

# Scratchbuilding PRR Class Gd, Gn and Gg Wooden Hoppers

By David J. Vinci



<Figure 01.jpg>

During the first 25 years of the 20<sup>th</sup> century, the rolling stock mixture on the Pennsy was really interesting to me mainly because this was the transition period from wooden cars to all steel cars. In the photo above, you can see the 30 ton Gd, the 40 ton Gn and the 40 ton (later 50 ton) Gg classes of wooden hoppers standing in front of a 70 ton H21. These cars were all running on the property at the same time!

PRR Class		Years of Construction	# Built/owned	Railway Equipment Register 1919	Railway Equipment Register 1925	Note
GB	wood	1874-?	~20,000	28	0	1
GD	wood	1886-95	~15,000	12	0	1
GG	wood	1895-98	2,800	1,072	12	1
GH	wood	1896-98	~1,000	27	0	1
GN	wood	1898-1902	4,000	2,481	53	1
GL	steel	1898-1904	20,138	20,082	18,652	2
GLA	steel	1904-15	30,256	30,195	27,106	2
H21	steel	1909-51	39,699	34,990	32,837	2
H22	steel	1912-14	4,500	4,500	4,500	2
H25	steel	1919-27	5,287	857	2,942	2

Notes: Years or construction, # built/owned information from:

- 1 Fisher, Ian, *Wooden Gondola Cars of the Pennsylvania System*, Keystone Vol. 19 No. 1, Spring 1986.
- 2 Teichmoeller, John, *Pennsylvania Railroad Steel Open Hopper Cars*, Highlands Station, Aurora, CO., July 2000.

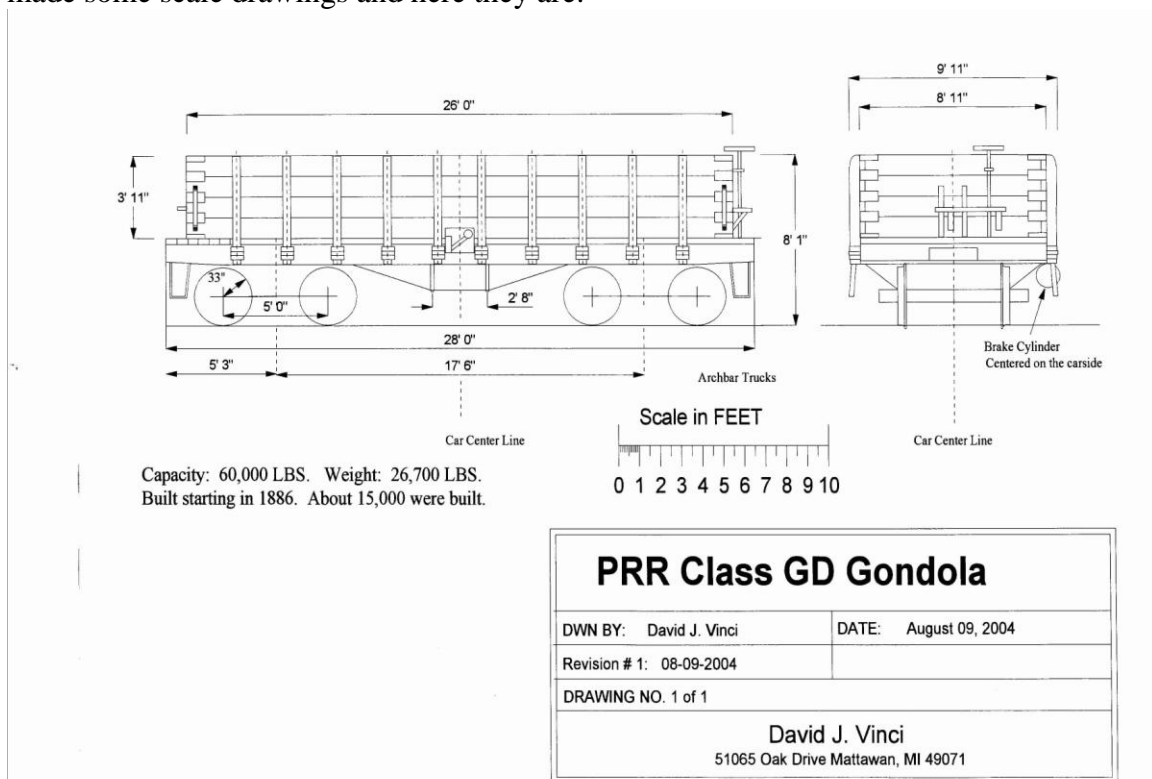
As you can see in the table above, the new steel hopper cars had replaced most of the wooden hoppers by 1919 but there were a very few still wandering around as late as 1925. At least that's what the Railway Equipment Registers report and assuming I didn't

miss a few lines while pouring over the endless tables of data. In any case, that's why I find these cars interesting to have wandering around my layout.

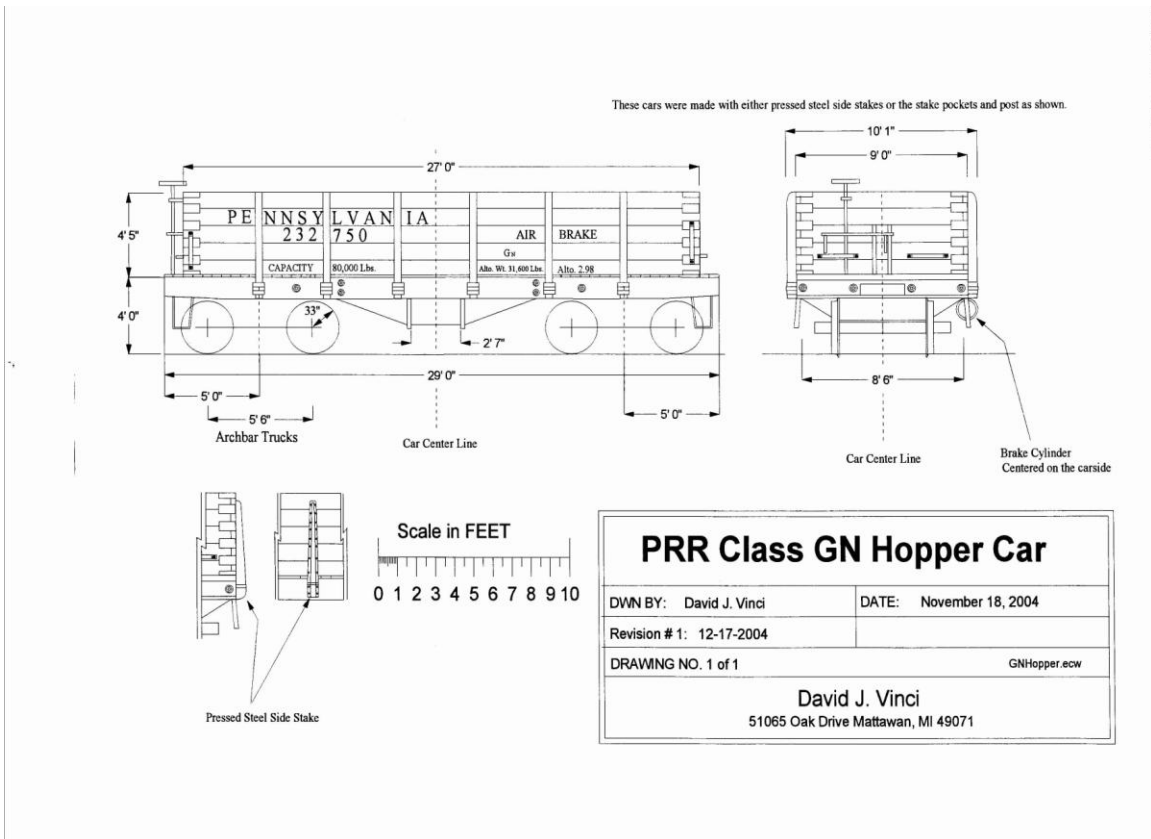
The Gd class was first built in 1886 and in fairly large numbers (between 12,000 and 15,000). It was pretty much the standard PRR hopper until the steel hoppers showed up. The 4,000 40 ton class Gn cars were built from 1898 until 1902 and were the last of the wooden hoppers that lines east produced. The 1895 Gg class was strictly a lines west car and in many ways is the design plan for the steel hoppers that followed it. It was designed to be self-clearing as opposed to the lines east designs which had to be emptied by laborers with shovels. The Gg was built initially with a capacity of 35 tons but was later upgraded to 40 tons and finally 50 tons. This was accomplished by replacing the trucks. More information on the history of these hoppers may be found in Ian Fisher's fine article, Wooden Gondola Cars of the Pennsylvania System in the Spring 1986 issue of the Keystone (Vol. 19 No. 1).

It has been my experience that hopper cars tend to be a little more difficult to scratchbuild than other types of freight cars. I figured that the wooden hopper cars of the Pennsy wouldn't be all that hard, I mean they're just little boxes on wheels, right? Well, not exactly... that turned out to be true for the Gd and Gn classes but the Gg turned out to be a .... er, let's just say it took a bit more effort.

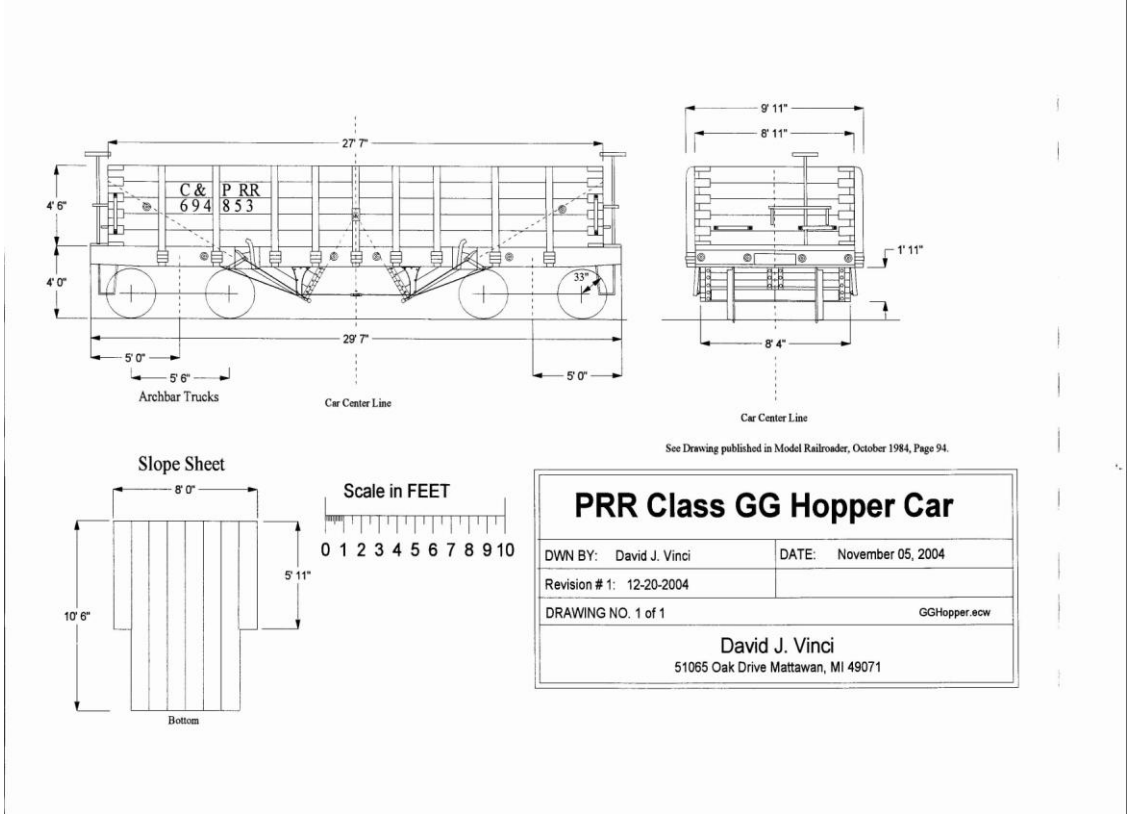
I decided to build these three cars together so the differences would be more apparent. I made some scale drawings and here they are:



<Figure 02.jpg>



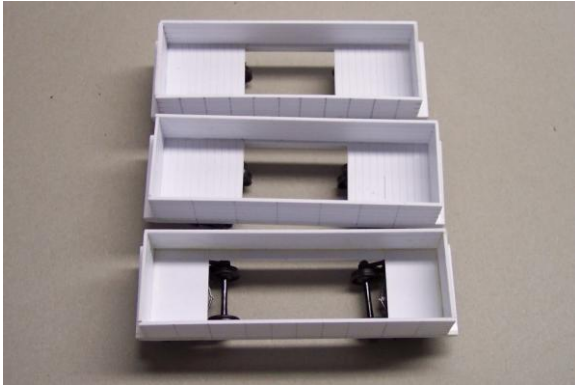
<Figure 03.jpg>



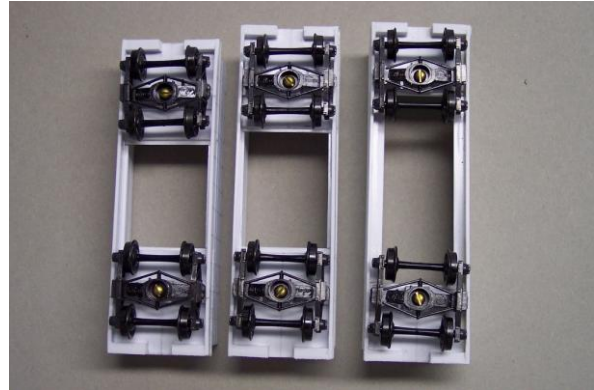
<Figure 04.jpg>

I recommend that you make a copy of the drawings to full size in your scale and then you can take measurements right off the drawings with your scale ruler. Many times I place the parts right on the drawings and mark the placement of items directly onto the parts.

The construction methods are pretty much the same as those I used in the building of the Class Gi and Gk wooden Gondola cars (see: TKM, September 2004).



<Figure 05.jpg>

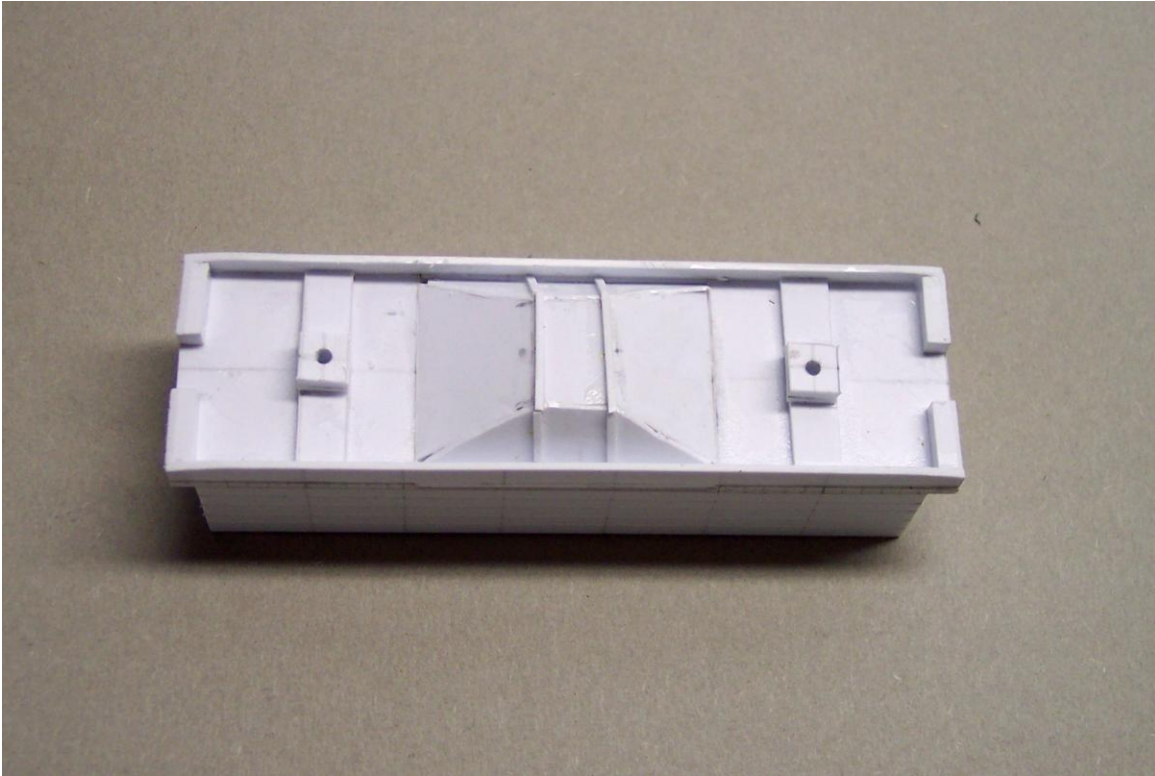


<Figure 06.jpg>

The basic car forms were made using 0.040" styrene sheet for the ends and sides and then I scribed the boards with my No. 11 hobby knife. Once complete, I cemented the 4 sides together making sure they were square. I cut side sills from 0.040" x 0.156" strip and cemented a piece of 0.040" material on top for the sub-floor. This time because the cars have hopper bottoms, I made just the ends of the floors and left the middle open (see figure 5 and 6). The length of these floor pieces you can get from the drawings, as they are different for each car. The Gn is measured from the end of the car to the second stake on the side. The Gd goes from the end of the car to the 3<sup>rd</sup> stake on the car. The Gg is measured from the end of the car to the point where the dashed line marking the slope sheet crosses the top of the side sill at the 2<sup>nd</sup> side stake. I used some strips of 0.040" material to fill the space between the 2 pieces of floor. The Gd and the Gn are not self-clearing cars, so I laminated a piece of scribed material on top of the sub-floor. The next step was to cut 2 pieces of 0.125" x 0.125" strip for the end sills with a gap left between for the coupler pocket. I use a Kaydee No. 5 coupler box that I glued together for a clearance template. The couplers are installed later. I made up truck bolsters using a 2' wide strip of 0.040" plastic and a pile of three 2' x 2' pieces of 0.040" placed in the center. This will place the trucks and couplers at pretty much the correct height. The Gg turned out to be a special case again and I had to raise the body just a bit to allow the trucks to clear the slope sheets. So, use 4 pieces of 0.040" squares to make the truck bolsters for the Gg and make a 0.040" shim for the coupler box too. Once the truck bolsters are assembled, drill and tap them for a 1/4" 2-56 brass screw. Once that is complete, glue the bolsters in position on the car bottom.

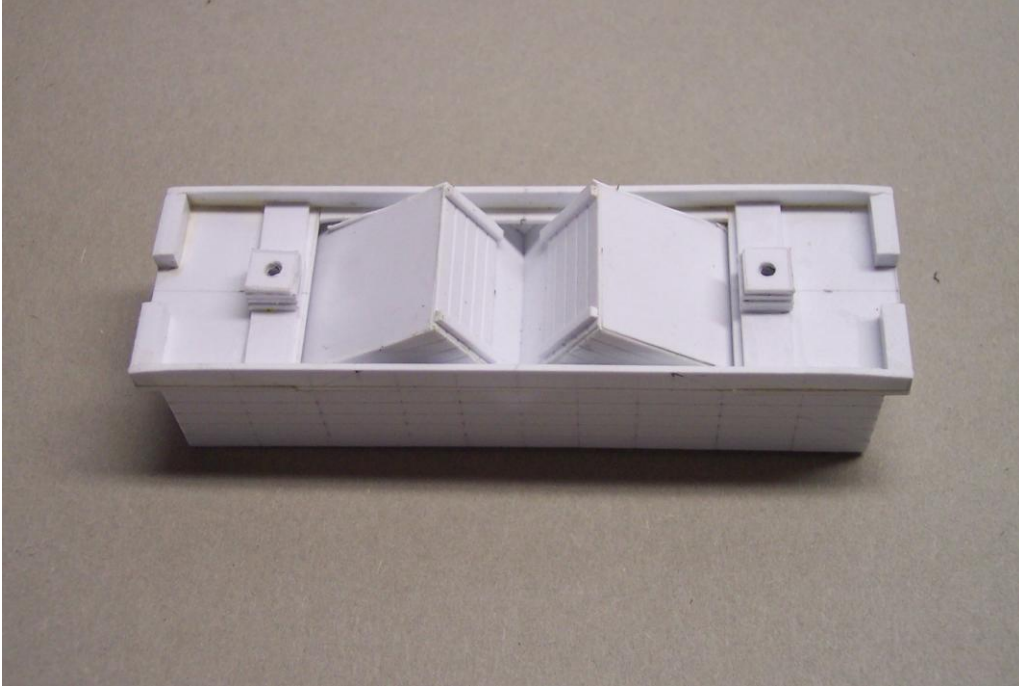
The next step is to position the pre-assembled sides on top of the floor assembly. Again, make sure everything is square and apply cement. Place the car on top of your scale

drawing and mark the position of the side stakes. Then using a small square or drafting triangle draw a line up the car side at each stake location. You can mount the trucks to check clearances and the cars should look like Figures 5 & 6. The trucks I used are Kaydee #501 archbar trucks.



<Figure 07.jpg>

The construction of the hoppers came next. The Gd and Gn were relatively easy to do. I cut a rectangle for the door area from 0.040" plastic scale 2' 7" x 5' 6". The sloping ends of the hopper were trapezoids that were the width of the floor opening at the bottom and 5' 6" at the top with a height of about 6'. I made these of 0.030" sheet plastic. Glue these three pieces in position and then make the sides of the hopper bottom from 0.020" sheet. I cut a piece a bit oversize, placed it in position, marked it, trimmed it and glued it in place. I used pieces of 0.030" x 0.040" strip to add the exterior bracing. The result looks like figure 7.

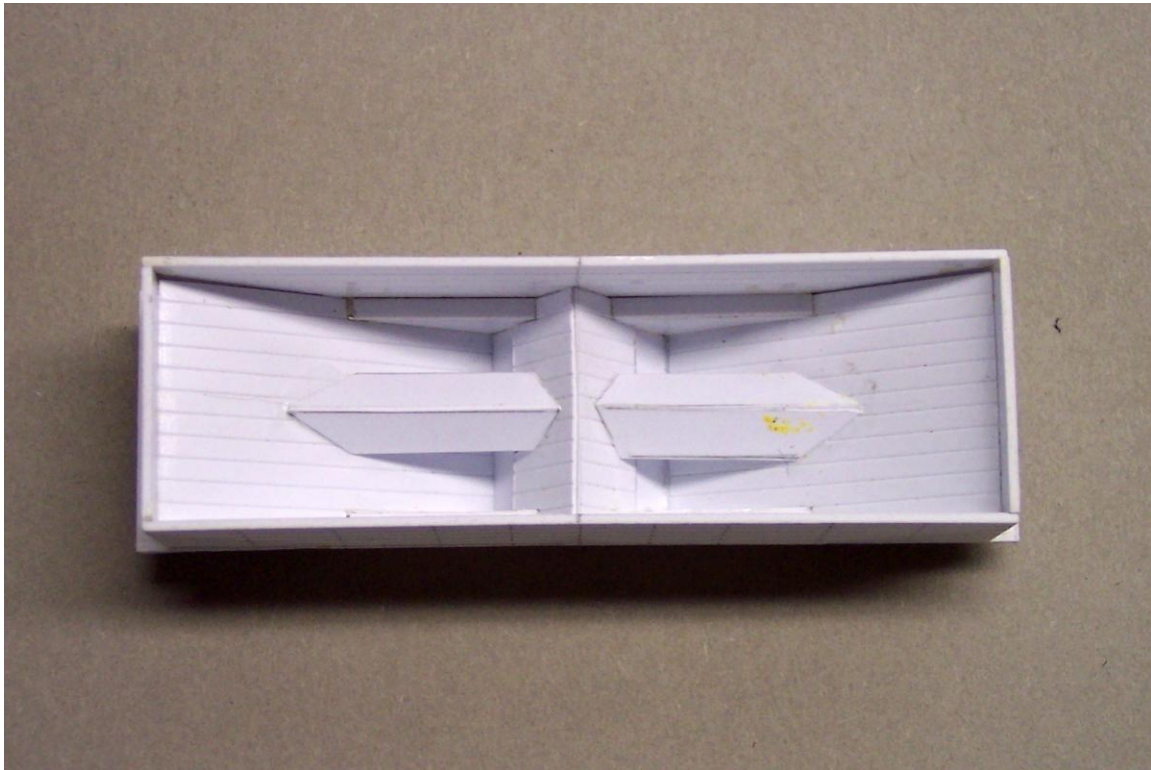


<Figure 08.jpg>

The Gg was a bit more challenging. First cut the slope sheets from scribed sheet plastic as shown on the drawing (see figure 4). The positioning of the slope sheet is such that the top of it is about 12" down from the top of the end and follows the dashed line on the drawing. When properly placed, it should rest against the inside end of the sub-floor. The space under the slope sheet and above the sub-floor turns out to be a great place to hide some car weights, so add them before gluing the slope sheets in place.

In the center of the car is a sloped sheet that follows the dashed lines on the drawing. I made these from some 0.020" sheet. These should be about 4' deep and 8' wide so they extend from side to side and only as far down as the bottom of the side sill. You will have to cut a notch for the side sills just like the end slope sheets. Both sides were cut in a single piece and then I scored the centerline and bent it to get a nice clean top edge. Don't break the two pieces apart, just score and bend. Place the part in position and cement it to the sides. Next I cut the hopper doors from some scribed sheet and glued them in place. These get cemented to the bottom of the end slope sheet and the bottom of the center slope sheet. Now all you have to do is cut the sides of the hoppers from the same scored sheet that you made the slope sheets from. Note that the boards should be parallel to the end slope sheets. I added some 0.030 x 0.040" strips to the doors about 3" from the edges. The car should look like figure 8 at this point. The last part of the hoppers to install is the slope sheet that covers the center sills. Yes, I know, we didn't build center sills but all we have to do is put the shields in and it will look like we did. You're going to make a rectangle of 0.020 or 0.030" stock and score and bend it lengthwise. You have to cut these to fit so the angle of the end cuts correspond to the angle of the slope sheets. They are at about the same height as the side sills. I just tinkered with one of them until it fit, then I cut a duplicate for the other side and tinkered

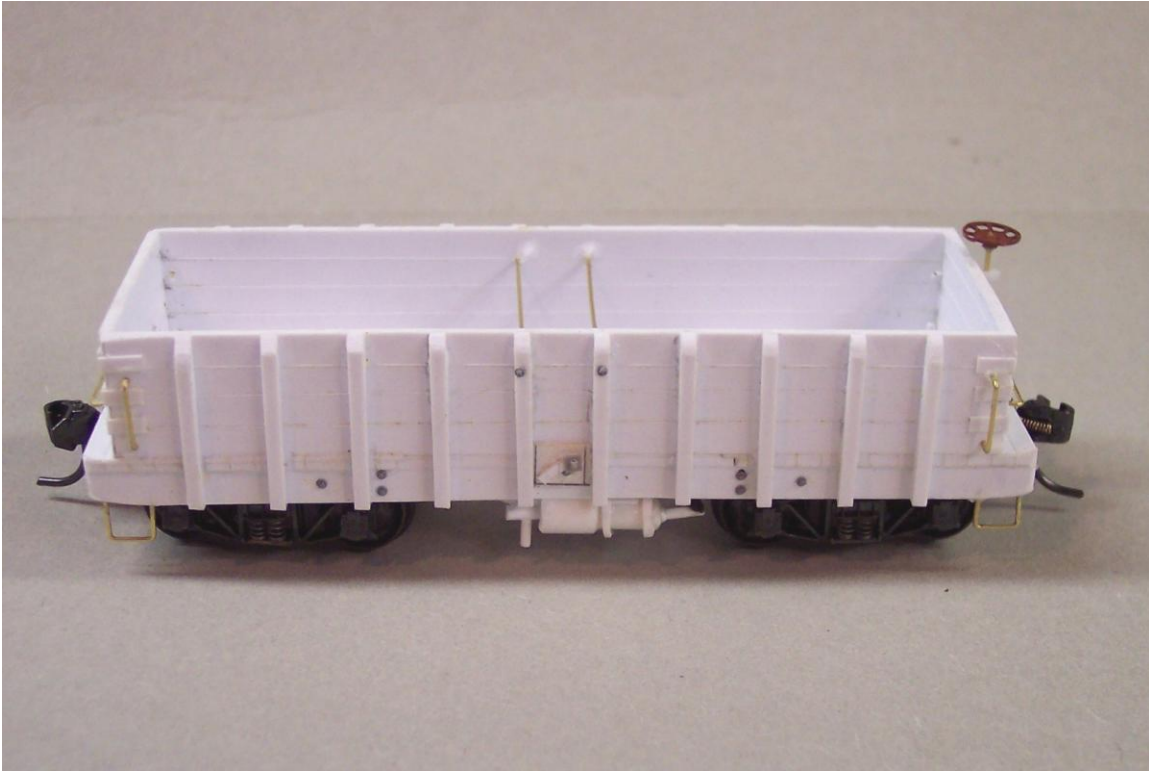
with it until it fit. Add a piece of trim to fit between the side wall and the hopper side wall and it should look something like figure 9.



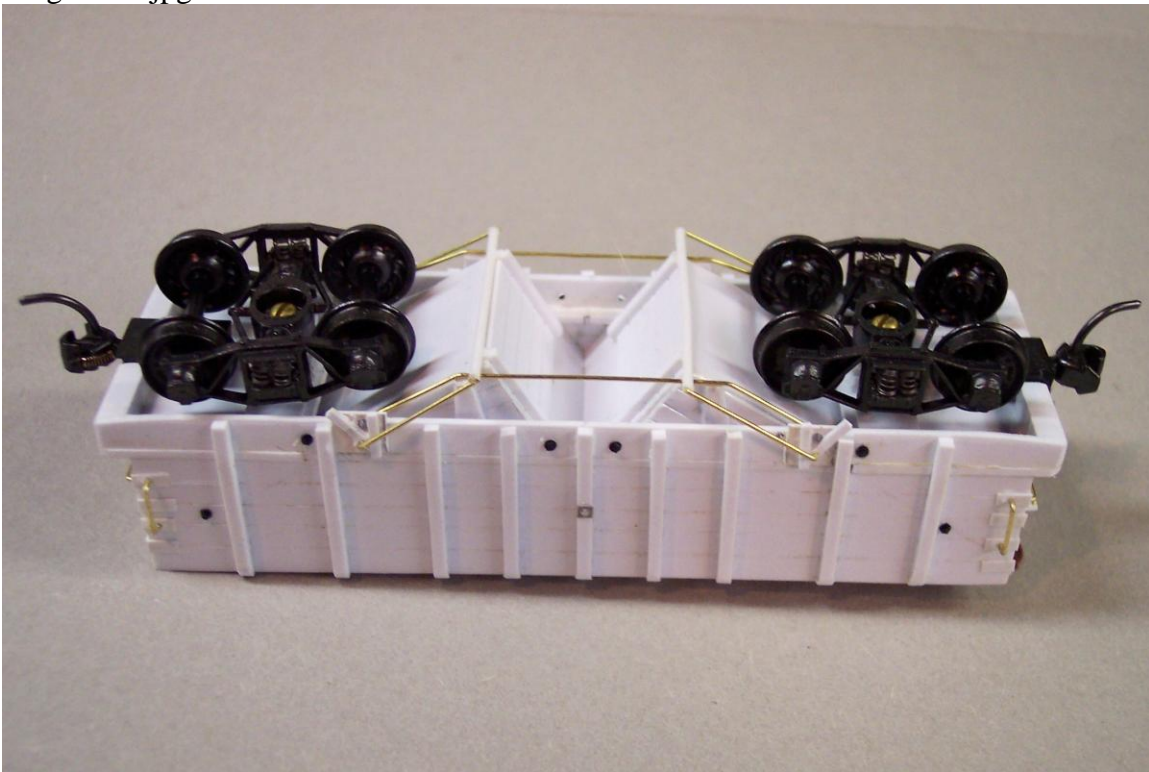
<Figure 09.jpg>

Well, that's the tough part. What remains is to cut the side stakes for each car from 0.060 x 0.060" strip. Glue one at each location that you marked earlier. If you cut them a little long so they stand just proud of the top of the carbody and the bottom of the side sill, you can then trim them flush. Sand the stakes level with the top of the carbody and then sand the profile into them. You can do this by placing a piece of sandpaper on a flat surface and hold the car on a 45° angle and slowly shape the stakes by moving the car. You have to roll the car as you sand to the point where the car side is against the sandpaper. It sounds more complicated than it really is. Just go slow and they will look great.

What remain are the details. You will need 2 K type brake cylinders, one for the Gd and one for the Gn. The Gg had these positioned under the slope sheet at one end of the car so we don't have to model it because it isn't visible. You will need some nut, bolt and washer castings, brake wheels, wire for grab irons, truss rods and stirrup steps. The door operation mechanism is different on each car so just follow the prints. I just made stuff that looked close. The Gg was the most intricate but it wasn't difficult.



<Figure 10.jpg>



<Figure 11.jpg>

Figure 10 shows the Gd with the details added. I scratchbuilt the brake cylinders just for grins but a commercial casting would look very nice. Figure 11 shows the Gg upside



down so you can see the truss rod and the door operation mechanism. They look close to the photos and drawings and after they're painted and weathered the viewer's mind will fill in the details I left out.

I painted these cars with my handy Freight car red blend. I use a mix of Poly S<sup>®</sup> Special Red Oxide, Reefer Orange and Caboose Red. Once the base coat was dry, I added just a little rust on the metal parts here and there. The interiors of these cars are mostly wood and are subject to substantial wear that is akin to sandblasting. That happens when you haul rocks and coal. I painted the inside surfaces with grey and streaked them with tarnished black, rail brown and a little rust here and there. The trucks I painted with Rail Brown and added some rust stains with diluted Poly S<sup>®</sup> Rust. Once the lettering was complete, I dry brushed the exterior with Rail Brown and a bit of grey. One has to use the grey sparingly because even though it helps the detail really pop out, it can be over done. Oh yeah, I brush painted this car.

I lettered these cars using Westerfield XL decal sets along with a Condensed RR Roman alphabet set for the class letters and reporting marks. I also used a set of Walthers Old-time Freight Car Data decals for a few items.



<Figure 12.jpg> Figure 12 is the Gd hopper with the 1902 style of PRR lettering.



<Figure 13.jpg> Figure 13 is the finished Gn hopper with the lettering style from 1920.



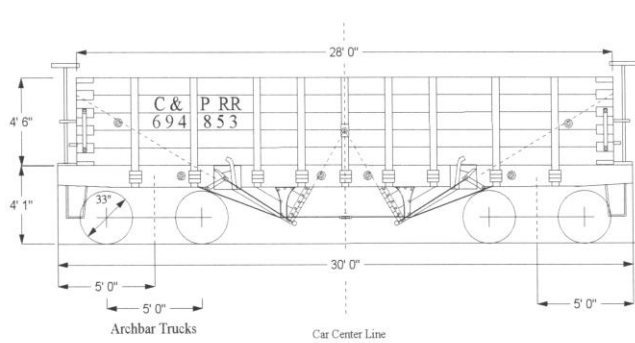
<Figure 14.jpg>

Figure 14 is the Lines West class Gg hopper. These were all Lines west cars so I chose the Cleveland and Pittsburgh Railroad. They only had about 375 of this class of car but I like variety and I didn't have a car lettered for this line. The lettering style is typical for the 1890's time period.

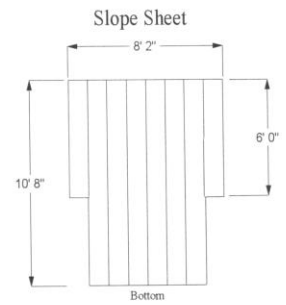
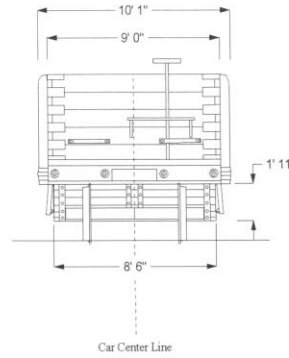
One of the problems I ran into was that of car weight. The Gd and Gn have no place to put any weight so I ended up adding permanent coal loads. This allowed me to add some weights over each truck and some lead shot in the hopper bottom with the coal load over all so the weights were hidden. The Gg was less of a problem as I added weights under the slope sheets and after the car was finished, I added some lead shot in the space between the hoppers from the bottom. So, here they are wandering around my layout.



<Figure 15.jpg>



Full Size for HO Scale



See Drawing published in Model Railroader, October 1984, Page 94.

<b>PRR Class GG Hopper Car</b>	
DWN BY: David J. Vinci	DATE: November 05, 2004
Revision # 1: 12-20-2004	
DRAWING NO. 1 of 1	GGHopper.ecw
<b>David J. Vinci</b> 51065 Oak Drive Mattawan, MI 49071 Published in The Keystone Modeler, No. 19, February 2005	

Drawing as later corrected. – DJV.