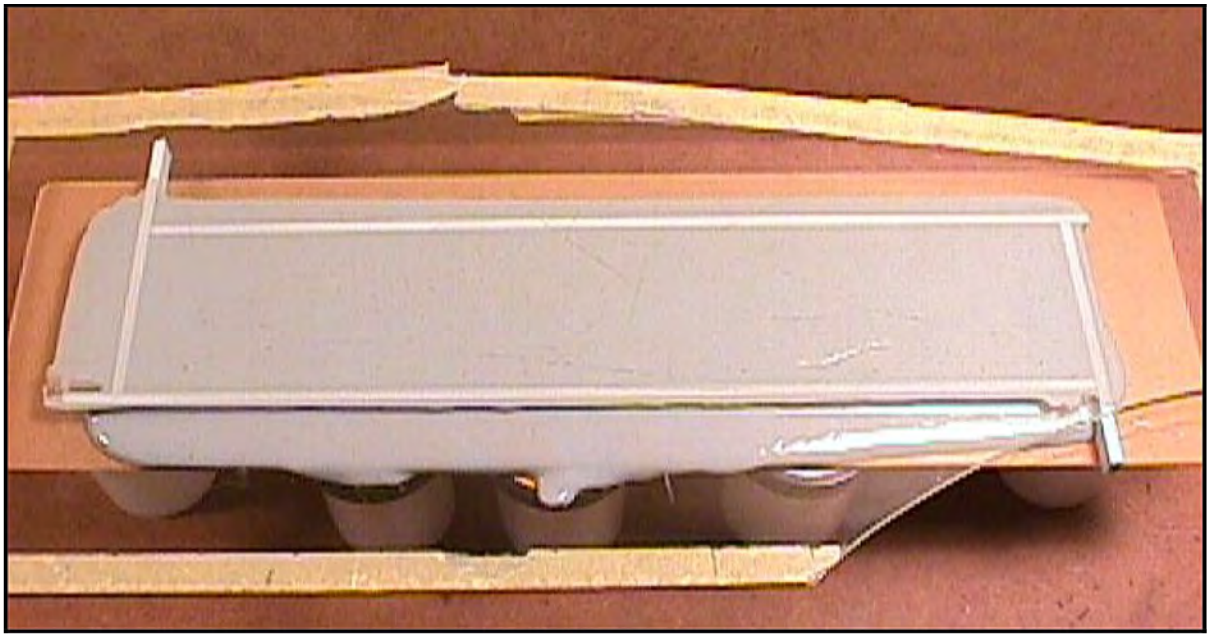
Once the mold frame is constructed, you are ready to pour the mold itself. For all-plastic construction such as this, I have not found the need to use a mold release agent on the patterns, whereas for deeper sections and other materials, this may not be the case. I do however; dust a coat of graphite on any modeling clay that will be exposed to the rubber as the two tend to stick to each other. Although they may not be the ideal choice, I currently just use the mold making and casting materials available through Micro-Mark as they are convenient to acquire. They usually come with helpful detailed instructions to guide you through the process, so read and follow them. The most critical step I have found is pouring the rubber into the frame and avoiding trapping air bubbles in the process.

To this end, I made a simple (and cheap) vacuum chamber from: a thick sheet of Plexiglas for the base, a Pyrex baking dish for the cover, some of the mold-making rubber for a gasket, some tubing, the vacuum gage from an automotive brake line tool and a compressor from a discarded dehumidifier unit. I first routed a channel into the Plexiglas sheet and filled it with the mold rubber. Using some blocks, suspend the inverted glass dish so that it sits partway into the uncured rubber. Once dry, pull the dish out and you

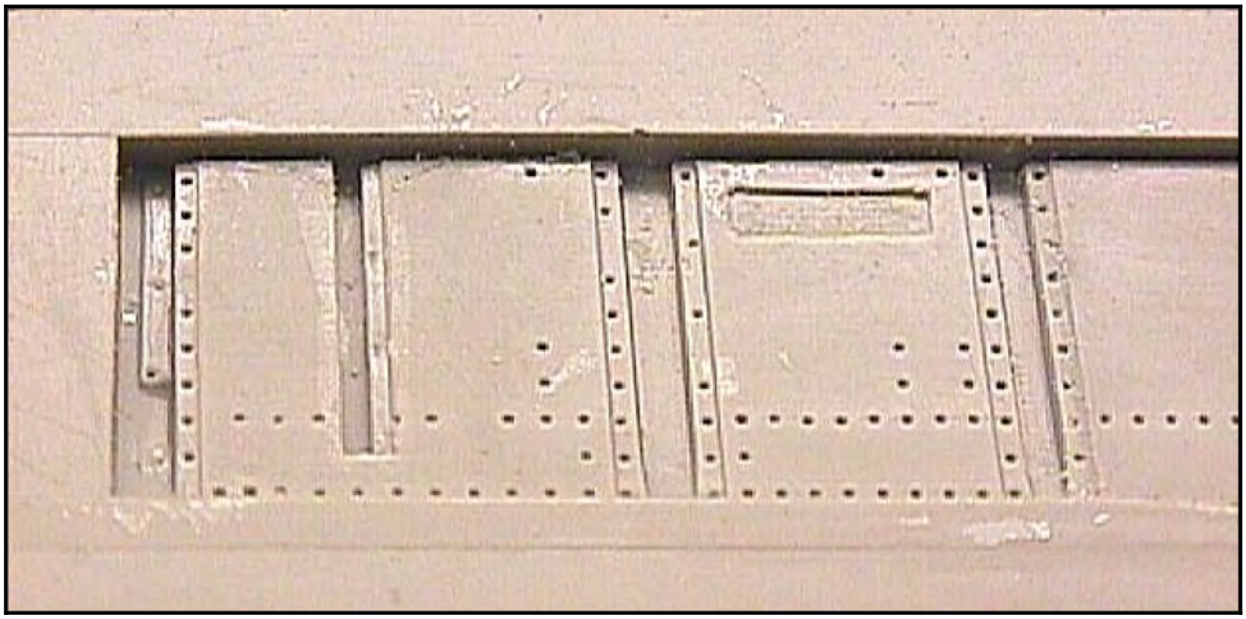
have a custom fit, airtight gasket for your chamber. I used the Pyrex dish as it is very thick walled and strong to resist the considerable amount of air pressure that it must support, it was cheap and easy to find and it is transparent so that you can actually see what is happening inside while you work. (I would hesitate to use a larger dish as all that much more pressure must be supported over a larger span.) Other than the one I dropped on the floor, I have not had any trouble in years of use. Drill and tap a hole into the Plexiglas base for an appropriate size hose fitting for the vacuum line into the chamber.

Homemade vacuum chamber and pump setup. Automotive brake line vacuum tool provides the vacuum gage and release valve. The coffee can (stuffed with old stockings) on the compressor output line acts as a muffler of sorts and collects any oil blown out the line.

For the vacuum pump, if you find an old dehumidifier, air conditioner or refrigerator that has already lost its refrigerant charge, you can simply cut the compressor input and output copper lines with a hacksaw and connect up a 110V cord and plug, following appropriate safe electrical practices. If the refrigerant is still present you need to have it disposed of it in the proper environmentally friendly manner. The pump is meant to compress the refrigerant at its output, but the useful consequence of this is that it tries to pull a vacuum on the input line. So you just basically run a hose from this input line to a hose fitting in the chamber. No, the pump is not intended to operate in "reverse" so to speak, nor is it recommended to operate without the lubrication of the refrigerant running through it: consequently you will reduce the "life" of the compressor. But these are not real concerns as you will actually run it for precious few minutes per year and even at that, if it does die prematurely, you took it out of the trash to start with anyway. The automotive brake line tool is handy for two reasons: it incorporates a vacuum gage as well as a pressure relieving button. (I originally attempted to hand pump the vacuum chamber with this tool, but that effort was futile.) You will find that you can't draw a complete vacuum with this arrangement, maybe -13 to -14 psi, but that is still quite helpful here and it works quickly. I hooked the brake tool into the main vacuum line with a tee connector. Whether you have the gage or not you MUST provide some way to release the vacuum by essentially opening the line, or you (and all your friends combined) will never be able to pull the cover off the chamber while still under vacuum. I have the pump plugged into a switched outlet on the workbench so that I can control the vacuum instantaneously while watching the gage. Sometimes when evacuating the rubber prior to pouring, for example, applying the full vacuum too fast will cause all the air bubbles in the rubber to expand too rapidly and in effect, suddenly boil up out of the container. The bottom line here is that although it isn't perfect, using the vacuum chamber on the mold and casting materials both before pouring and then again once they have been poured, does help avoid bubbles in the final parts. The other alternative is simply to go out and buy a commercial vacuum pump and/or chamber, if that is better for you.



The two-part silicone rubber has been de-aired and then poured into the frame over the pattern. I run the tip of a toothpick around all the internal corners of the pattern to help release bubbles that tend to stick there. A sheet of glass is then slowly pressed down in a rolling motion until it sits on the mold frame fence, thus squeezing off the excess rubber. This yields a flat-backed mold, necessary to get a flat casting. The overflow is peeled away after curing.



Detail view of the completed mold cavity. Silicone rubber is amazing stuff and will reproduce every detail on your pattern, good or bad, from the raised lettering on the Trust plate to the minor crazing of the side sheet surface where solvent cement was used to assemble the ladder stile.

When the mold is ready to use, I place it on a flat piece of wood or Plexiglas just slightly larger than the mold (it has to fit into the vacuum chamber). I like to mix the two part resin in a small paper cup and place this in the vacuum chamber to de-air it prior to pouring. Pour the resin into the mold such that there is some excess. I again gently run the tip of a toothpick around the inside corners of the mold to help release the bubbles. I then place the mold into the vacuum and de-air it also. It is not mandatory to get rid of every single air bubble in the resin; you just need to get them off the surface of the mold faces. Remove the mold, place it on a flat surface covered in newspaper and press a flat cover sheet down onto the mold, rolling it from one edge across the part to squeegee away the excess material. I use a thin flat sheet of silicone sitting on a flat block. I then place a weight onto the top block to insure things stay flat during cure. This pouring process can be somewhat hectic depending on the pot life of the resin you have chosen, so work quickly. Let the resin cure as per the instructions. Remove the top flat block then peel away the

silicone cover sheet. Pull the mold off the flat base and peel the mold back away from the cured part. The flexibility of the rubber allows you to remove even some features with undercuts.

Cloned G28 sides. Without an industrial strength vacuum pump, air bubbles are always a concern. However, as long as they can be "released" from the critical outside surfaces of the part they will only cause voids in the back of the part that can later be filled with putty.

The Prototype

June 1953 PRR photo of recently converted G28 343338 (originally built 2-41) shows three-piece removable roof and the modified, fixed end details. Note that it appears that the galvanized roof panels and lift lugs are unpainted, while the running boards and supports, stacking spacer tubes and guide pin tubes were painted red.

A broader overview of the development of covered gondolas on the PRR is required to understand the history of this unique car and its significant role in the evolution. One specific example of the growing impetus for this development in the railroad industry in general was a meeting called by a Traffic manager of Inland Steel Company in May 1951. The purpose was for discussing having gondola cars designed with removable covers to protect freight requiring protection from the weather that was normally loaded by crane at the steel mills. It was noted that much of this traffic was being handled by trucks at the time, not necessarily because of lower shipping rates, but due to lack of appropriate railroad equipment. Railroads were in fact considered to be better suited to handling this traffic due to considerations of the weight of the material, shipment sizes and available loading facilities. These products included coils, bundled plates and sheets.

About that same time, the PRR started development of cars that might meet these needs of the steel industry. Studies were made of three approaches: detachable covers, hinged covers and telescopic covers that rolled along the car. Plans were

set forth in August 1951 to build one car with sliding covers followed in February 1952 by a plan for one car with removable covers. Both experimental cars were rolled out October 3rd, 1952 with Altoona-fabricated roofs. G27 346859 had a two-piece telescoping roof that was rolled by means of rack and pinion gears and G27 348986 had a three-piece removable roof. Both cars had their original drop-style ends fixed and retained their steel floors. A photograph of #348986 appeared in the G27 article in TKM issue #10, May 2004. They did not come up with a suitable concept for a car with hinged covers: hinges along the outside of the car seemed unworkable and centered hinged concepts were messy due to the need for running boards (roofwalks). [The I.C.C. had ruled a gondola with a rigid cover that a man might be likely to walk across was, in effect, a house car (boxcar) and thus required appropriate safety appliances.]

Meanwhile in August 1952 work on a third experimental covered car began. Wood-floor G28 343338 was selected to be modified with fixed ends to receive a three-piece removable roof. Unlike G27 348986, this car was to incorporate a roof built by the Standard Railway Equipment Co. utilizing their stock, raised diagonal panel roof sections.

Careful watch was kept of the pair of G27's as they entered service with repeated inspections, maintenance and consultations with shippers and consignees. In December 1952 wood floors were applied to both G27's at the request of the shippers to avoid having to crib the steel floor to allow for nailing in guide strips for each load. Development of the cars was enthusiastically supported by the parties in the steel industry using them as they provided a potential solution for a desired service. However, both had inherent problems and in the end, were not favorably received. The sliding covers on 346859 were hard to move and were constantly binding, the tracks filled with ice and snow in the winter, the large vertical gap in the running board between the sections was considered to be a hazard, the telescoping arrangement was not particularly weather-tight, the operating mechanism in the center of the car was somewhat awkward to use and interfered with plate loading. Also, since only one half the car could be open at a time, the blocking and loading forces of the shipper would have to make two passes nailing guide strips into the cars and then loading them with the covers first rolled to one end, then the other. In August 1955 the order was given to de-equip the car and return it to regular service citing: "In view of the heavy maintenance expense of this car since it was first equipped, together with its limited usefulness and acceptance by shippers and receivers, we have no objection to its removal from service."

In December of the same year the recommendation was made to scrap the Altoona-built, smooth profile, three-piece removable roof of 348986, noting that its construction was too light and flimsy and continually required repair and was thus proven not very satisfactory. Further, it was recommended to replace it with a roof from Stanray similar to the one on the G28 which was noted to have not required any repair in its 2½ years of service. (It is unclear to the author if this replacement ever actually happened.) Complaints from the customers about this car included: a lack of room at the loading/unloading facilities needed to place the covers on the ground; too much valuable crane time was required to remove and replace covers; the lift eyes should be replaced with hooks to allow use of the same wire rope slings used on the lading; the roof lap joints should be changed such that the two end sections lifted off first instead of the center as many loads were concentrated over the trucks and did not necessarily require the center section to be removed at all. In spite of these drawbacks, the removable roof car was deemed the more desirable of the two designs on account of its simplicity.

Throughout this period neither the railroad nor the steel industry were totally yet convinced that permanently equipped, dedicated service cars were the best solution for this shipping need. During this time parallel investigations were made into the suitability of: disposable plastic or treated Kraft paper covers; reusable covers made of supported and/or unsupported plastic sheet, canvas or synthetic tarpaulins, fiberglass covers and hinged covers. None were particularly successful for a variety of reasons.

The conversion of G28 343338 was completed and it entered service April 16, 1953 with its removable covers. Stanray had built the roof itself and shipped it to Altoona where it was fitted to the car and the running boards were applied. The Altoona Works was also instructed to spray the inside of the covers with "Insulmat" since there had been no complaints of sweating on the G27's since its application to those covers. During construction of the roof it was determined that the two end sections could be interchangeable except that the striker projections on the end sills of the car were different. Since the striker locations governed the running board overhang, the two ends needed to be different. To prevent improper installation on the car, the guide pins on the end sections were placed on different spacings. The G28 Stanray covers cost $1800. The

car was not reclassified by the PRR, but its A.A.R. "GB" designation was changed to "GBR", the "R" indicating it was equipped with a roof.

In the process of fixing the ends on the G28, new end sheets were applied along with a power wheel handbrake and the brake platform was moved. New safety appliances were added to the car including end grabs and ladders. Since the car could operate as either an open top gondola or (effectively) as a box car, the ladders had to be in effect "convertible". Per the regulations, open top cars required the top rung very close to the top of the car (I.C.C. Plate E); whereas a house car required a larger distance below the lateral running board grab iron to the uppermost ladder rung (Plate C). The solution was to build a shroud onto the corners of the covers that overhung the top rung on the end and side ladders, resulting in the proper distance between the uppermost (actually the second) rung and the running board grab. When the roof was not present, the uppermost grabs were exposed and met the open top car requirements. To accomplish this, the original four-rung side ladders were reconfigured with five rungs. An additional end detail was that they built extra overhang into the ends of the covers as it was noted that there were "no locking devices on end bulb angles and no need for close clearances. Gondola ends can bend outward several inches without causing any trouble."

It was envisioned by the designers that when the roof sections were removed from the car they could be stacked either on the ground or on one end of the car, if space was limited. The inherent angled shape of the roof sections with the raised running boards however, made them likely to tip when stacked. The original design concept from Stanray incorporated two 3" channels, 11' long, mounted open-end down under each roof section, 12" in from the outside for use in stacking. The PRR insisted the design be changed because with the roof sections in place, the channels would have extended 6" below top of the car and would thus interfere with the lading if the car was loaded level with the sides. It is the author's belief that the order to retract these channels up under the roof necessitated adding the raised support tubes on top of the roof sections to mate with the channels to prevent tipping.

A second PRR photo of #343338 shows how the center section of the 3-piece Stanray roof overlapped the two end sections with an arrangement similar to that used between panels on standing–seam metal roofing. Four locking guide pins per section protruded up along the top chord of the car and four flat metal eyes on each section were the attachment points for the lifting sling. Raised longitudinal tubes were incorporated on both sides of each roof section to prevent tipping of the sections when stacked during loading/unloading.

In its first 13 months of testing G28 343338 carried 13 loads, 11 of which went from Allegheny Ludlum Steel Corp.'s Brackenridge and Leechburg plants near Pittsburgh to Joseph T. Ryerson & Son Inc., in Chicago. Unlike the G27 experimentals, the G28 continued to operate successfully enough that these two steel companies inquired about getting six more similar cars built in July 1955. The PRR's Chief of Motive Power commented in December (the same month the second G27 experiment ended) that "It is also our understanding that the steel industry is looking very favorably toward these cars with removable roofs, and that there is a possibility of equipping more gondola cars with this type roof."

View of interior of car and lading at the conclusion of impact tests. Bulkhead car 344351

Full length rails along the sides of this car allowed the four movable, cushioned bulkheads to adjust to the load. PRR photo, PRRT&HS collection.

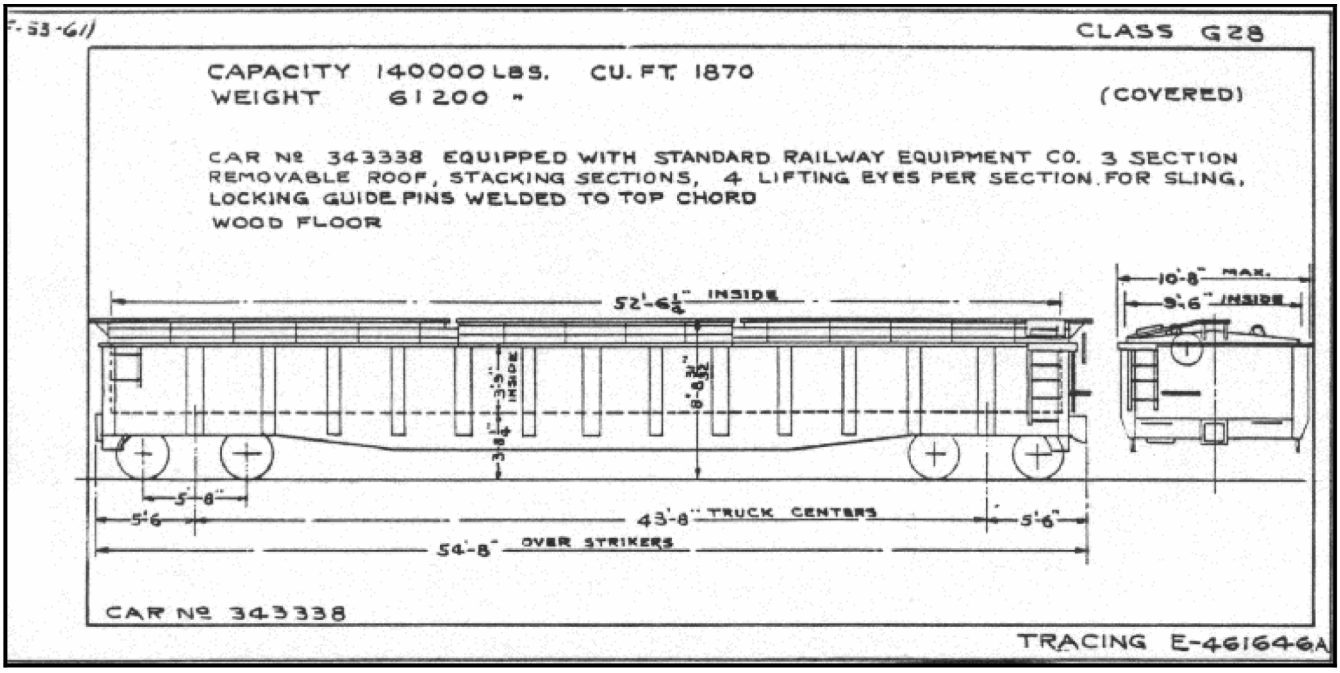
One negative comment often heard from the steel customers was that the covers gave very little clearance above the car sides and would not be suitable for larger coils: they would be more adaptable to their needs if the cars had higher sides.

As a workable solution for weather protection had seemingly been found in 343338, work was underway to deal with another inherent problem in hauling finished steel loads, damage in transit. In March 1955, standard drop-end G28 344351 was equipped with an experimental adjustable bulkhead cushioning device for steel plates and impact tested (successfully) vs. a standard G28 for relative damage to the car and the load under various impacts.


View of interior of car and lading at the conclusion of impact tests. Standard car 342891

The ends of this G28 without the load cushioning devices were nearly torn out during the testing. PRR photo, PRRT&HS collection.

G28 343338, proved to be the most successful of the early experimental covered cars. The lessons learned and various experiments run, among others, were steps in the development of the covered gondolas that later went into regular service on the PRR. Following the covered G28, some G31D class cars were equipped with extended sides, Stanray three-piece roofs and both with and without cushioned bulkheads. The later G36C and G42 class covered gons were similarly equipped for steel service. A divergent development path resulted in similar cushioning devices for coil and/or plate loading in the G31E and G31D cars that incorporated removable hoods, instead of removable roofs. The pioneering G28 continued in service until it disappeared from the roster between October 1963 and January 1964.



G28 (covered) diagram dated 1961 describes the features of the 3-piece Stanray roof-equipped experimental car.

The Model

The basic car is the same as the standard G28 with some modifications to the ends, so whether you repeat the process of kitbashing the car as in the first installment of this article, use cloned sides as described here or some other option as a start, it is not important. The roof sections will be built separately and added to the car later. Having the cloned side pieces to start with, and with the roof alleviating any need to make the interior of the model look correct, made it seem there was no real value in using one of the Con-Cor kits as the core of this project, as was done with the standard G28. I would end up discarding everything but the floor and underframe when a few simple pieces of styrene could be substituted for these mostly invisible parts. The construction process is much like that described in Elden's earlier articles in this series on scratch building the G32 or G36 cars, except starting with pre-made sides.

Side Preparation

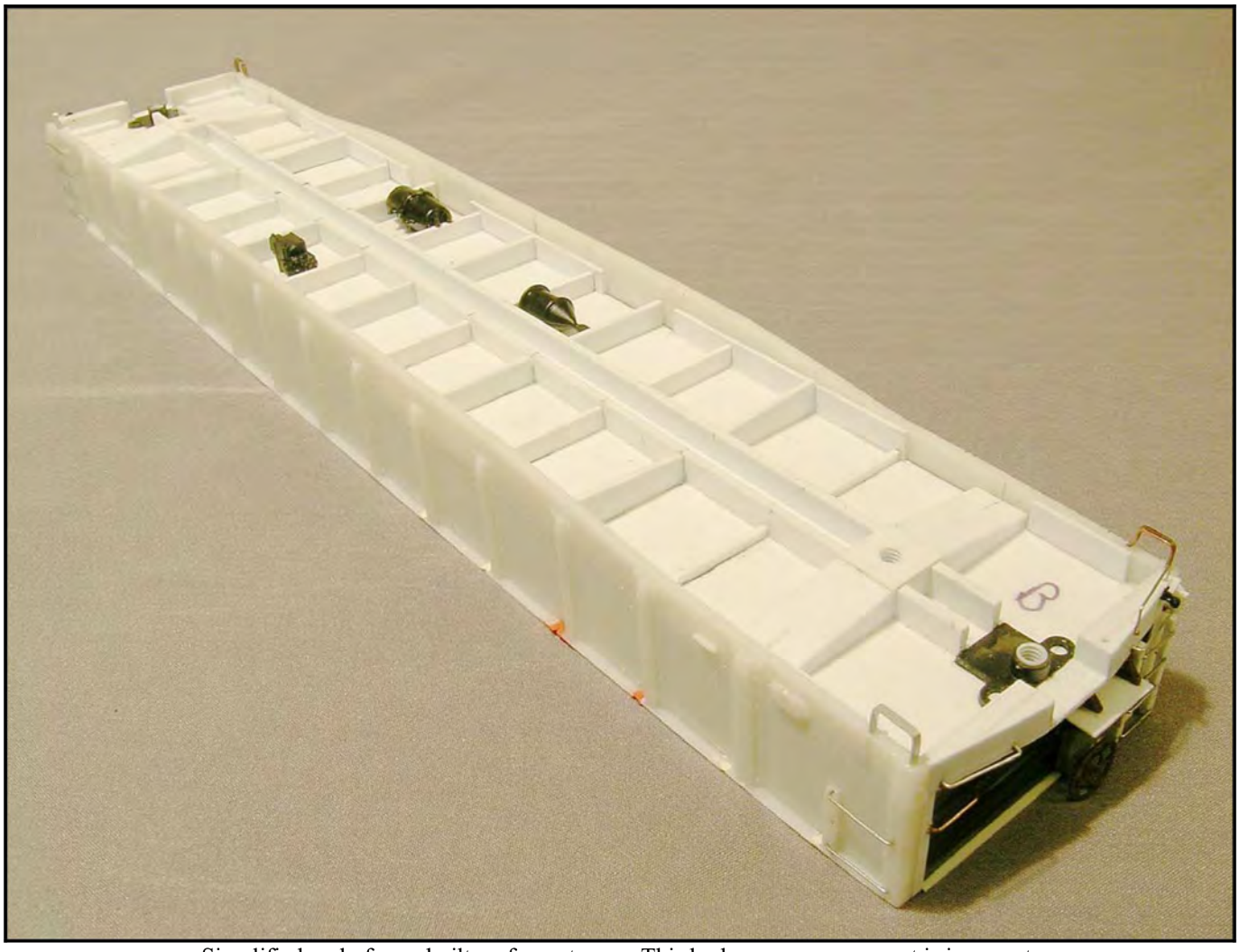
This step is almost trivial with the cloned resin sides and is the same as when building an all-resin kit. Fill any objectionable air bubbles in the castings with putty and let dry. Sand the backs of the castings smooth to give them a little "tooth" to make gluing more effective. Then clean up the edges by carefully sanding them smooth and square, removing any roughness or unevenness from the castings. Hold the sides back-to-back when lightly sanding the ends, so the sides will end up exactly the same length. Drill all the holes for the grab irons where pre-spotted in the castings. I found it almost impossible to see the cast-in dimples on these milky white-yellow parts when drilling, no matter how I positioned the work light. Take remedy this, I took a very sharp pencil and set it into each dimple and rotated it a bit. The resulting graphite spots helped immensely in seeing where to drill and help to lubricate the bit in the process. Draw lines on the backs of the castings for a vertical centerline and one where the bottom of the floor will be, about .135" up from the bottom of the ends of the sides. Glue pieces of .020" x .125" styrene strip along the back of the sides, their tops flush with the line for the floor bottom.

Assembling the Car

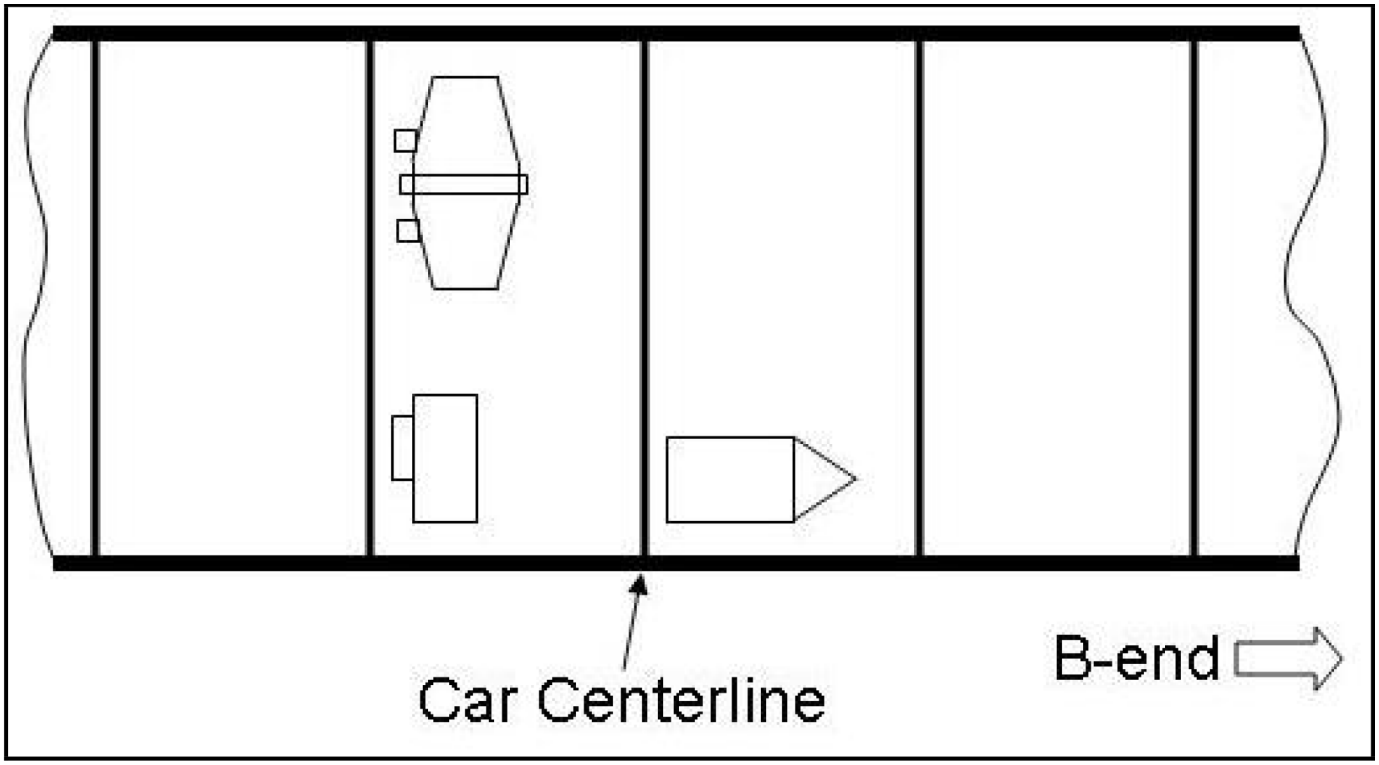
The most important dimension to get correct when building this car is the width across the car sides. This is because commercial (boxcar) roof parts will be used later as the basis of the roof sections and adjusting their width to match the car would be (unnecessarily) painful, as well as incorrect. I purchased three spare Branchline #100005 50' (or you can use #140001 40') Diagonal Panel Boxcar Roofs to bash into the triple section roof. The basic G28 car diagram shows the outside width across the car side top chords to be 10'-5". I propped the resin sides up in a small vice with the jaws set at that spacing and then sat the roof piece on top. I wanted to see if the amount of top flat surface of the upper chord around the roof appeared similar to the overhead prototype photo above. It did, and thus seemed to confirm my assumption that the PRR used

standard Stanray boxcar roof sections and if the Branchline parts were correctly scaled, and the model sides were the correct width, the model and the prototype should necessarily look the same. [If you are making the direct conversion from the Con-Cor car as in the first part of this article, you should cut the car floor apart lengthwise and reassemble with a styrene spacer inserted to get the 10'-5" outside width correct.]

Cut an overly long floor piece from .040" thick by about 1.275" wide styrene. Carefully sand it to size, making the edges square, to a final width of 1.265". Trim the length to be equal to .100" (.050" per end) less than the overall length of the side casting. Cut three or four pieces about .400" long from the leftover material to use as bulkheads inside the car. Draw centerlines in both axes on the floor bottom. Add additional lines for the outside extents of the 21" wide center sill beams and for the centerlines of the truck bolsters such that they line up with the centers of the first side stakes in from the ends. Turn the floor over and glue the three or four bulkhead pieces to it vertically on edge, spaced more or less evenly along its length. Be sure to get them square and aligned with the edges of the floor and let dry thoroughly. Using sections cut from the same original floor piece ensures they all have the exact same width and will thus easily result in the car body being square. Glue the car sides to the floor/bulkhead assembly with CA adhesive. Align the centerlines longitudinally and make sure the floor sits down onto the support blocks on the sides.



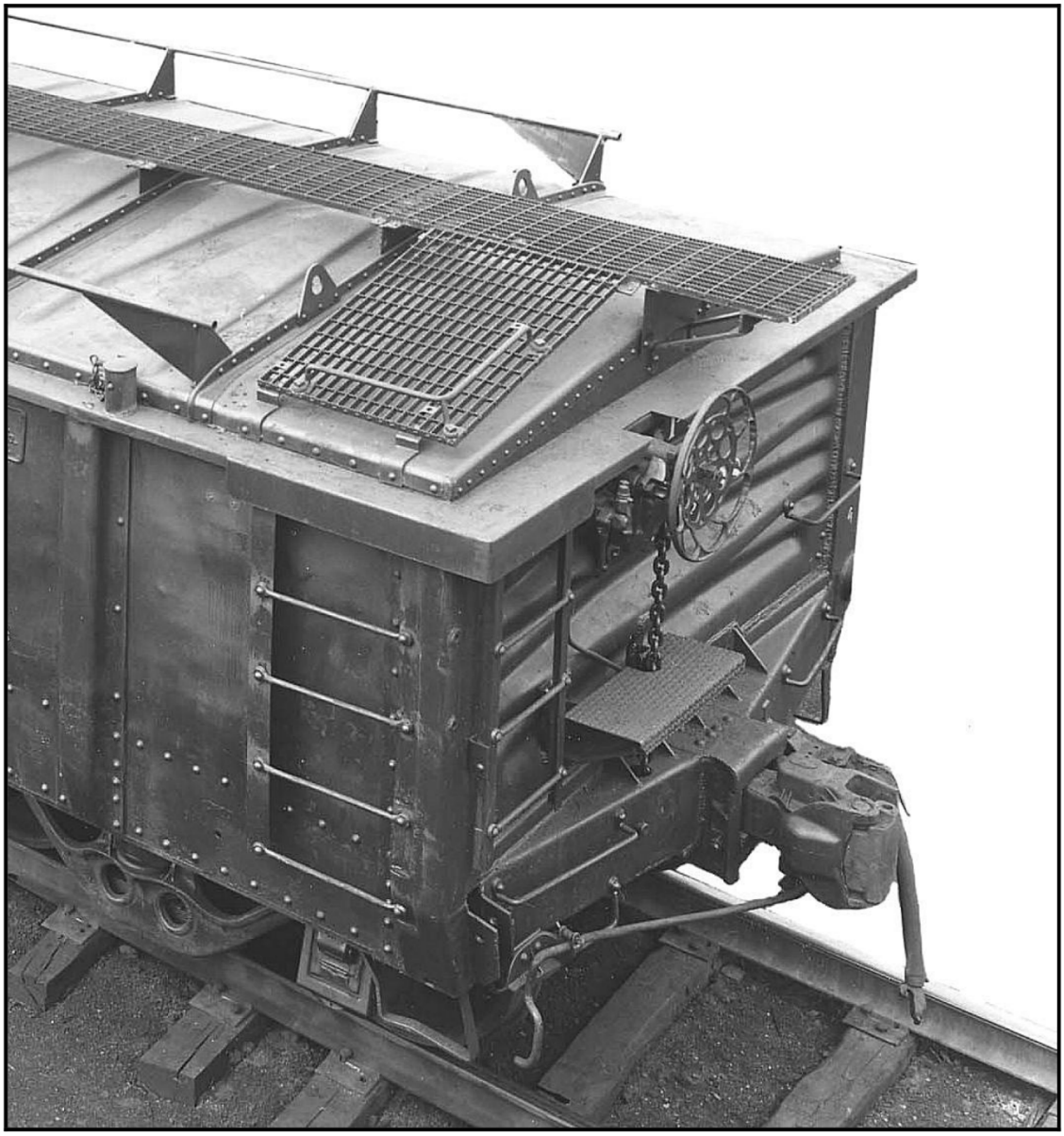
Simplified underframe built up from styrene. This brake gear arrangement is incorrect.



Correct brake gear arrangement, bottom view of car.

Make two bolsters from .125” x .250” styrene strip to fit across the width of the car. Leaving about a .210” flat in the center of the pieces, file tapers out to the ends of the bolsters, to a height of about .050”. Glue these to car floor on the centerlines. Cut two pieces of .040” x .125” styrene strip to fit between the bolsters to approximate the center sill beams. Glue on edge to the floor inside the lines drawn earlier. Add more under-floor detail if desired. The G28 had crossbearers at every side stake. At the second side stakes in from the ends use .030” x .040” styrene strips; at the third and the other wide side stakes use .030” x .125” styrene strips; at the remaining narrow stakes use .030” x .100” strips, all set on edge. I added some token brake gear components, although they are virtually invisible with the car on the track. Drill and tap holes in the centers of the bolsters for the truck mounting screws. There is no need to worry about accommodating weight for this car in the underframe as the covers allow it to be loaded inside the car.

Ends



Detail view of the roof and car end. New fixed ends were applied and new power brake gear replaced the as-built lever operated gear, although the original opening for the brake chain pulley and the extra grab under the original brake platform remained. The brake platform was moved up off the end sill and four-rung ladders were added to each end. The vertical flanges on the near corner of the cover were intended to shroud the upper rung of the side and corner ladders when in place. Note the cut levers were different on each end of this car. PRR photo.

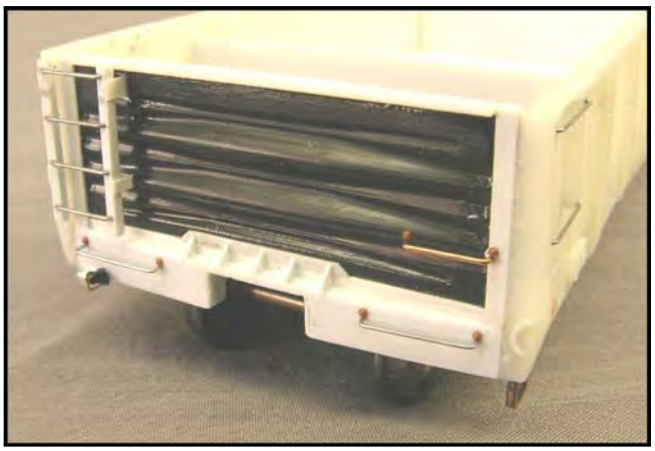
The ends of the covered G28 require the most work on the car portion of this project. As on the standard G28, numerous plastic parts are added to the ends to form the proper geometry of the yoke. For each end sill cut a strip of .135" tall styrene the same length as the floor width, about 1.265". This converted car retained the different depth end sills of the standard car so use a strip of styrene .075" thick for the A-end (a 6" x 12" plus a 2" x 12") and .140" thick on the B-end (two 6" x 12"s plus a 1" x 12"). Mark the end sills about .180" out from the centerline of the car and file a taper on the sills from these lines out to their ends where they will meet the corner posts. The taper is more pronounced on the B-end. The outside edges of the sills should protrude just slightly out from the end plates when tapered properly. Glue these strips into the ends of the car flush with the bottoms of the sides, seated in against the end of the floor. Glue .040" square reinforcing strips about .250" long between the bottom of the floor and the back of the new sill, leaving space between for the coupler box. When thoroughly dry, Cut notches through the end sills .310" wide and up to within .025" of the bottom of the floor bottom (the

thickness of a Kadee coupler pocket lid) for the couplers. Clean up all the edges with a sharp knife and slightly round the outside corners of the end sills.

Add Kadee #5 coupler pockets. Cut .150" and .190" off the front edges of the A-end and B-end coupler pocket lids respectively and glue the coupler box lids to the floor bottom, flush with the inside edge of the new sill. For additional strength, I prefer to drill through the car floor on non-open top cars, effectively extending the coupler pocket lid boss holes. Tap the holes for 2-56 screws and use screws long enough to extend into the car floor to better anchor the coupler. Notch the coupler box lids to fit into the end sills. Assemble the coupler boxes and then cut additional short pieces of .040" x .125" styrene strip to fit between the rear of the coupler boxes and the bolsters. Glue in place to complete the center sill.

Cut a strip of .010" x .040" styrene slightly taller than the car side height for each corner. Glue these to the inside edges of the corner posts, flush with the outside of the end faces. They overhang the inside of the sides to form the lip the end sheets rest behind. The bottoms of these strips rest on the end sills. These strips should extend past the top of the car slightly: they will be filed back to final size later. Cut a piece of .030" x .040" strip and place one behind these verticals on top of each end sill to form the ledge that fills in under the end sheets. Cut a strip of .010" x .030" styrene .500" long with each end chamfered 45°. Glue this on edge to the ledge at the end of the car floor, flush with its outermost surface. When dry, cut .060" squares of .010" styrene strip diagonally to form gussets and add five of them, evenly spaced, between the top of the end sills and the above .500" long strip. On the B-end these gussets will sit fully on the end sill. On the A-end they will overhang the end sill, so when dry, file them off vertically flush with the end sill.

Now form the new fixed end sheets, starting with a spare set of drop end doors from a Proto 2000 52'6" Greenville gondola kit. Use the other style end not used on the standard G28 project, the ones with the two large protruding corrugations with the smaller, narrow full-width corrugations between them. I suspect that I should not have been surprised that these parts fit perfectly into the space formed for them at the ends of the car: I did not have to trim them to fit at all. Trim off the door latches and overhanging protrusion along the top lip of the doors. Glue the ends into the car, sitting down against the ledge pieces. Once these parts have dried hard, file the end plates smooth and the tops of the end pieces flush with the top chord of the sides. Finally, add a 2" x 6" strip to the tops of the ends, flush with the inside of the end sheets, overhanging on the outside of the ends.



Construction of A-end; showing shallow-tapered end sill, strengthening gussets, corner posts and modified Proto 2000 end door details.

Final Details

Now complete the detailing by adding the smaller detail parts to the sides first. Drill holes in the bottom of the sides and add bottom-mount style stirrup steps. Car #343338 appears to have had one rectangular step at the corner of the car diagonally opposite the brake gear, while both on the opposite side of the car were angled. The prototypes measure about 9" tall by 11" wide at the base and are angled outward slightly. The fourth is not clearly visible. I used some old Tuttle Industries type "R" steps for the straight steps (or A-Line #29000 style "A") and a pair of A-Line #29002 style "C" parts for the angled steps. It cannot be seen from the photos whether this car had the rectangular or cylindrical style defect card holder. So I added a .100" long by .020" diameter styrene rod on the 2nd panel on the left end of the car side (with the B-end at left) on this car. There are two grab irons on the left ends, and five on the right ends of the car sides. Bend .011" wire to fit for these straight rungs.

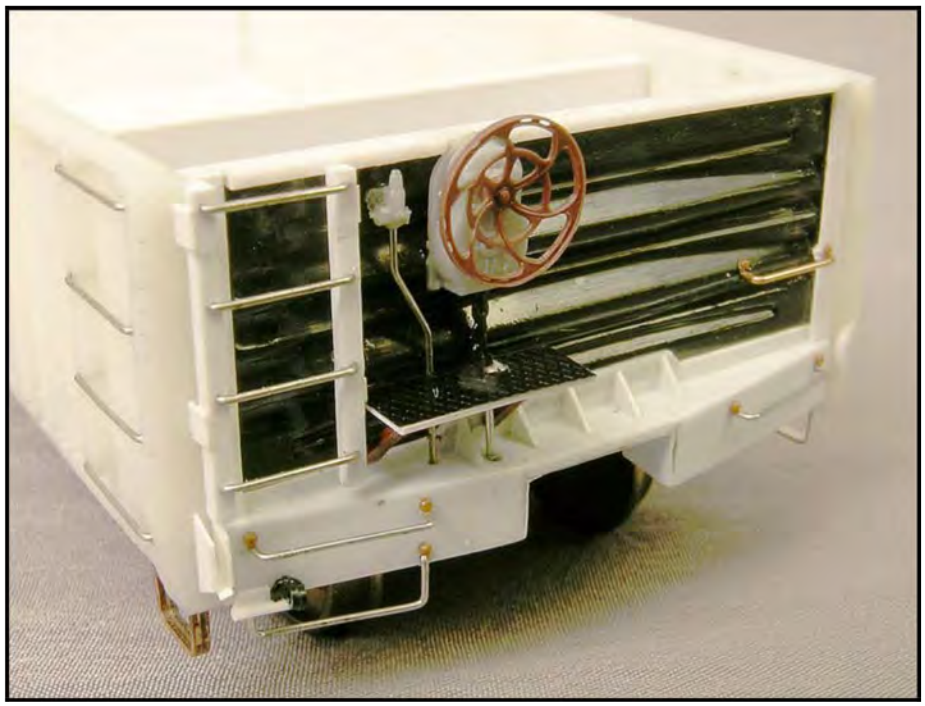
On the ends start by adding simulated poling pocket castings as on the standard car. Drill, bend and insert four straight 24" grabs into each angled face of the end sills. The original fourth 24" grab mounted under the sill at the corner with the brake gear remained after the conversion, so add it as well: the left end attaches under the sill, the right end attaches to the face of the sill. There is an additional straight 18" grab up on the right side of each end on this fixed-end car: one leg attaches into the corner post, the other into the end corrugation. Drill and add .020" diameter Tichy/CMA #8017 plastic rivet heads above the attachment points for all these seven grabs. I simulated the coupler release lever brackets at each

end using a combination of a Detail Associates #SS2213 bracket and a short length of Plastruct 1/32" #AFS-0 styrene angle. Bend the uncoupling levers to fit and set aside.

At this point I had hoped to simply cut a piece off a commercial detail part for the end ladders. Unfortunately no parts I found had anywhere near the correct rung spacing to get four into the space available on the ends, so I had to scratchbuild them. First tape six lengths of .030" square styrene strip together, side by side. Wrap the tape around in two places, a distance a little longer than the finished ladder apart. Mark lines across all the strips with a small machinist's square for what will be the ends of the ladder stiles as well as for each rung location. The stiles are .470" long and the rungs are on .125" spacing. Carefully impress small dimples at each rung attachment point with a sharply pointed tool, then clamp the strips across their width and drill #80 holes for the rungs. Clamping the strips together helps reduce the tendency of the drill bit to wander and exit out the sides of the strips. Once drilled, singulate the stiles by cutting them to length at the marks. Trim the ends of four 18" straight grab irons to about .030" long and insert into each pair of stiles. Place the ladders, grab iron side down, on a smooth surface and slide against a square to align properly. Carefully touch CA to the four corner grab ends to tack and hold it square and once set, go back and finish gluing all the joints. Cut four small strips of .005" styrene overly long for the ladder supports and glue to the stiles as per the photographs. Once dry, trim the supports individually to length to touch the appropriate points on the car ends and glue to the car.

Next add the brake gear to the B-end of the car. I used parts from a Detail Associates FC-6227 AB brake set. Notch the end top chord and end upper corrugation and mount the power brake housing flush with the top of the end. Add a retainer valve and pipe to the left of the housing. Drill a hole in the end sill below the housing and add a piece of chain and a rod to reach between the two. Trim the two angled supports for the platform from the set to fit the end geometry and glue in place. Cut a .345" long piece of 1" x 10" styrene strip for the brake platform, notch for the chain, apply a bit of Walthers HO self-adhesive Diamond Treadplate film to the top surface and glue to the supports. Add a couple small pieces of styrene for the bracket where the pump-style handbrake chain pulley was formerly mounted in the end sill. Attach a Kadee Equipco style brake wheel.

(I was questioned on the source of the treadplate film since the first part of the article appeared and upon investigation I found that the product was sold through Walthers as their part 166-1, from a company named U.D. Bilger in West Germany. However, Walthers no longer lists this part or manufacturer on their website. I did locate the company's home site at http://www.Bilger-Modellbahn.de but it is all in German and I couldn't navigate well enough to determine if they still offer this product. Contact information is given so maybe somebody can figure out if it is available. Too bad, it's a really slick product.)



B-end detail showing brake gear, platform, grabs, ladder, deep end beam and interior bulkheads.

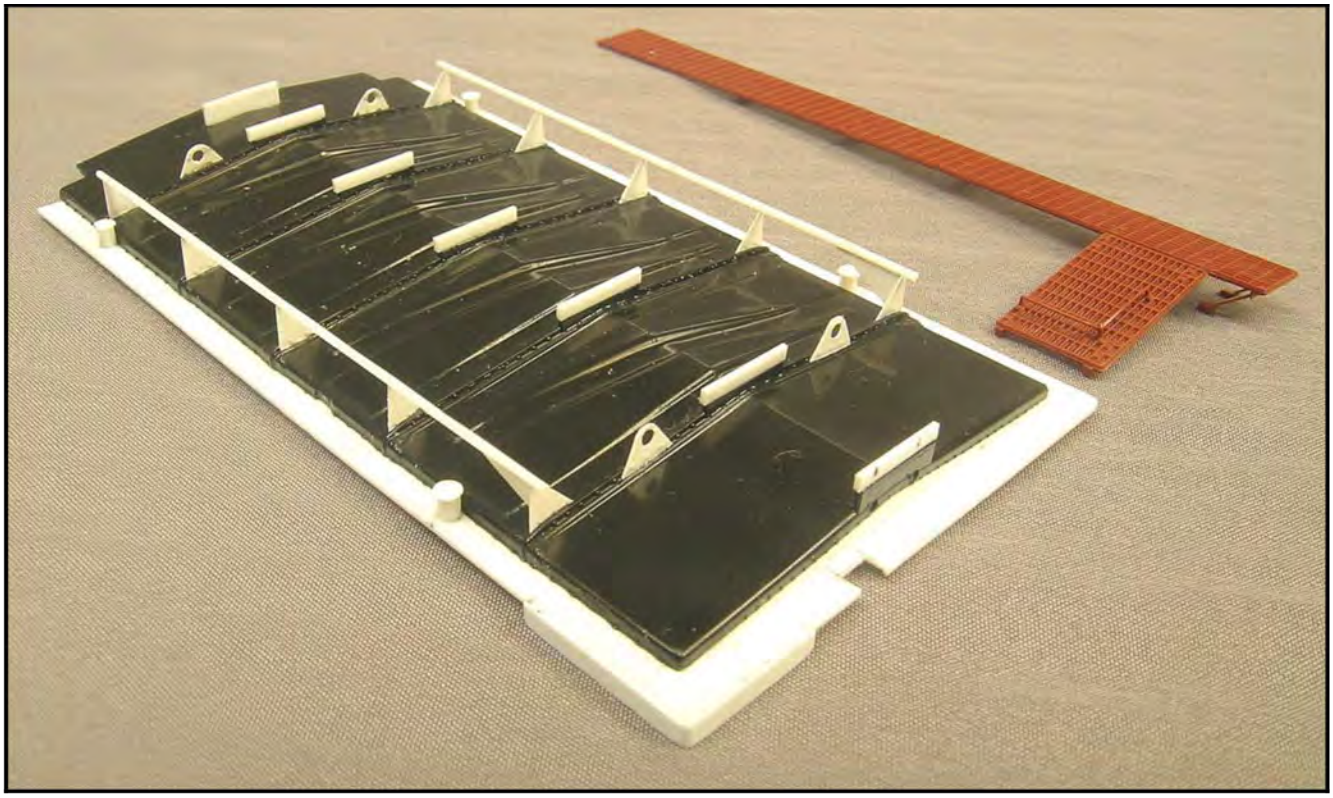
Mount the coupler box lids with 2-56 screws. Add weight inside the car. Prepare appropriate mounting screws for the trucks. For this car I again used Proto 2000 National B-1 trucks with Reboxx #WS1-1030 .088" narrow tread wheelsets installed. This completes the car itself.

Roof Sections

Of the three roof sections, the two end sections are almost identical, whereas the center section is substantially different. The end sections are six panels, the center section is five. All three have flat sheets at each end and raised diagonal panels in between. You could use either the Branchline 40' or 50' Diagonal Panel Roof parts: two of either are sufficient to build the car, but you might consider using three and thereby avoid having to sand off the raised panels on the cut ends. I tried it and found it difficult to do cleanly and decided instead to splice the sections to get the flat panels at both ends, thus requiring six roof ends or three full roofs. Cut the appropriate length pairs of section pieces just beyond the necessary panel seam, so as to include a flat end panel on each. Using a NWSL True Sander, sand the cut ends smooth and square. On one piece of each pair leave the raised seam rib, sanding right up to the far edge of the rib, and on the other sand the rib away completely. Align carefully and glue the section pieces together. The overall length of the center section needs to be 2.150" to best match the Con-Cor body conversion. Cut the section a little oversize and sand to the final length, making the end panels equal length. File away the locating ribs under the ends of the center section as well as about .150" of ends the side ribs so it will sit flush atop the end sections.

Underside of center roof section at right shows splice joint and end recess to overlap outer roof section at left, with its corresponding notched corners.

On the outer ends of the end sections glue .015" spacer strips onto the end faces of the recessed locating ribs (on the underside of the roofs) to properly space these relative to the insides of the car ends. Then fill in the remaining space under the eaves with triangles of .030" x .060" styrene, flush with the bottoms of the outer edges of the roof. Place the end sections on the car and overlay the center section making sure it is centered: mark where it overlaps onto the flat panels of the end sections. Notch out the corners of the end sections to within about .020" of these marks so they fit under the center section. Glue 1" x 3" strips along the sides of the center section to fill in the space under the eaves since this section sits higher than the end sections. Glue blocks of .040" x .100" styrene flush at the outer corners of the center section – these simulate the caps that overlapped the ends of the end sections to create a weather seal. Add strips of .010" x .080" styrene horizontally along the bottoms of the sides of all sections, and .010" x .115" along the bottom of the outer ends. Add .010" x .020" strips vertically around the perimeter of the sections. Add additional 5" x 20" vertical shrouds on the end section corners to cover the upper ladder rungs. An 8" wide notch was coped out of the flange on the B-end roof section to clear the power brake housing.



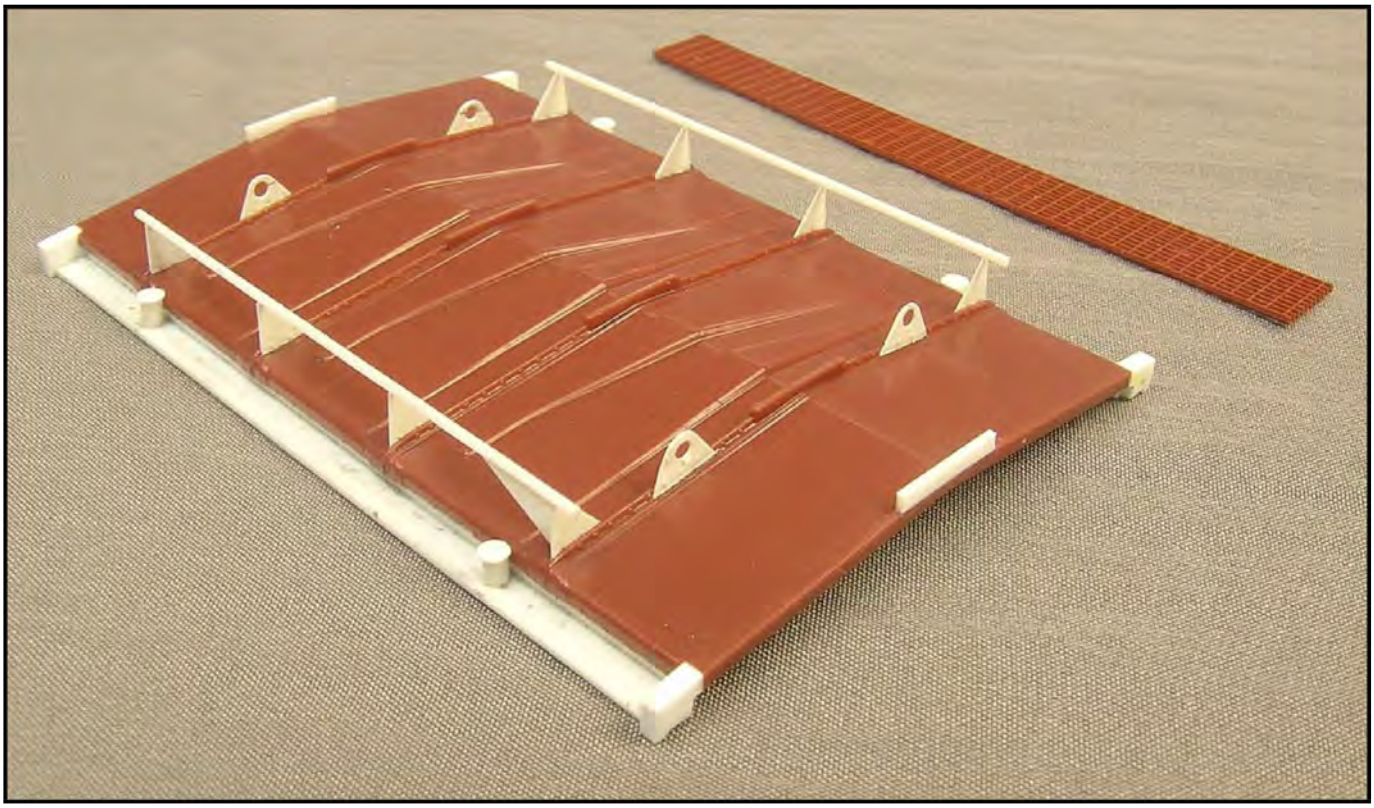
Details of B-end roof section include: corner ladder shroud, brake housing flange cutout and running board saddle extensions. Running board will be attached after painting.

Cut twelve sections of .047" diameter styrene rod about .065" long for the alignment pin /locking device caps on the covers. Punch .060" diameter disks out of .005" thick styrene sheet. I pushed the back end of a #53 drill (sharpened if necessary) into a #52 hole drilled into a steel plate as a punch and die. Glue these disks to the tops of the rods and then glue the assemblies along the flanges on the sides of the covers, locating them using the photos as a guide. Recall that the locations on the two end sections were intentionally made different.

To make the lifting lugs, first emboss a row of rivets along the very edge of a sheet of .005" styrene with a pounce wheel. Draw two pencil lines in .060" and .090" from the same edge. Cut the strip off the sheet along the .090" line. Using the back end of a #59 drill bit and a #59 hole drilled into a steel block as another punch and die set, punch a .041" hole somewhere on the .060" pencil line near the end of the strip. If the hole punches cleanly, cut a piece .160" long from the strip, centered around the hole. Cut a 30 degree angle on each end of the piece and then round off the tip of the part with a file to form the completed triangular lift lug. If the hole does not punch cleanly, cut off the end and try again – since you are aligning the punch and die blindly, this is a hit or miss operation, but the waste is minimal. The lift lugs were riveted to the sides of the seam caps on the roof sections, so remove the molded-on rivet heads in the appropriate locations and glue the lugs to the outer sides of the caps at each end of each roof section.

Make the supports for the stacking spacer tubes in a similar manner. Emboss a row of rivets along the edge of a sheet of .005" styrene. Cut the strip off the sheet to be .125" tall. Cut the supports out as (almost) triangular sections, the full height of the strip, with the rivets along the bottom. Leave a small flat about .015" wide at the top of the triangle on which to mount the tubes. The side towards the outside of the car is cut at a 10° angle from vertical, the side towards the inside of the car is cut at a 35° angle (these are two of those intermediate miter slots on those miter-choppers). Twenty-eight are needed, so make some extras: roughly half the parts should be left-handed and half right-handed to apply them to the proper sides of the seam caps as seen in the photos. Remove the necessary rivets molded onto the sides of the seams caps and glue the two end supports for each tube in line near the outer ends of the seam caps and let dry. Cut lengths of .020" diameter styrene rod about .060" longer than the supports so there is a slight overhang at each end and solvent glue the rod to the supports. This is something of a balancing act, so let the rods dry firmly in place once positioned properly. (This is another one of those situations where I question using metal wire, which

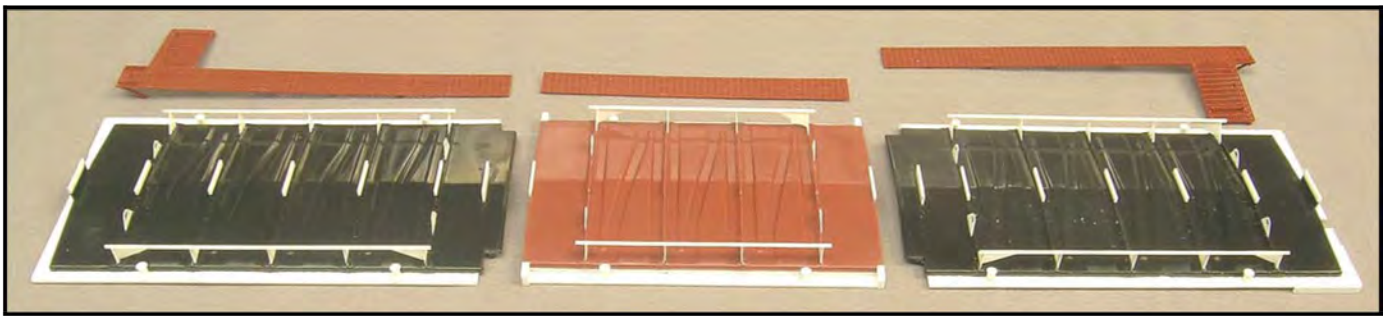
would be much easier to keep straight and would yield a much stronger part, versus using styrene rod, which will allow for much more secure weld joints between the like-material parts but is weaker material and likely to be more difficult to keep straight. I went with the stronger glue joints this time and fortunately it was not as hard to keep the rods straight as I had feared.) Cut right triangle gussets of plain .005" styrene .115" high x .200" long to fit under the rods against the end supports as visible in the photographs and glue in place. Note that although there were 12 ends of the stacking tubes, these anti-rack gussets were only applied seven places. Once these are dry, go back and add the remaining intermediate triangle supports between the seam caps and the rods. It is considerably easier to get everything aligned properly this way. Sight along the length of the rod as you insert each support to make sure it isn't bending the rod: if necessary, trim the tip to fit properly.



Center roof section details include: side height extensions, corner weather-seal overlapping covers and added end running board saddles. The .005" thick lift lugs and stacking tube supports are glued to the sides of the seam caps.

Next prepare the support saddles for the running board sections. Glue .265" long sections of .015" x .040" styrene to extend the existing saddles on the end roof sections. Additional supports need to be added back to back at the flat overlapping panels of the roof sections as well. This will result in the running boards being "smooth and uninterrupted" across the three sections. On the end sections file a flat where the saddle will be adjacent to the center roof section and insert .265" long sections of .015" x .080" styrene on edge. Similarly on the ends of the center roof section, file flats and insert .265" long sections of .015" x .040" styrene. For the running boards cut pieces from two Kadee #2010 50' oxide red Apex running boards and cut the large mounting posts off flush with the bottom. (Since it is a 52'6" car, one 50' running board just isn't long enough, but if you cut them up right, you can reassemble the two remaining ends of the 50' parts to salvage a full 40' running board for use on another project.) The center section is simply a straight piece spanning from end support to end support. Cut a section such that the support plates cast into the running board align with the saddles on the roof section. Technically the running boards on this car should overhang the saddle at the end of the roof sections a little further than on the typical boxcar. However, it's not terribly noticeable and using them as-is reduces the amount of work involved greatly. Likewise, the underside end supports are close enough to the correct length to be used as is. Mark and drill .025" holes in the face of the end saddle to accept the tabs on the bottom ends of the running board supports. With the end supports in their holes, mark the required length of

the running board to the far-end saddle, remove from the roof and cut to length. The lateral walks on the end sections are also very close to being correctly located straight out of the package. Carefully bend them downward at a steeper angle and trim the two end supports to be about .030" high. The grab irons on the lateral running boards should be relocated more towards the outer corner of the grid panel as per the photographs. Set the finished running board assemblies aside for painting.



View of the completed roof parts, ready for painting, illustrates non-symmetrical pattern of application of support tube sway braces and guide tube locations.

Finishing

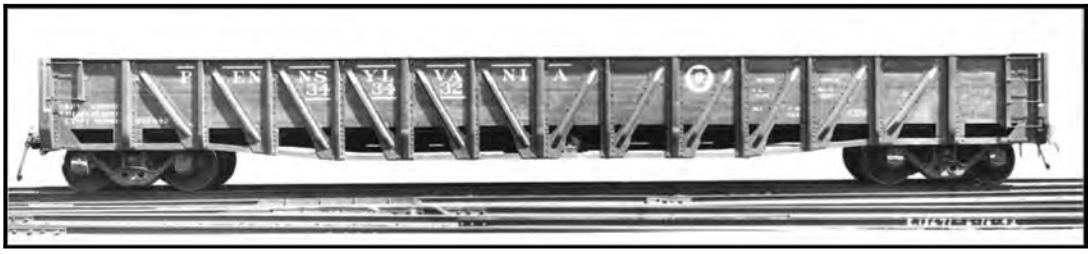
Since this car is more like a short boxcar than a gondola from the finishing perspective, I initially thought it would be considerably simpler to paint than a normal gondola with its exposed interior. That was until I studied the photographs carefully and realized that the roof sections were not painted Freight Car color all over. The Stanray roof panels appeared to have initially been bare, galvanized steel, as did the lifting lugs. All the other roof components appear to have been painted FCC. The potential difficulty in achieving the color separations was my rationale for not assembling the roof to the car or the running boards to the roof earlier. First, I sprayed the entire car as well as the unassembled running board sections with Floquil Zinc Chromate Primer and the trucks and wheel sets weathered black. After applying a coat of Floquil Crystal Cote where needed for the decals, the car was set aside to dry thoroughly. The decals for this car were mostly pieced together from a Champ HG-148 set. The specific data for car 343338 as built was: CAPY 140000, LD LMT 148800, LT WT 61200, scale mark P57 dated 4-53, built 2-41, I.L. 52' 6", CU.FT. 1870 and was equipped with WRT ST WLS. I sealed the decals and the entire car with an overspray of Flat Finish.

I sprayed the roof sections a 50:50 mixture of Floquil Primer Gray and Old Silver to represent the new galvanized steel. Once the silver dried, I experimented as to how to paint the small details FCC. I would have much preferred to spray paint them, but I just saw no way to mask such a large number of small, fragile parts without damage and/or considerable tedium. Conversely, neither Floquil nor Scalecoat lacquer could be applied by hand directly onto the silver gray, as the silver almost immediately goes into solution in the overcoat of FCC and creates a mess. An intermediate coat of Dullcote might have acted as a barrier to prevent this problem, but I didn't have the time to try it. I found Polly Scale™ non-solvent based paint to be a workable solution: it would cover in one coat straight from the bottle, wouldn't dissolve the silver underneath and seemed to be somewhat reluctant to wick out across the surface of the silver, a plus when painting without masking. A mixture of two parts Zinc Chrome Primer to one part Caboose Red seemed to be a decent match to the color of regular Floquil Zinc Chromate Primer. Using a fine chisel tip brush, I carefully hand painted the running board support saddles, stacking tube assemblies and guide post covers, cleaning the brush often. When all the paint was fully dried, I glued the roof sections onto the car and then the running board subassemblies to the roof sections.

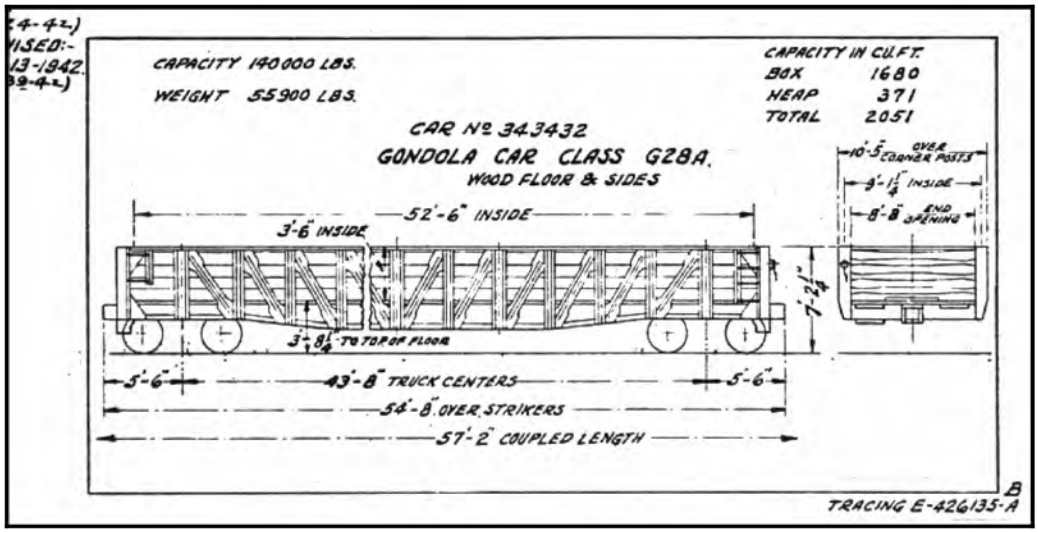
Overhead view of completed car illustrates the bare galvanized roof sections with painted hardware components.

Since this car would have been newly rebuilt in my modeling period, it received minimal weathering. I used the color photo of a nearly new looking standard G28 gondola in *PRR Color Guide to Freight and Passenger Equipment; Vol. 3*, Ian S. Fischer, Morning Sun Books, Inc., 2002, page 57 as a guide. (The G28 is not the main subject in this photograph but about half the car appears in the foreground.) I gave the car, roof and truck sideframes an all over thin wash of Burnt Umber (artist's oil color thinned in mineral spirits). I applied medium rust color weathering powders to the couplers, trucks, wheels and tops of the roof stacking tubes. I did a final very light blending coat of weathered black over the car: a little more heavily on the roof than elsewhere. I drew only a few chalks marks on the car with a very sharply-pointed white colored pencil and then followed by a final sealing of the weathering with an all over light coat of Dullcote.

Modeling (or not) the G28A

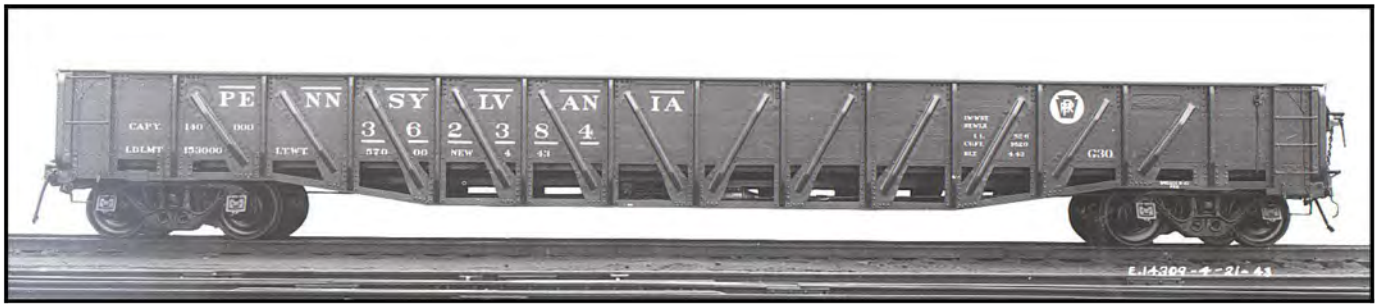


PRR photo dated June 16, 1942 of the lone G28A 343432 rebuilt April 1942 shows the unique rib and bracing configuration of this composite car. Note the car is still stenciled "G28".



G28A diagram dated 1942.

Although at first glance the single car class G28A composite gon appears similar to the later G30 class cars as well as the typical "war emergency" gondolas on other railroads, a *correct* G28A cannot easily be modeled from any existing models. First, the mixture of narrow and wide side stakes makes the Tichy, Sunshine or Funaro and Camerlengo G30 models wrong with no easy means to correct, because in addition to modifying the stakes, the diagonal braces must be modified where they meet the wide side stakes. Second, although the fishbelly offset of the G28A appears less deep than on the all-steel cars, in actuality, the center section is similar height, but the end sections of the sides are deeper than the standard G28 or G30 resulting in the taller openings along the bottom of the sides near the ends. Even if an off-the-shelf G28 model was available, it would not be very useful either. The ends on the G28 and G28A are the same and would not require modification (see prototype photo in the previous installment of the G28 article). However, despite having the correct wide & narrow side stakes, they would still need to all be replaced to get them to be the full height of the sides for this car. In addition, the daunting task of having to add all the distinctively shaped diagonal braces and cut-outs along the bottom remains. So the modeling choices for this single car class are to either more or less scratchbuild this difficult car or to settle for an available, but not-particularly close "stand-in" model. In the latter case the modeler would probably be better off to just letter the car correctly as the mass-produced G30.



PRR photo of G30 362384 in April 1943 illustrates the configuration of all equal-width side stakes, different than the G28A. PRRT&HS collection.

Modeling the G28C

Ex-PRR G28C 344421 at Altoona, PA, in October 1979 appears to have been last reweighed 12-66, stenciled "DO NOT LOAD" 10-74, whitelined and then later the reporting marks and car number refreshed via spray can (so would this be paint scheme SC1?). Unfortunately, the big differences in the "C" subclass cars, the fixed ends, are not visible here. Rich Burg collection.

Late in the PRR era the nearly 700 cars converted to class G28C made up just over half of the remaining G28 fleet. I did not model a G28C specifically, since they existed long after my modeling period.

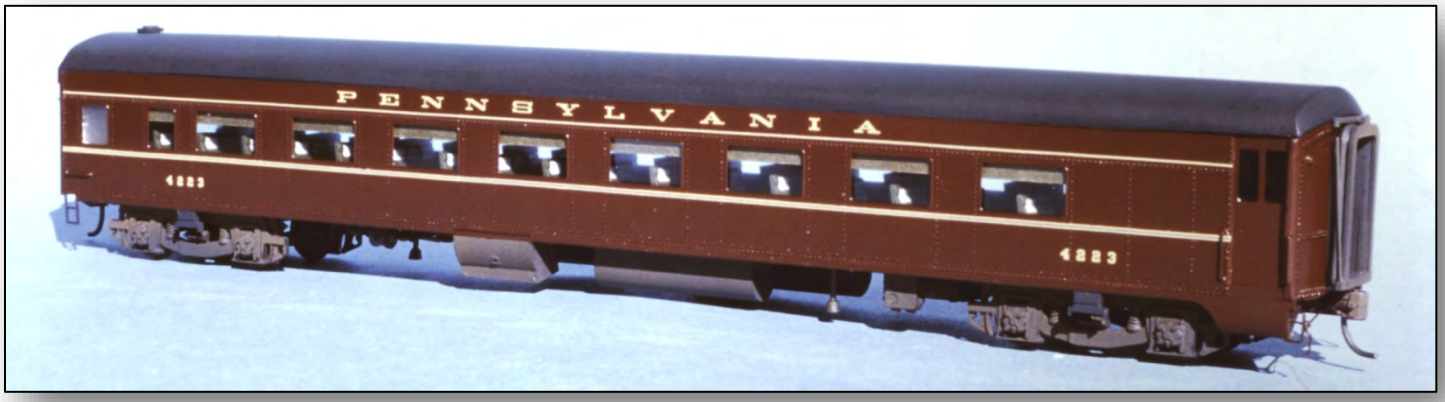
However, the work involved in converting a G28 to a G28C is essentially the same as the steps described above in creating the fixed-end covered car with its different brake gear, end grab iron and ladder arrangement. Tracing A-463136 issued December 1964 showed that unlike #343338, the G28C cars received corrugated Stanray end sheets and the power hand brake gear was located lower on the end than on the covered G28. The brake shaft centerline was 19" to the left of the car centerline and 30 7/16" above the top of the end sill. Additionally, since there was no complication due to having a roof, there were only three steps on the end ladders and the original four on the side ladders. A photo of fixed-end G28C 343373 in 1968 appears on George Elwood's website: http://www.rr-fallenflags.org/prr/prr343373ajs.jpg, showing a car in the plain Keystone paint scheme. Although it is a side view, the power brake gear is somewhat visible on the fixed end. If anyone out there has a photograph of the end of a G28C, we'd like to see it.

The covered G28 was the first car modified to have fixed ends, similar to the later G28C conversions.

This concludes the coverage of the G28 class gondolas.

Modeling Pennsy's Class P70gsR Coach

By Bob Chapman – Models and photos by the author unless noted



The P70gsR is an essential car for Pennsy's secondary trains in the transition era. NKP Car's kit can be built in a variety of configurations to match a modeler's preferred era.

Memories of Nos. 204/205

While growing up in Cincinnati, I spent many enjoyable hours watching and photographing the parade of passenger and freight trains on Pennsy's eastbound line out of town. Queen of the area fleet was the *Cincinnati Limited*, a sixteen-car consist always headed by Pennsy's newest power.

While considerably less glamorous than the *Limited*, Cincinnati's other eastbound daylight train was perhaps the more interesting. Nos. 204 (eastbound) and 205 (westbound) was a Cincinnati-Pittsburgh workhorse, too lowly to even merit a name until it reached Pittsburgh, where some of its consist traveled on to New York City as the *Iron City Express*.

Whatever could be said about the *Cincinnati Limited*, the opposite could be said about Nos. 204/205. The *Limited* was elegant; 204/205 was blue-collar. The *Limited* was lightweight and streamlined; 204/205 was heavyweight. The *Limited* had one of Pennsy's signature blunt end observation cars; 204/205 often ran with one of Pennsy's huge twin-door X42 express boxcars tacked to its tail. The *Limited* minimized head-end traffic; 204/205 reveled in it.

204/205 was Pennsy's last steam-powered train in the Cincinnati area, reliably headed by a K4s until the mid-50s. After dieselization, it was headed by power deemed past its prime for the Blue Ribbon trains, often AP20's, sometimes BP20's, occasionally a pair of AS17m's, and if all else failed, a brace of weatherbeaten EP20's. Most of us model memories. Having completed my model of the *Cincinnati Limited* consist, it was time to turn my attention to modeling 204/205.

Pennsy's P70gsR Coach

With only general memories of Nos. 204/205's consist, I relied on the 1952 consist information offered in Harry Stegmaier's book, *Pennsylvania Railroad Passenger Trains, Consists, and Cars – 1952, Vol. 1*. I would need about a half-dozen head end cars, spread across such car types as X29, R50, B60, BM70M, and the aforementioned X42. A pair of through sleepers survived in the consist until early-1953, but much of the train's passenger load was local, carried in a pair of P70gsR coaches, modernized from Pennsy's classic P70 heavyweights.

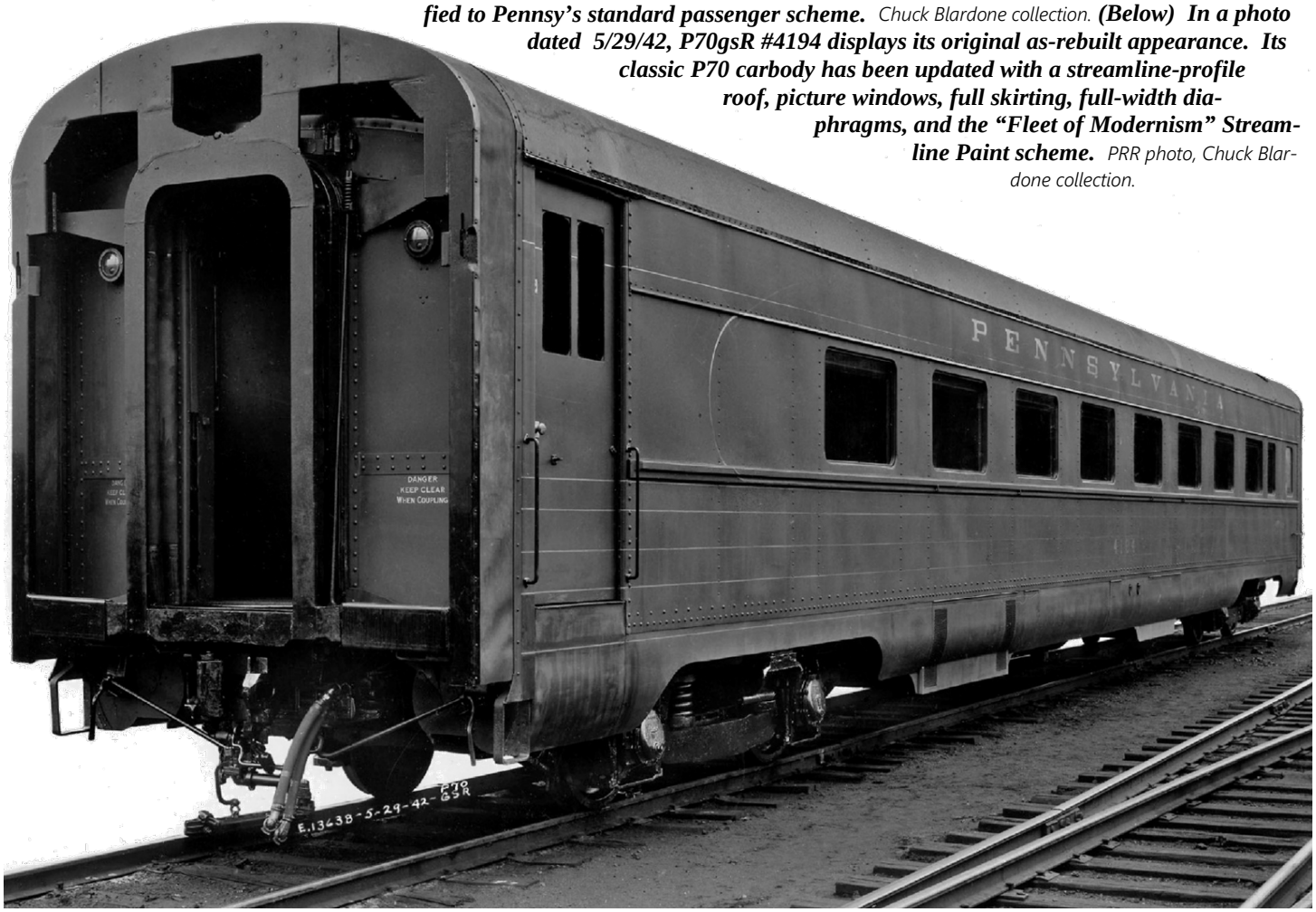
The P70gsR's were an outgrowth of Pennsy's "Fleet of Modernism" initiative of the late-1930s to upgrade the *Broadway Limited, Liberty Limited, General, Spirit of St. Louis, Trail Blazer,* and *Jeffersonian*. Orders went out to Pullman-Standard for lightweight sleepers, Budd and ACF for lightweight dining cars, and Budd for 19 lightweight coaches for service on the FOM trains. There was no mistaking a FOM consist. Designer Raymond Loewy had created a special paint scheme of Tuscan Red sides with a Dark Tuscan oval on the window band, a set of five gold pinstripes spaced horizontally across the lower side, and Futura lettering on the letterboards.

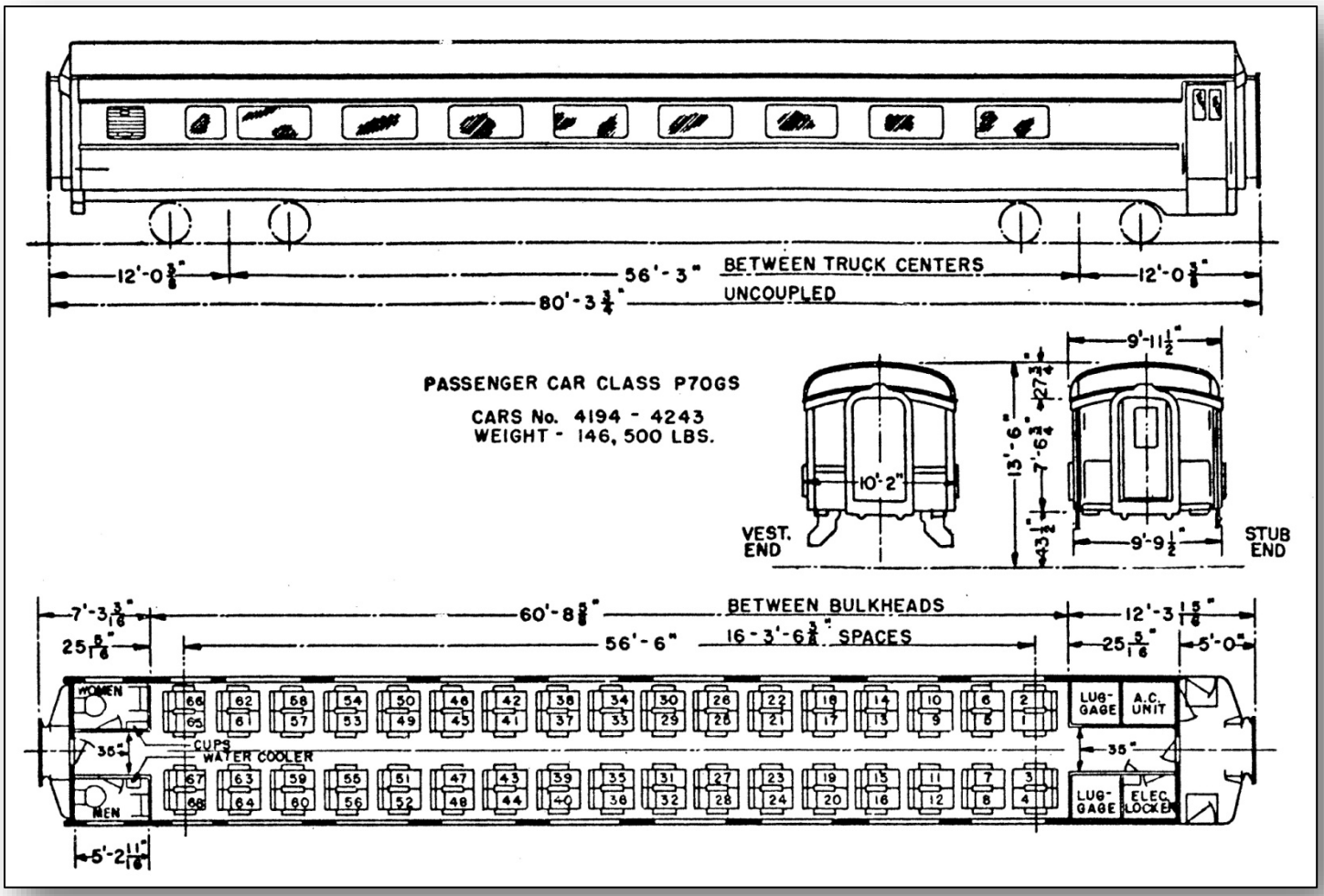
To augment the handful of new lightweight coaches, Pennsy in the late 1930s modernized over 300 of its P70 heavyweight coaches with air-conditioning and new interiors. While some of the rebuilds received picture windows, they remained unskirted and lacked streamline-profile roofs – a jolt to one's sensibilities when coupled into a string of matched FOM streamlined lightweights.

In April-June 1940, Altoona moved to correct this omission by rebuilding 66 P70's into the P70kR class (Nos. 4244-4309). The kR's were virtually indistinguishable from the new FOM lightweights, featuring picture windows, smoothed sides (eliminating the heavy gussets of the original P70 carbody), a streamline-profile roof, a single vestibule with retractable steps, full skirting, and Mansard-style roof ends which were squared off with lips to accommodate full-width diaphragms. Rotating reclining seats, greatly expanded lavatory-lounges, and new interior décor upgraded the cars to contemporary comfort standards, with seating capacity reduced from 88 to 56.

Following in May-July 1942 were 50 P70gsR's (Nos. 4194-4243). The gsR's were very similar to the kR's, but with drastically downsized lavatories to allow expansion of seating capacity to 66, possibly the result of increasing wartime passenger traffic demands. These interior changes prompted a modified window pattern versus the kR's. (Note that the "R" suffix, designating an air-conditioned car, is dropped in some listings.)

(Above) In a photo probably shot in the mid-1950s, P70gsR #4209 reposes in Cincinnati Union Terminal, perhaps in the consist of unnamed Cincinnati-Pittsburgh train No. 204 or 205. Since its rebuilding, #4209's full skirting has been reduced to semi-skirting, its full-width diaphragms removed, and its "Fleet of Modernism" Streamline Paint scheme simplified to Pennsy's standard passenger scheme. *Chuck Blardone collection.* ***(Below) In a photo dated 5/29/42, P70gsR #4194 displays its original as-rebuilt appearance. Its classic P70 carbody has been updated with a streamline-profile roof, picture windows, full skirting, full-width diaphragms, and the "Fleet of Modernism" Streamline Paint scheme.*** *PRR photo, Chuck Blardone collection.*





P70gsR arrangement drawing.

Both the gsR's and kR's were painted in the Loewy two-tone scheme matching the other cars in the FOM consists. Note that an earlier set of 50 rebuilds (Nos. 4310-4359) in 1939 was also designated class gsR; these cars were similar to the later rebuilds, but lacked the picture windows.

As the gsR's and kR's progressed through their service lives, they experienced several cosmetic changes. Based on photographic evidence, first to go was the full skirting, an unnecessary wartime maintenance headache. Full skirting survived at the vestibule end for the retractable steps, but was replaced with partial skirting for the remainder of the carbody. In the late 1940s, the FOM scheme and FWD's appear to have been eliminated concurrently; the FOM scheme was replaced with the familiar postwar streamline scheme, and the lips on the roof and sides abutting the FWD's were retained on many of the cars. By the mid-1960s, all remaining skirting and the roof lips were often removed, with the roadname replaced by a pair of keystones.

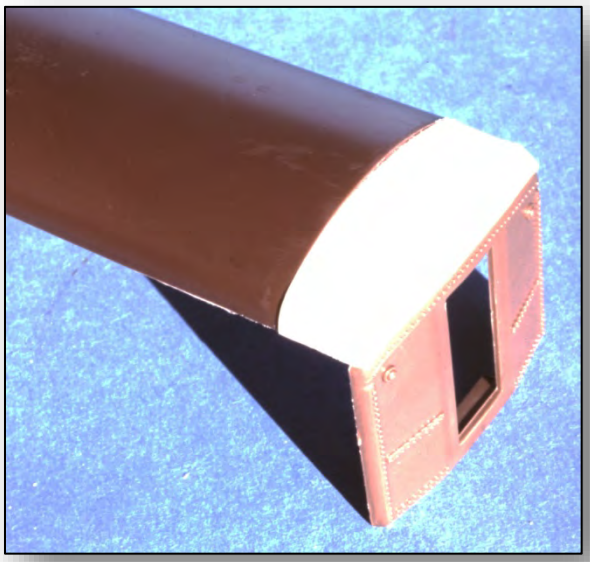
P70gsR Modeling Options

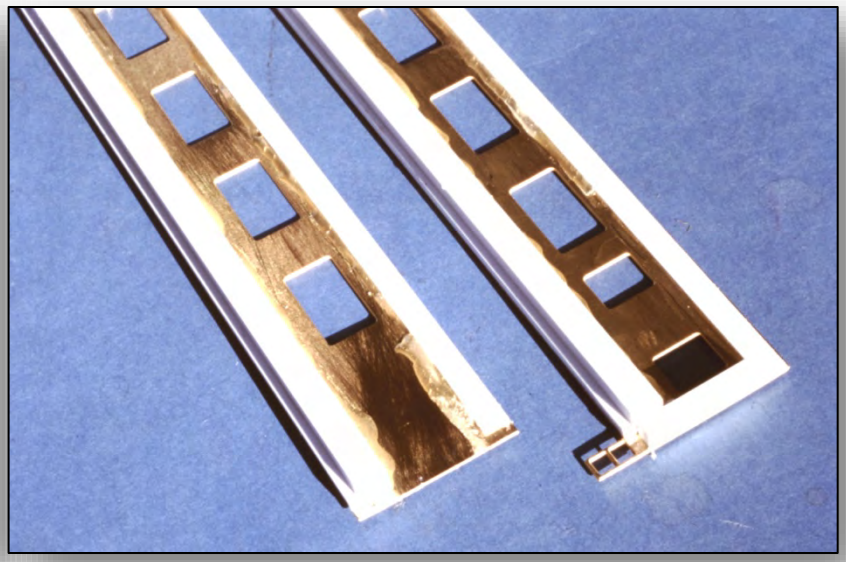
As a mundane railroad-specific coach, I was expecting trouble in modeling the P70gsR, and was delighted to learn of the two modeling options covered in Steve Hoxie's fine article, "Modeling a Class P70kR" (*TKM*, November 2007). Both options involve cross-kitting custom sides with available carbody components, creating a credible prototype model. Laser Horizons offers plastic laser-cut sides with either full or partial skirting; due to the limitations of the laser cutting process, rivet detail is omitted. NKP Car (www.nkpcarco.com) offers photoetched brass sides with rivet detail, but only in an unskirted version. Both companies offer similar kR models.

For my early-1950s era, I needed a semi-skirted car. Since it bothered me to lose the rivet detail, I elected to go with the NKP Car version, and add partial skirting. While my focus will be a partial-skirted gsR, the techniques presented can be adapted to build a full-skirted or unskirted model of either the gsR or kR using NKP Car's kit, and in many cases can be extended to the Laser Horizons option.

Building the Roof

NKP Car's kit includes photoetched brass sides, an Eastern Car Works streamline roof trimmed to correct length, custom cast resin Mansard-style roof end caps, carbody ends from ECW and Bethlehem Car Works, an ECW floor, a sprue of ECW P70 details, and ECW two-axle Pennsy trucks. Some additional parts are needed, as shown in the parts list following the text. A highly summarized instruction sheet is provided as a general guide to assembly.





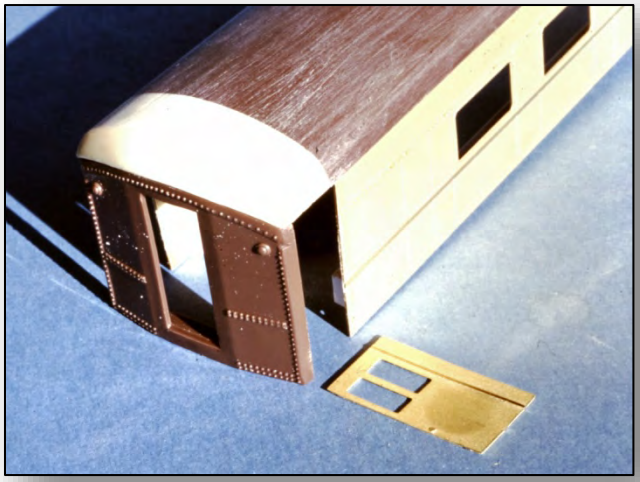
(Above left) The end cap is glued to the end of the roof. Note that the curvature of the roof is higher than that of the end cap. The roof will be sanded to match in a later step. (Above right) Framing is glued to the interior of the sides to properly space the sides relative to the roof, and provide a support structure for the removable floor. Fillets of five-minute epoxy were added to strengthen the CA joint.

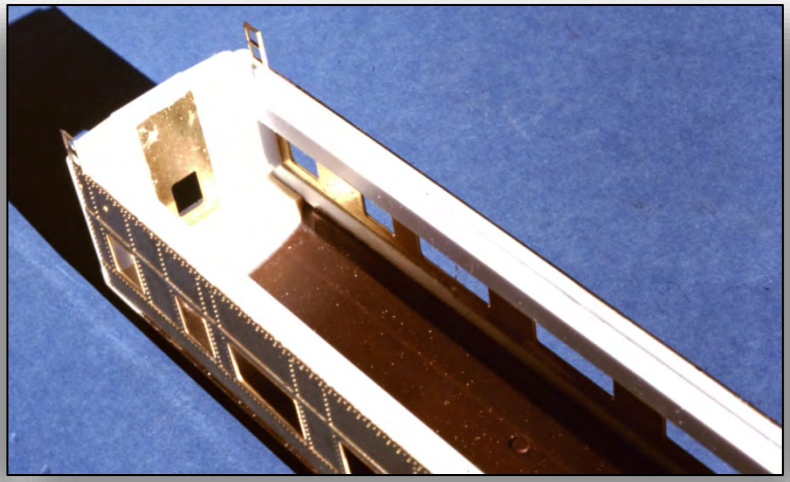
In modeling projects, it often helps to start with the most challenging operation; after success there, everything else is downhill. In the case of the P70gsR, I was least comfortable with getting smooth joints between the roof and its end caps, so I started there. A few test measurements convinced me that the resulting total length of the roof would be about the same as the length of the sides plus their separate vestibule doors, so I kept the length of the roof and end caps as-is, and did only minor touchup to the end surfaces of the roof and end caps with a file, making sure that the joint did not result in a banana-shaped roof.

To glue an end cap to the roof, begin with a drop of CA near one edge of the roof and align that side with the end cap. As the CA dries, repeat for the opposite edge. With the two sides perfectly aligned, run a bead of CA under the roof along the entire joint. Repeat for the other end of the roof. Even with the sides aligned, it is likely that the peak of the roof and end caps will be slightly misaligned. On my model, the roof was slightly higher than the end caps at the peak. Correct this by laying a sheet of medium sandpaper on a perfectly flat surface such as a plate of glass, then dragging the roof longitudinally along the sandpaper, rotating the roof to avoid flat spots. Continue to refine the joint with fine, then 400-grit sandpaper until satisfied with the joint. I found it unnecessary to use any body putty filler.

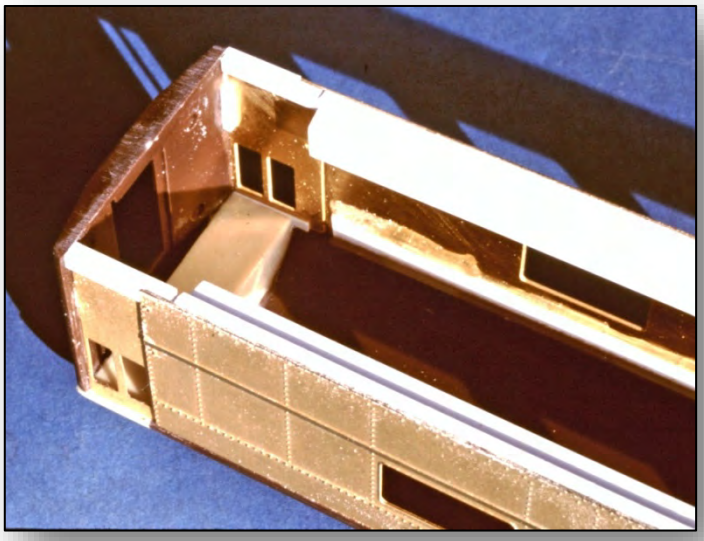
Add the Sides

I used styrene strip framing behind the sides to space the sides at proper width relative to the roof and to support the removable floor. The backs of the photoetched sides have a mirror finish, just the thing for poor glue adhesion. Having had a bad experience with a prior model, I now take special pains to achieve a strong joint between the side and its framing.





(Left) With the ends and sides glued to the roof, the carbody takes shape; the vestibule doors will fill in the remaining gap in the sides. Note that the roof has been sanded to match the curvature of the end caps. (Right) Interior of assembled carbody at blind end. Note that the plain baggage-car-style end door has been replaced with NKP Car's brass door featuring a modernized window.



Carbody interior, vestibule end.

Begin by scarifying the back of the side with medium sandpaper; this will give the side a bit of "tooth" for glue adhesion. With a file, remove any unwanted edge tabs left over from the photoetching process. Wash the sides thoroughly with a non-oily detergent such as Ivory Liquid.

The framing at the bottom of the side is .060 in. x .250 in. styrene strip, with a .125 in. x.188 in. strip glued atop it flush with its top to provide an L-shaped member to support the floor. This arrangement will allow our .060 in. styrene floor to be flush with the bottoms of the sides. Cut the L-shaped member slightly shorter than the side, and glue it with CA flush with the bottom of the side (see photos). To achieve perfect alignment, run a bead of CA the entire length of the side, then lower the styrene strip starting with one end, checking alignment as you go.

The framing at the top of the side is .020 in. x .156 in. Cut the strip slightly shorter than the side and glue it with CA flush with the top of the side. At the blind end of the side, glue a short vertical strip of .125 in. x .125 in. between the top and bottom framing strips, flush with the end of the side. For extra insurance, I like to run a bead of five-minute epoxy along the joint between the side and the styrene framing members. With clean scarified brass and epoxy strengthening, no glue joints have dared to release since my earlier learning opportunity.

Glue the sides to the roof/end assembly, making sure that the sides are properly oriented, blind end of the side to the blind BCW end. The photoetched vestibule doors will fill in the remaining space between the ends of the sides and the vestibule ends. Glue them in place with CA, strengthening the joint with the end with a scrap of styrene strip. Fill in under the doors with a .060 in. x .080 in. styrene strip (the .080 in. dimension is vertical) glued to the back of the side and butting against the end. Glue a second strip of .020 in. x .080 in. styrene cut equal to the width of the door atop the first strip; the top surface of this strip should be flush with the surface of the door.

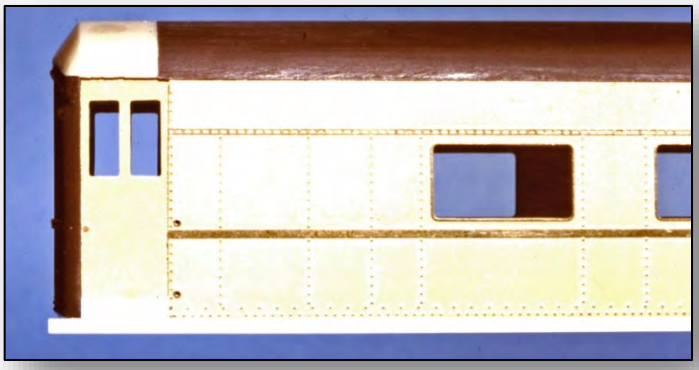
You should be feeling good – it's beginning to look like a passenger car!

Cut Out the Floor

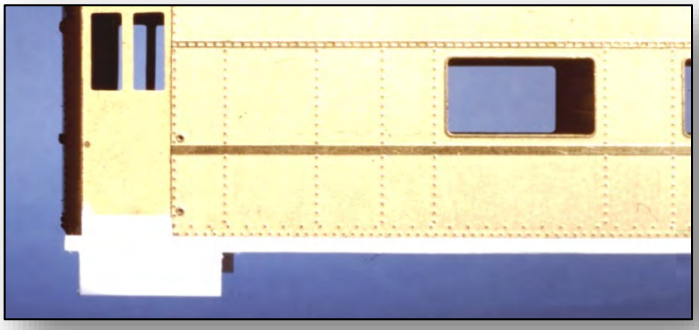
Rather than use the ECW floor provided, I chose to make my own from .060 in. styrene sheet. To avoid bowing the sides of the carbody with handling, I cut the floor and temporarily installed it before proceeding with any other steps. For my model, the dimensions of the floor were 8 ft. 6 in. x 75 ft. 6 in. Snap the floor into the carbody, adjusting its dimensions as needed for a snug fit.

Add the Skirting

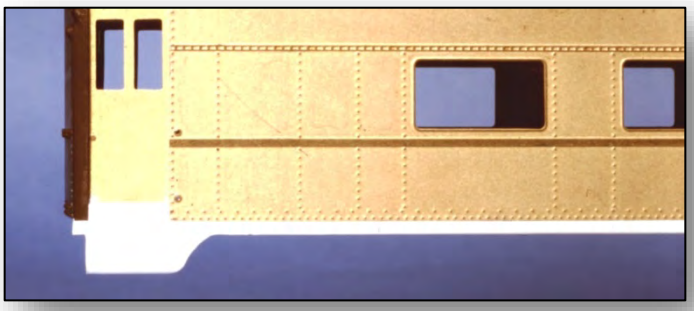
For my early-50s model, I elected to go with partial skirting, with full skirting only at the vestibule end to accommodate the retractable steps. For a full-skirted model, the technique for the vestibule end can be applied along the length of the carbody.



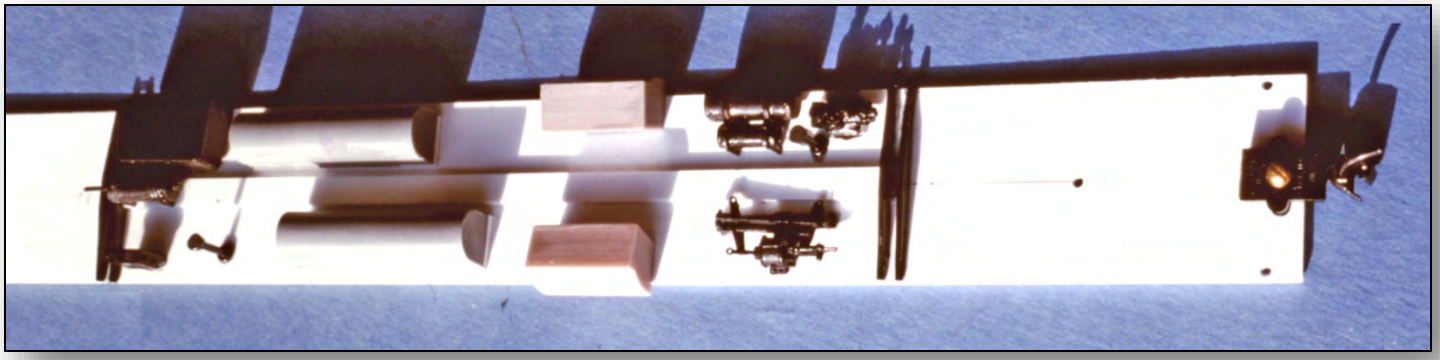
The gap under the vestibule door is filled with .080" styrene strip, followed by partial skirting of .060" styrene strip glued along the entire length of the carbody.



A strip of .188" styrene is added below the partial skirting to represent the full skirting at the location of the retractable steps.



With a file, shape the inward curve of the full skirting and the S-curved cutout for the truck.



On my P70gsR, I modeled only the underbody detail visible when viewing the carbody from the side. The battery boxes were mounted at an angle to compensate for their incorrectly molded side curvature.

We'll do the skirting the same way the Pennsy did – as an afterthought add-on to the carbody. Measuring from photos, I estimated the partial skirting to be about 7 in. high, and the full skirting to be a 1 ft. 8 in. add-on to the partial skirting. This converted to .060 in. x .060 in. styrene strip for the partial skirting, and .060 in. x .188 in. strip for the full skirting add-on. Cut a .060 in. x .060 in. strip slightly longer than the carbody and glue it to the bottom of the side, flush with the exterior surface and butting against the stirrup at the blind end. Cut a length of .060 in. x .188 in. strip 4 ft. 3 in. long and glue it to the bottom of the .060 in. x .060 in. strip at the vestibule end. Be sure the strip is perfectly flush with the .060 in. x .060 in. strip. The end of the strip should extend 1 in. past the outboard edge of the vestibule door.

After allowing the glue to dry thoroughly, use a convex needle file and a mill file to form the "S-curve" truck cutout. Complete the skirt by rounding it inward with a mill file until its bottom is a knife edge. Finish the partial skirting by rounding the sharp corner along its bottom edge.

Cut a .040 in. x .250 in. strip a scale 2 ft. 3 in. long, and divide it diagonally into triangles; glue these behind the skirting under the end of the car to form the receptacles for the retractable steps. File the end of the skirting flush with the surface of the triangles.

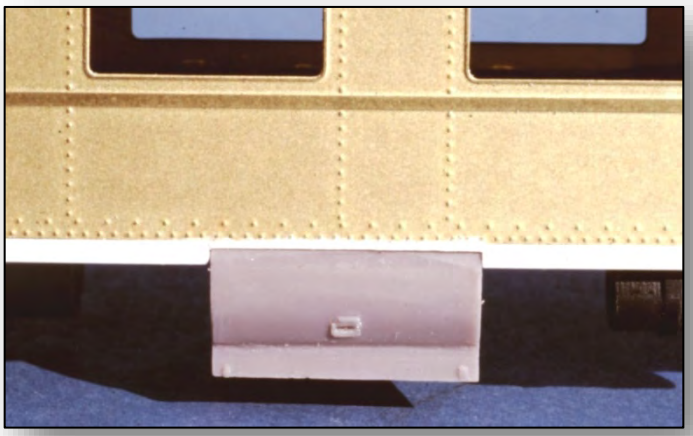
Complete the Floor

Remove the floor from the carbody and layout the centerline, and the truck centers 56 ft. 3 in. apart. Insert the floor in the carbody and locate the coupler mounting holes 2 ft. 3 in. inward from the outer edge of the carbody end. Drill (No. 50) and tap for the trucks and couplers.

Custom battery boxes for the gsR's and kR's are available separately from NKP Car, with one needed for each side of the car. Using the photos as a guide, locate the position of the battery box at the bottom of the car side, and notch the skirting to accommodate it. The second battery box is directly opposite. The mounting surface of NKP Car's battery boxes is improperly oriented, causing them to bubble outward from the side rather than match the inward curve of the skirting. Correct this by filing the mounting surface of the battery box to an angle.

Replace the floor in the carbody, and glue the battery boxes to the floor, extending them through the notches in the skirting to be flush with the outer surface of the sides. On my model there was a slight gap between the battery box and the bottom of the side which I filled with a scrap of styrene strip.

Remove the floor. Trim the bottoms of the ECW cross bearers so that their ends will rest on the floor, and glue them 8 ft. 0 in. inboard from the truck centers; trim their width to match the floor. Cut a center sill from .060 in. x .188 in. styrene and glue it between the cross bearers.



The battery boxes were glued to the removable floor, and mounted in a gap in the partial skirting. A thin shim filled a gap between the top of the battery box and the bottom of the brass side.

File the mounting surface of the ECW air-conditioner so that its front surface will be vertical when mounted, and using the photos as a guide, glue it to the floor. Likewise, add the ECW regulator, generator, air tanks, and steam traps; a BCW brake cylinder; and two New England Rail Service water tanks. The Pennsy water tanks are quite plain, and I filed all detail from the NERS tanks before installing them; mount the tanks on a slab of .040 in. styrene.

Insert the floor into the carbody, and drill (No. 55 for tap hole, No. 51 for clearance hole) for six 0-80 x 3/16 in. screws – a pair at each end, and a pair at the center.

Detail the Carbody

Install Westerfield 18 in. drop grabs at the bottom of the ends on either side of the diaphragm opening. Detail Associates L-shaped caboose end grabs are handy for the end grabs on the blind end; modify them so that their inboard end terminates in the vertical diaphragm support. All remaining grabs are non-standard, and must be bent from .012 in. dia. wire; locate them using the photos as a guide.

Stirrups are required adjacent to the retractable steps at the vestibule end; I slightly widened the base of A-Line stirrups, and mounted them horizontally into the sides of the retractable steps.

Uncoupling levers are needed at the right hand corners. I bent mine from wire and on the vestibule end suspended it from a DA eyebolt glued to the retractable step receptacle. On the blind end, the uncoupling lever is suspended from a strut located behind the stirrup. Drill for an eyebolt in a short length or .030 in. x .030 in. styrene strip; drill a No. 56 hole in the bottom of the end, and jam the top of the strip into the hole and glue it for a solid joint. Terminate the uncoupling levers in a hole drilled in the bottom of the coupler box; we'll mount the levers after painting.

On the roof, a circular escape hatch is located above the second window at the blind end of the carbody. With a three-ring punch, punch a hatch from .010 in. styrene and glue it in place. One of the large ECW roof vents is needed at the joint between the roof and end cap at the blind end; drill (No.42) and glue the vent in place.

When the full-width diaphragms were removed from the prototype P70gsR's in the late-1940s, Pennsy's shops typically left intact a short lip extending from the ends of the roofs and the sides which filled the gap between the carbody and the FWDs. In later years, this lip was removed from the roof, leaving the plain Mansard-style end as presented in the cast resin roof end caps. In the aforementioned *TKM* article, Steve Hoxie presents a technique for modeling this lip with excellent results on his P70kR. For my P70gsR model, I omitted the lip, not trusting my modeling skills to achieve a respectable result on the cast resin end caps. I like to believe the possibility that some gsR's operated in the early 1950s with their roof lips removed.

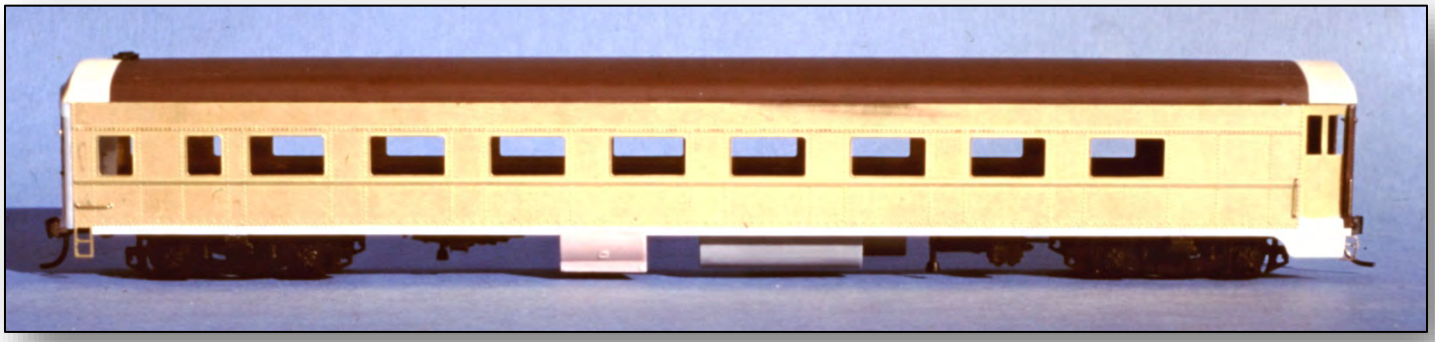
Cut away the circular bottom tabs from the ECW diaphragm faceplates, and glue the faceplates to the bellows. Fabricate support bars from .025 in. dia. styrene rod, terminating in short lengths of .030 in. x .030 in. styrene strip glued at the bottom on each side of the faceplate. Narrow the ECW interior vestibule end so that it will fit into your carbody, and glue it atop the floor about 3 ft. 0 in. from its end. Reinforce the joint with a scrap of styrene.

Steam and air hoses will enhance the detailing of the carbody end, and can be added now if you desire them on your model. I omitted them as an operational nuisance.

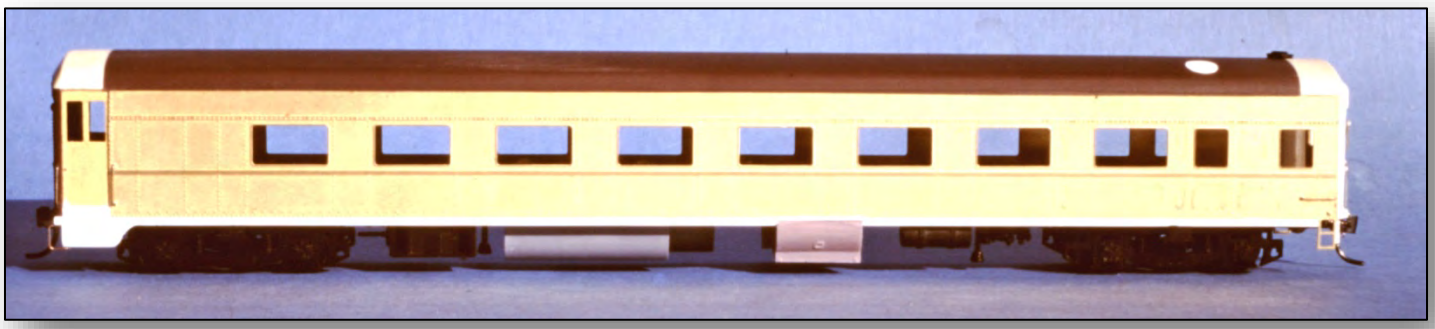
Trucks

The P70gsR prototype used class 2D7P2 roller bearing trucks, which I simulated with the ECW trucks supplied with the kit. Walthers non-roller-bearing B60b trucks are an alternative option.

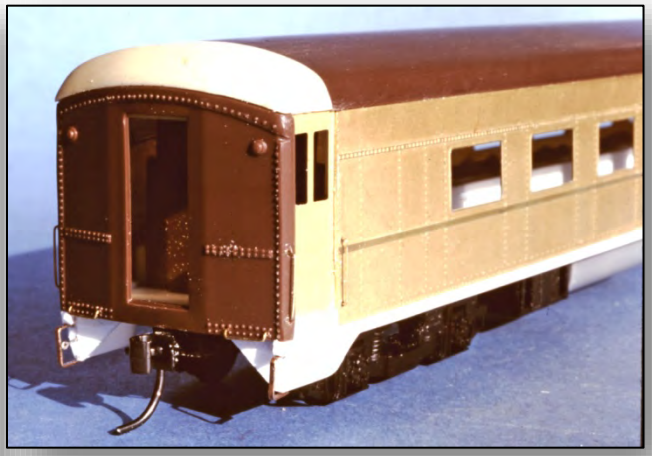
ECW's truck design incorporates the side bearings into the truck frame, but I prefer to mount the side bearing separately on the bottom of the car side. If you choose this approach, omit the strut from the truck that glues to the bottom of the side bearings. You'll need to shorten the side bearings by the height of the partial skirts before gluing them in place. Kadee 36 in. wheelsets run smoothly in the ECW sideframes.

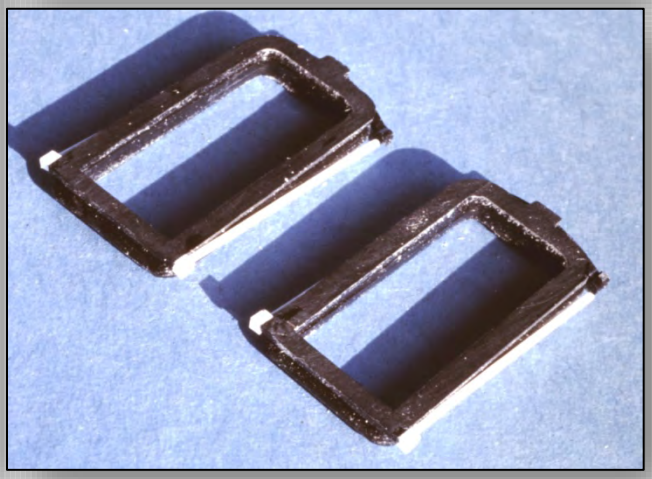


Completed unpainted carbody, left side.

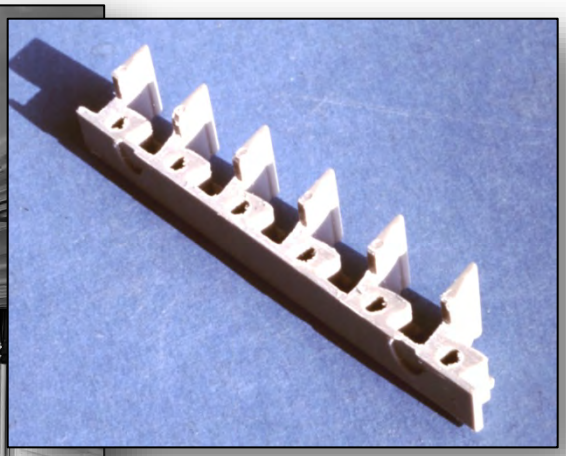


Completed unpainted carbody, right side. Note the escape hatch and vent on the roof.





(Above left) Completed blind end; note the profusion of grabs on this end. (Top right) Completed vestibule end; stirrups were added adjacent to the retractable steps, and fewer grabs were required on the carbody end. (Above right) The Eastern Car Works diaphragms were modified by removing the bottom tabs and adding support rods.



(Left) The modernized P70gsR interior was comparable to the new lightweight coaches of the early 1940s with reclining seats, upgraded lighting, and stylish luggage racks. This photo dated 5/29/42 likely shows the interior of #4194. *PRR photo, Chuck Blardone collection.* ***(Above) Pikestuff seats were notched to fit around the interior framing.***

Painting and Lettering

Begin with a coat of primer to normalize the color of the various carbody components. Paint the sides and ends of the carbody and the uncoupling levers with Scalecoat II Tuscan Red. Mask the carbody, and paint the roof black. Paint the underbody, diaphragms, and trucks Grimy Black. Mask the battery boxes and paint the top 6 in. Tuscan to match the partial skirting. The underbody appurtenances, diaphragm end plates, and trucks will benefit from weathering with a light overspray of dark rusty grunge.

I lettered the car for my early-50s era, and used decals from Champion Decal Company, now out of business. If you are fortunate to have Champ's Pennsy decals in your inventory, post-1952 Dulux lettering is available from either the PH-82D or PH-153 sets. Matching stripes are found in set S-88. Alternative decals are available from Microscale in their #87891-87894 decal set series.

Locate the top single stripe just above the horizontal rib above the windows. The bottom stripe pair is located atop the belt rail. The decal alignment jig shown in the March 2002 issue of *Model Railroader*, page 62, will assure straight stripes and lettering.

The roadname is horizontally centered on the letterboard midway between the stripe and the top of the side. The car numbers are centered on the lower sides above the trucks midway between the bottom of the lower stripe pair and the top of the skirting. Correct numbers for the gsR's are 4194-4243.

Seal the decals with a satin overcoat such as Floquil Flat Finish for a clean, freshly painted car, or with a flat finish such as Testors Dullcote for a car which has run some miles since being washed. Avoid a glossy finish, which will make your model look toy-like.

Final Detailing

As one disinclined to model what I can't see, few of my passenger cars have interior detail, but with seatbacks clearly visible through the picture windows of the gsR's in most photos, I made an exception. Pikestuff offers economical coach seats spaced at exactly the correct pitch. By notching them with a cut even with the seat tops and about 10 in. deep, they can be made to fit atop the framing at the bottom of the side; a razor saw works well for this operation.

Where visible in prototype photos, the seats appear to be a textured dark green; I simulated this color with a base coat of Coach Green followed by a light overspray of Pullman Green. Antimacassars for the seat backs were cut from 8 in. white stripe decals, 12 in. wide.

Install windows using your favorite window material. Note the frosted glass in the lavatory windows. The window shades on the prototype are an olive drab color, which I was able to match with the inside surface of a cardboard Pendaflex file folder. Glue the shades in place using contact cement. Varying the height of the shades will give your model a "lived in" look. Glue the seats to the sides; the tops of the seat backs should extend about 1/3 the height of the windows.

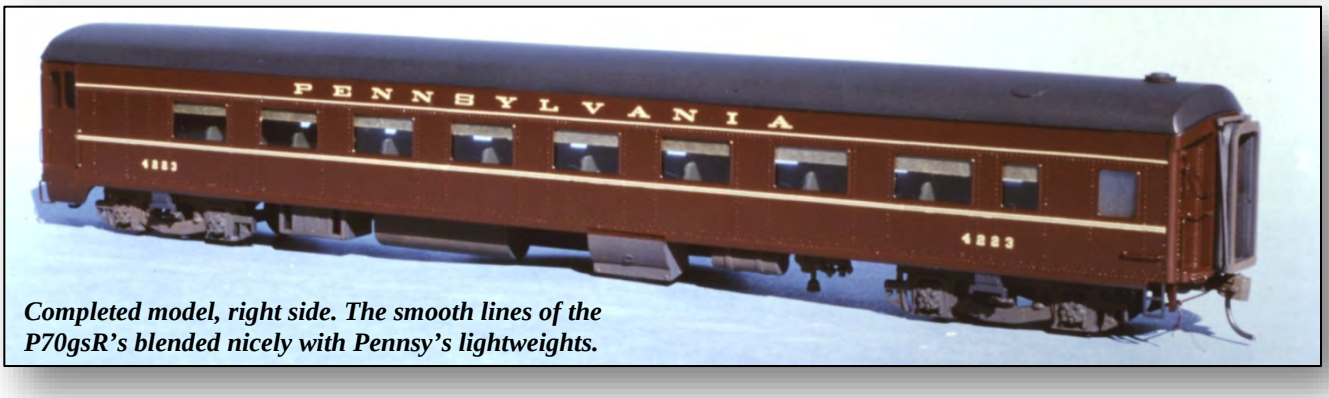
The completed carbody weighs about four ounces. If adhering to the NMRA recommended weight chart, two additional ounces of weight should be added in the carbody interior.

Secure the floor to the carbody with 0-80 screws, and install the uncoupling levers. Install the diaphragms, couplers, and trucks. Your P70gsR is now ready to roll!

Photo References

To build a good model, one needs good photos. Published photos are available in the following references. Note that kR photos are useful for the gsR, and vice versa. The right or left side of the car is determined by looking from the vestibule end.

- *PRR Color Guide to Freight and Passenger Equipment, Vol. 1*, David R. Sweetland and Robert J. Yanosey
  - Pg. 13, P70gsR No. 4214, 3/4 right side, partial-skirts, 1959.
- *PRR Color Guide to Freight and Passenger Equipment, Vol. 3*, Ian S. Fischer:
  - Pg. 7, P70gsR No. 4200, right side, partial skirts, FWD, FOM, 1948.
  - Pg. 8, P70gsR No. 4240, right side, unskirted, 1967.
  - Pg. 8, P70kR No. 4264, right side, partial skirts, 1956.
- *Pennsylvania Railroad Passenger Trains, Consists, and Cars – 1952, Vol. 1*, Harry Stegmaier, Jr.
  - Pg. 8, P70gsR No. 4240, right side, unskirted, 1967.
  - Pg. 19, P70kR No. 4292, left side, partial skirts, 1951
  - Pg. 26, P70gsR No. 4336, right side, unskirted, narrow windows, 1967.
  - Pg. 88, P70gsR No. 4214, 3/4 right side, partial skirts, 1959.
- *Pennsy Streamliners*, Joe Welsh
  - Pg. 39, P70kR No. 4269, 3/4 right side, full skirts, FWD, FOM, 1940.



Completed model, right side. The smooth lines of the P70gsR's blended nicely with Pennsy's lightweights.

Parts List

A-Line

29000 Stirrups

Bethlehem Car Works

12 UC Brake System

Detail Associates

2206 Eyebolts
2504 Wire, .012 in. dia.
6504 Caboose Grabs, L-Shaped

Evergreen

124 .020 in. x .080 in. Styrene Strip
127 .020 in. x .156 in. Styrene Strip

Evergreen, cont.

131 .030 in. x .030 in. Styrene Strip
149 .040 in. x .250 in. Styrene Strip
186 .125 in. x .125 in. Styrene Strip
188 .125 in. x .188 in. Styrene Strip
219 .025 in. dia. Styrene Rod
353 .060 in. x .060 in. Styrene Strip
354 .060 in. x .080 in. Styrene Strip
358 .060 in. x .188 in. Styrene Strip
359 .060 in. x .250 in. Styrene Strip
9010 .010 in. Styrene Sheet
9040 .040 in. Styrene Sheet
9060 .060 in. Styrene Sheet

New England Rail Service

230 Water Tank

NKP Car

P70gsR Kit
Battery Boxes (2)

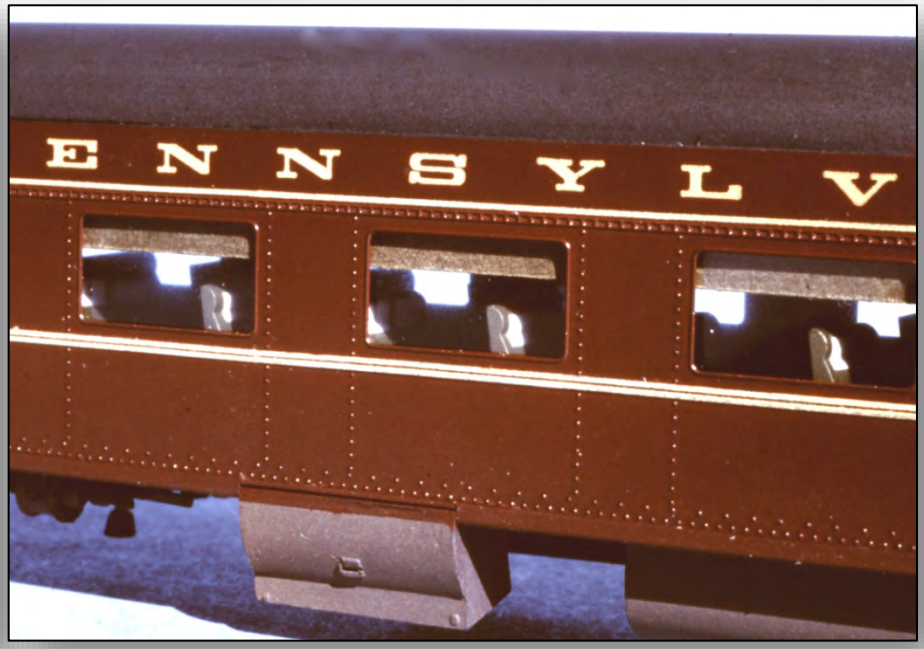
Walthers

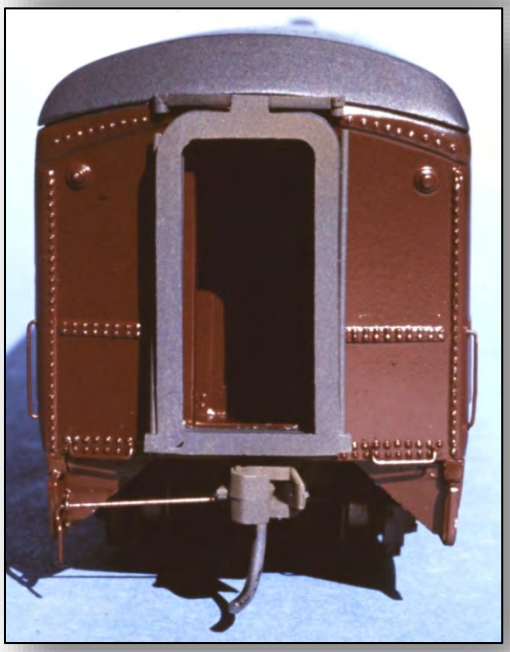
1012 0-80 x 3/16 in. Screws

Westerfield

1197 Grabs, 18 in. Drop

Decals and Paint, see text





(Above left) Completed blind end.

(Left) Completed vestibule end.

(Above) The gsR's large windows beg for interior detailing. The Pikestuff seats were painted a textured olive green, with decal antimacassars added. The top of the battery box was painted Tuscan to match the partial skirting. NKP Car's small photoetched rivets show nicely in this photo.