

**Conductor Railway Hobbies
LLC**



Chicago Burlington & Quincy Waycar

Product Reference Guide

2 Rail O Scale

Western Style Caboose (CB&Q) #3612

Made In The USA

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Contents

Contents	I
0.1 Introduction	1
0.2 Components	13
0.3 Assembling	15

0.1 Introduction



Figure 0.1: Concept Model Chicago Burlington & Quincy Waycar

The Western Style Caboose (CB&Q) #3612 Kit product may require some moderate skills in model building. It should be challenging, fun and allow the modeler to innovate or try new ideas in the process. Please read this entire document of assembly instructions and the references herein before starting to assemble your Western Style Caboose.

The western style caboose, also known as a waycar was one of those outstanding products in a line of kits in the All Nation Hobby Shop years ago. The Chicago Burlington & Quincy (CB&Q) was featured being one of the most popular models on many layouts.

Upon our acquisition of the All Nation Line, it seemed the CB&Q Waycar stood out among all the other reference models and kits in the inventory. The original reference models were still in tact and there was extensive supporting documentation. Consequently, I decided this would be the first kit to be resurrected and made available for sale to model builders.

After researching the original development of the kit as sold by All Nation, examining the parts for accuracy and materials used, I determined with today's technology, a little re-engineering would vastly improve the model by metrics and final realism. With computer aided design software and ultimately 3D printing, I have enabled many other options for modelers when they go to build this model. In the past, the kit was primarily wood, Swarthboard scribed sides, and a few castings. It is easier to build in feature options such as modeling interior detail if so desired given our use of technology tools at our disposable today. For example, if the modeler does not want the standard sides, those that contain only 4 windows on each side and would

rather the CB&Q Waycar with a baggage door, the sides are interchangeable. This would also be the case if you were modeling a CN&W or Colorado & Southern Caboose.

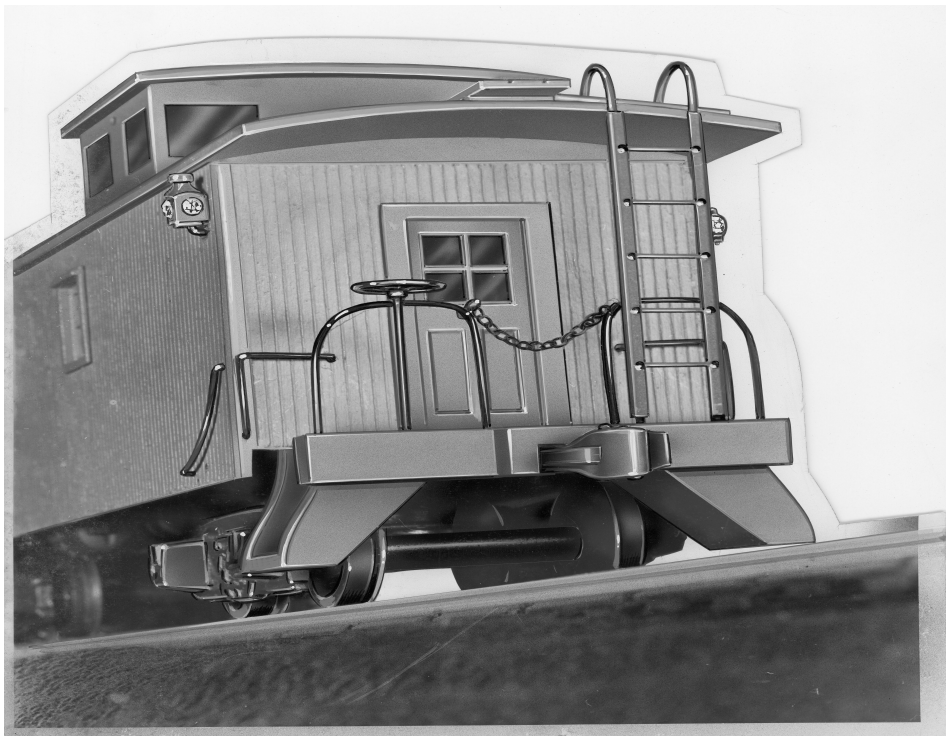


Figure 0.2: Concept Model Chicago Burlington & Quincy Waycar



Figure 0.3: Concept Model Chicago Burlington & Quincy Waycar



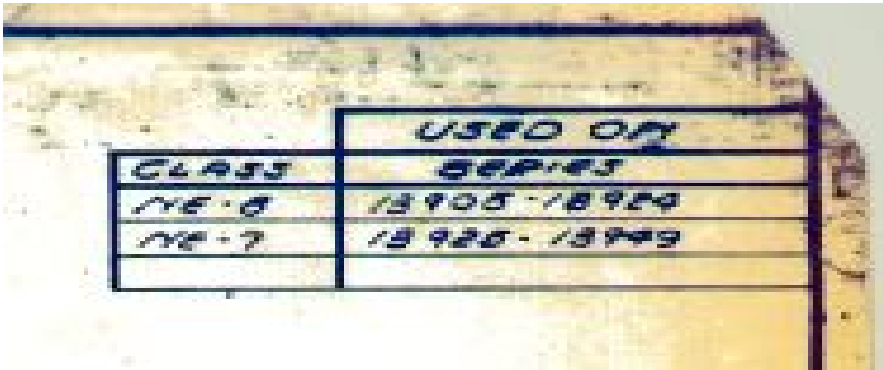
Figure 0.4: Concept Model Chicago Burlington & Quincy Waycar

As a starting point and a quick introduction toward building this model, I recommend my video that illustrates the progression of bringing this kit together. The video link on my website is at:

Modeling The Waycar

You will also note that across many photographs of western style waycars, there are many different configurations both on exteriors and interiors. For example, the location of baggage doors may differ. The referential information about these differences extends back to the original engineering blueprints that the railroad used to describe a specific class of car whether those were ordered from a manufacturer or built in-house.

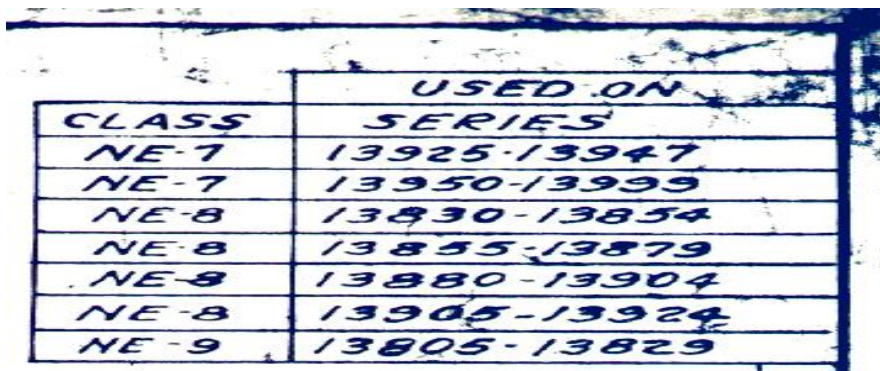
The master blueprints, particularly for maintenance departments was crucial to know these differences. In most blueprints, a legend would define these for cross referencing when reading and interpreting the print. The following snippets are found on either drawings or blueprints as examples.



A photograph of a blueprint legend table. The table is drawn with dark lines on a light-colored, textured background. It has two columns and four rows. The first row is a header with the words 'CLASS' and 'USED ON'. The subsequent three rows contain handwritten entries. The first entry is '17E-6' and '13905-13924'. The second entry is '17E-7' and '13925-13949'. The third row is empty.

CLASS	USED ON
17E-6	13905-13924
17E-7	13925-13949

Figure 0.5: Blueprint Legend

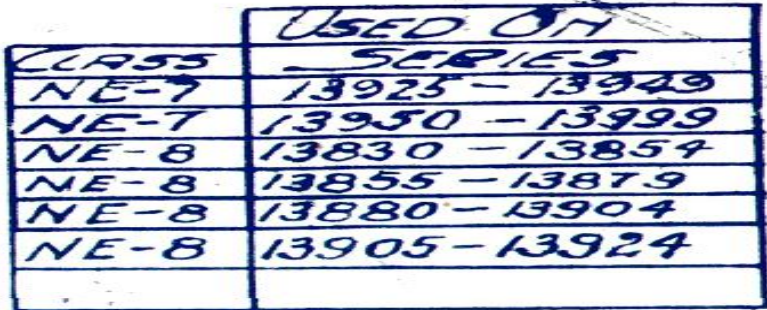


CLASS	USED ON
	SERIES
NE-7	13925-13947
NE-7	13950-13999
NE-8	13830-13854
NE-8	13855-13879
NE-8	13880-13904
NE-8	13905-13924
NE-9	13805-13829

Figure 0.6: Blueprint Legend

CLASS	USED ON SERIES
NE-7	13950-13999
NE-7	13925-13949
NE-8	13905-13924
NE-6	13880-13904
NE-8	13855-13879
NE-6	13830-13854
NE-9	13805-13829
NE-9	13765-13789
NE-9	13790-13804

Figure 0.7: Blueprint Legend



CLASS	SERIES
NE-7	13925 - 13949
NE-7	13950 - 13999
NE-8	13830 - 13854
NE-8	13855 - 13879
NE-8	13880 - 13904
NE-8	13905 - 13924

Figure 0.8: Blueprint Legend

And another drawing that depicts a window on only one end of the car.

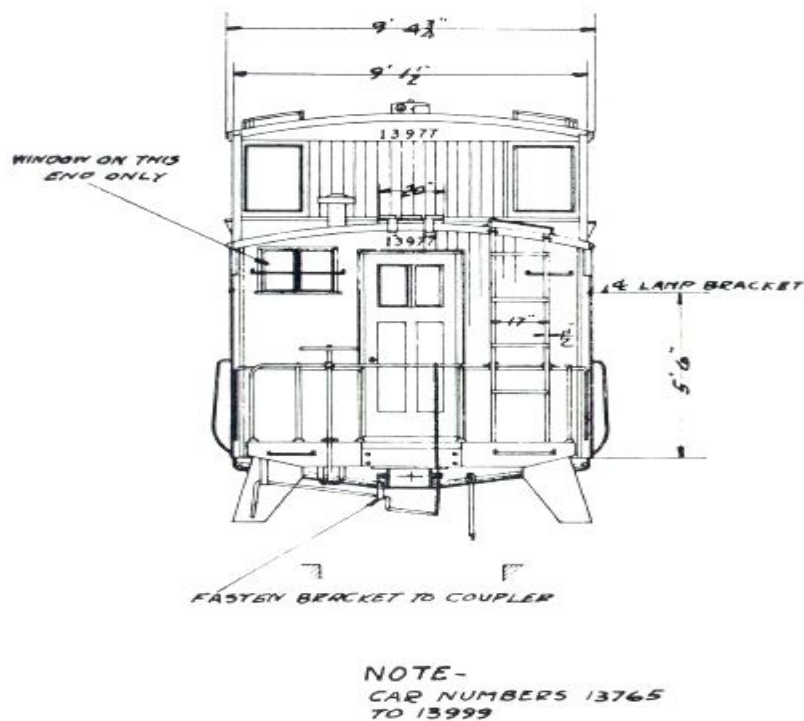


Figure 0.9: Drawing with reference to a car series.

For the modeler, blueprints are not only enlightening, but it aids in determining how much detail one would want to build

into the car. Original CB&Q blueprints are available for sale on DVD from All Nations for anyone interested in getting to this level of detail.

The advantage of re-engineering the CB&Q kit is the fact that we have eliminated all wood screws and pins as sold with the original kit. On the other hand, there are more parts today that come with the kit for two reasons. One, we can print to a finer level of detail for the most realism. Two, more parts facilitate options for the modeler in terms of super detailing or just a good looking operational model without for example putting the interior detailing.

Consequently, we are selling a basic kit version and a comprehensive version. The basic kit does not come with a full sub-assembly of detail parts. The comprehensive kit has many more detail parts and will be limited runs. The comprehensive sub-assembly of detail parts is dependent on sourcing and availability.

Below is a general parts list to help identify the contents of the kits. Detail parts may or may not be in the box depending on our sourcing and availability. All super structure parts are included in both the basic and comprehensive kits.

0.2 Components

Basic Kit Bill of Materials Parts List

Quantity	Part No.	Description
1	#6100	Roof, PLA, 228mm x 65mm x 7mm
2	#6101	Brace, PLA
2	#6102	End, Sub, PLA
1	#6103	Floor, PLA, Scribed
2	#6104	Sides, PLA, Scribed
2	#6104B ¹	Sides, PLA, Scribed/Baggage Doors
2	#6405	Support, End, Platform, PC, Z Bar
2	#6106	Sheathing/Skin, PLA, Scribed
1	#6107I	Cupola, Sheathing/Skin, PLA, Interior
1	#6107E	Cupola, Exterior/Skin, FLEX
1	#6108	Underframe, PLA, See #6103
2	#3168	Door, PLA
1	#3181C	Roofwalk, PLA
1	#3513A	Roofwalk Supports, Printed on #3181C
2	#6109	Quarter-round, PLA, Exterior Roof Trim
2	#6110	Roof Ends Trim, PLA
4	#6114	Cupola Sheathing/Ext/Skin, PLA, Scribed
8	#3167	Window Frames, PLA
2	#3178	Platforms, Cast
4	#3179	Steps, Cast
1	#6011	Smokestack, Cast
1	#3183	Vent, Globe, Cast
2	#3051	Marker Light, Cast/Brackets
2	#697	Jewels, Marker Light, Red
6	#166	Screws, Wood, 1 x 3/8, for Couplers
2	#3177	Sides, Cupola, Cast
1	#3177A	Cupola, Corner Angle Iron, PLA
2	#6012	Fronts/Backs, Cupola, Cast
4	#3182C	Turnbuckles, plastic

Quantity	Part No.	Description
2	#3014	Supports, Roofwalk, Metal Stamping
2	#6112	Supports, Handrail, Roof, Cupola Stock #3182
2	#3182	Brass Straps
1	#1907	Wire, Brass, 0.025 x 10
2	#805	Couplers, Kadee #805
2	#3847	Trucks, Caboose
4	#3009	Irons, Grab
2	#1903	Wire, Brass, 0.032 x 10
2	#6113	Handrail, Platform
2	#6111W	Ladders, End
2	#3027	Bolsters, PLA, Brass Nuts Embbeded
4	#C1260	Screws, Brass, 2-56, Bolster
1	#1698B	Freight Brake Set
2	#C1404	Screws, Trucks, 4-40 x 5/16
2	#1532	Springs, Truck Bolster
2	#C2031	Washers, Truck Bolsters
4	#3151	Jewels, Marker Light, Green
2	#3001	Brake Wheel
1	#5050	Acetate, Windows, 1.75x10
1	#61	Brake Wheel
2	#6115	0.12x3/32x12 Strip Wood Facia Board

1

¹Optional

0.3 Assembling

The first thing you will note upon inspection of the parts is that most are "as is" coming off the printer build plate. Therefore, some amount of work will entail removing any of the brim around the perimeter of the part or support material required by the print process. Some lite filing or sanding may be required to clean up the flash after removing the brim. In some cases where tolerances are very tight may also require some sanding or polishing of moving parts.

There is no "right" way to go about assembling this kit. My way here is a general suggestion or path. However, I would recommend laying out all the parts and identify them to become familiar with the parts if you have never built a caboose kit before. Once you are comfortable with the parts and their descriptions, think about some early decisions such as whether or not interior detailing will be part of your process. In so doing, think ahead of time about priming and painting and whether or not that makes sense before or after gluing certain components. Laminating skins or surfaces to a part such as the car ends or roof.

Let's start by having a quick look at the floor in the following 2 FreeCAD screen shots.

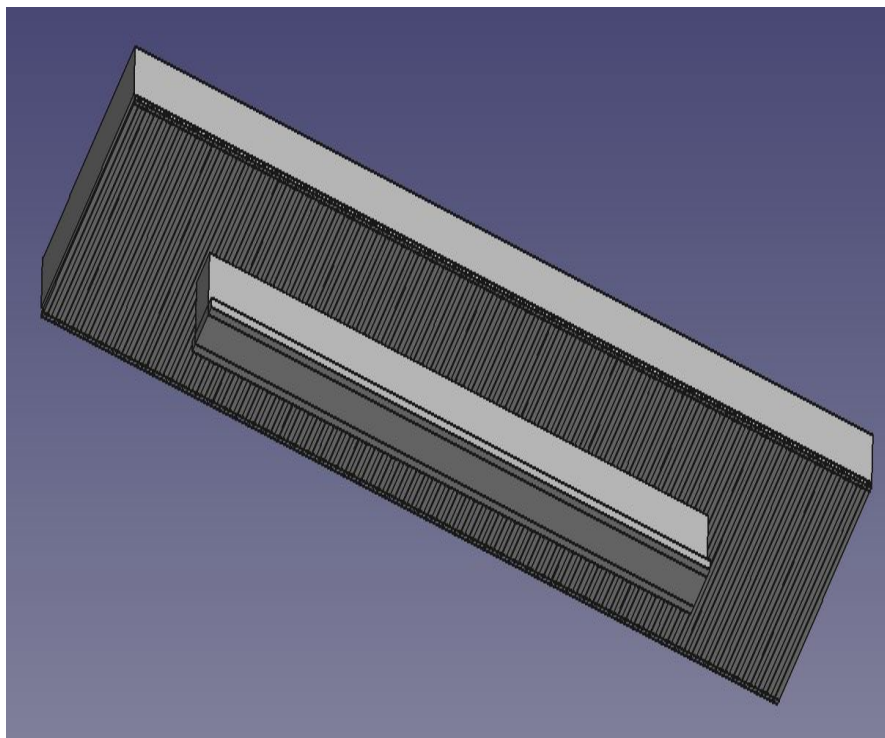


Figure 0.10: Underside of the floor with center sill.

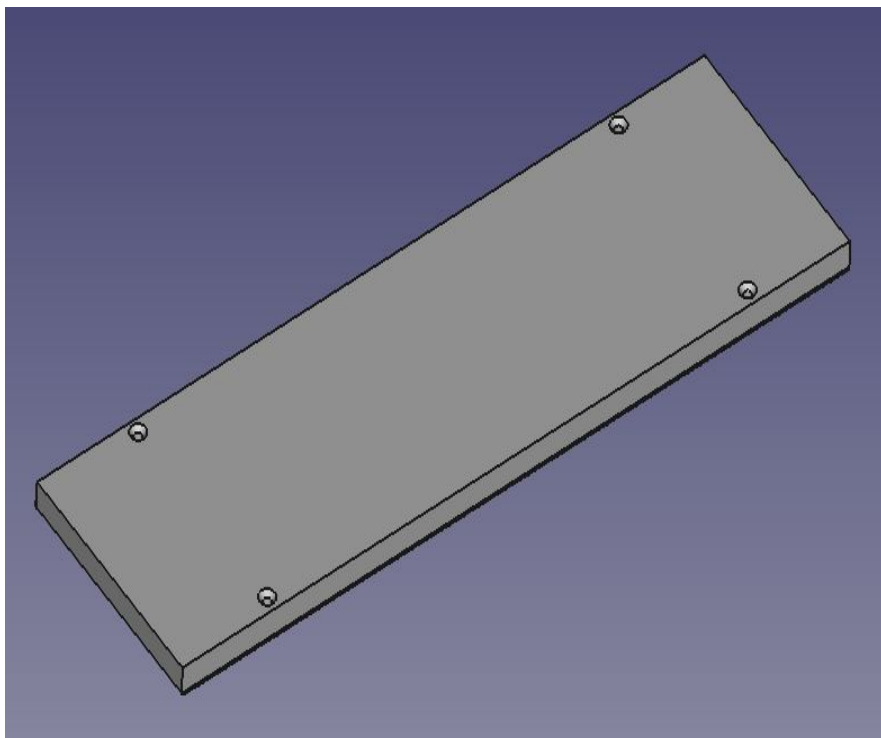


Figure 0.11: Top side of floor with bolster mount pilot holes.

The original kit came with wood floor, ends, roof and bracing. Wood screws were used to mount the bolster to the wooden floor

whereby the head of the screws were visible and not prototypical. With a redesigned bolster, we have embedded 2 2-56 nuts to hide the mounting using 2 flathead countersunk machines screws to be used from the floor topside. Later in the construction, the inside floor skin can be laminated over completely hiding the screws. The bolster also has a 4-40 nut embedded for the king pin screw for mounting the trucks.

The first step is to start building the inner frame of the car using the floor and gluing the ends followed by the bracing. Note the end with the inset should be outward facing so that the doors can be snapped into place later. When gluing the ends I would recommend Walther's Goo since it sets well but has some rubber elasticity to it even after 24 hours. Make sure when gluing, the ends are square with the floor.

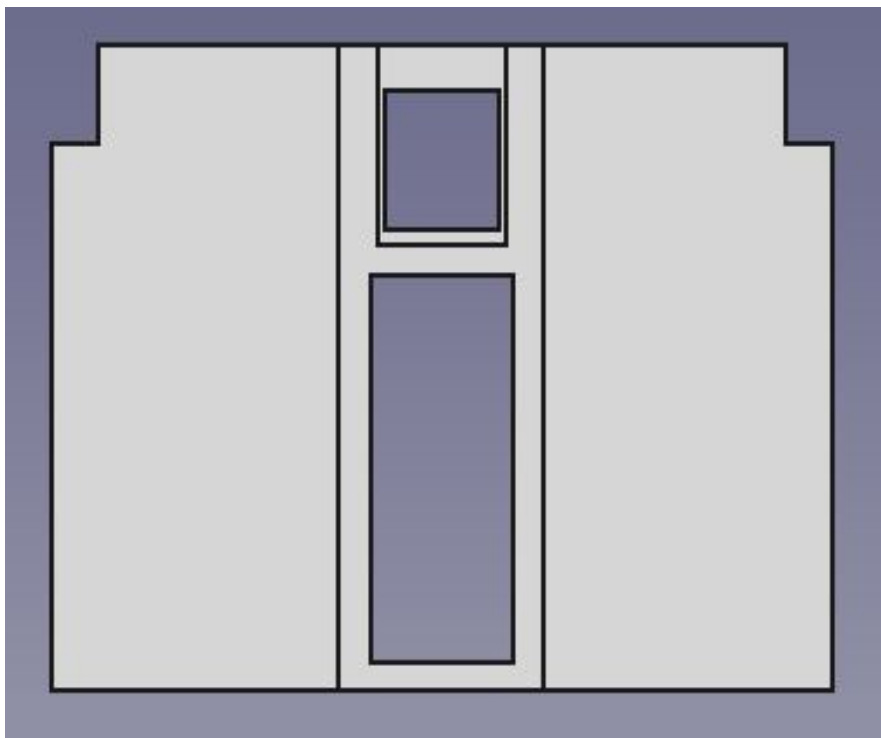


Figure 0.12: Box Car Floor Part

The following hand sketch drawing illustrates gluing the ends to the floor. The ends should not be positioned on top of the

floor for gluing.

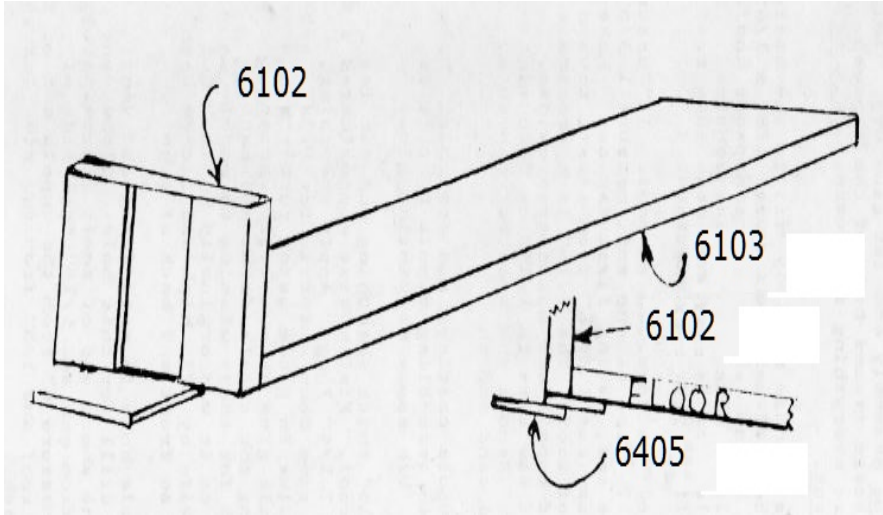


Figure 0.13: Car End Gluing Illustration

The top of the car ends are notched to accommodate the bracing which bridges the ends and supports the roof #6100.

Once the ends are glued and dried solid, set them aside and clean up the main roof component #6100 of any printer support material. The next step will be to glue the bracing on both sides to the top corners of the ends. But first, take the roof and make sure that it drops into place between the mounted ends. At a

maximum, there may only be a very slight allowable spread. To much spread would mean the positioning of the bracing will put the rectangular sub structure out of square. If unsure, assemble the roof, bracing and floor with ends with rubber bands and hold a car side up to eye ball the fit of the pieces. If the spread is still to wide, make sure all the printer build material has been removed from the ends of the under side of the roof. Note, this is why I use Goo on the ends just in case slight elasticity is needed to fit things together. Use the roof as the guide for positioning the bracing and you should get this step right the first time.

Now on my reference model where I used a rough semi-textured car side with a baggage door, I used some K&S square brass tubing $1/8 \times 1/8$ in place of the ones supplied in the kit. I glued the brass tubing high and flush with the top of the end so it would not block the windows in the baggage door yet still give adequate strength to the frame of the model.



Figure 0.14: Basic Car Framing Illustration

On the above photograph shows the brass bracing with the sides mounted, window frames installed, simulated wood flooring laminated overlaying or covering over the bolster screws and the skins glued to the ends of the car.



Figure 0.15: Basic Car Framing Illustration

Closeup photos to show more construction details. The roof fits perfectly on the model at this point.



Figure 0.16: Basic Car Framing Illustration

The interior wall skins have not been installed on this reference model. However, the time to do so is before mounting the sides to the frame. Laminating the interior simulated wood wall skins to the sides should be done before mounting the side to the frame if interior details will be added.

With the intention of detailing the inside of the car, obviously the roof would not be permanently glued to the top of the frame. The recommended procedure for removing the roof, is to fasten the ladders permanently at four brackets cast on ladder to roof;

leaving bottom brackets cast on ladder free and unfastened on end platform on the car.

At this stage, we may have come along in these instruction a little to far and fast getting ahead of the game. Never hesitate to slow down and evaluate where your work stands. For example, I have not yet spoken to issues around drilling, gluing or painting on these plastics. There are excellent resources on the Internet from experienced model builders wher you can learn from their experience. Prusa Research blog article on glues is a good starting point.

Gluing Information Guide

While I have printed ends in ABS plastic, I decided to make the model parts primarily of PLA with the exception of the #6405 which is a tough Poly Carbonate polymer knowing that coupler pockets or mounts will be installed on this piece. The original part was a 2 piece wood shape that was pinned to the wood floor on the original reference model. I would have imaged though modelers would have preferred wood screws and glue.

This brings us to the topic of drilling. ABS drills exactly like a regular injection molded model because that is an ABS plastic. Unlike PLA, ABS drills pretty cleanly. PLA because of its lower melting temperature and a hot tipped drill bit will clog not allowing material to exit. Thus, a sharp bit and a non-aggressive drilling approach will allow you can to get a clean hole. However, if it clogs and the more you try to clear the clog, the more likely you will end up with a wider hole when all done or a stuck bit. If you do not have practice with drilling different 3D

Printed Plastics, I would recommend doing some test holes and become comfortable by testing the limits of each. You will find out that recommended tap and clearance bit recommendations for materials like brass may slightly differ for example on PETG plastics. For example a tap bit might have to go one number smaller in order to get a good cut on the threads when tapping.

It is far easier to start now and list what needs to be drilled before assembly. Assembling the kit and trying to do your drilling later complicates things. For example, I pre-drill the die cast platforms for the railings because you can mount the part and use the drill press to get perfect pilot holes.

Referring to blueprints once again become indispensable. Let's look at the corners on the car sides.

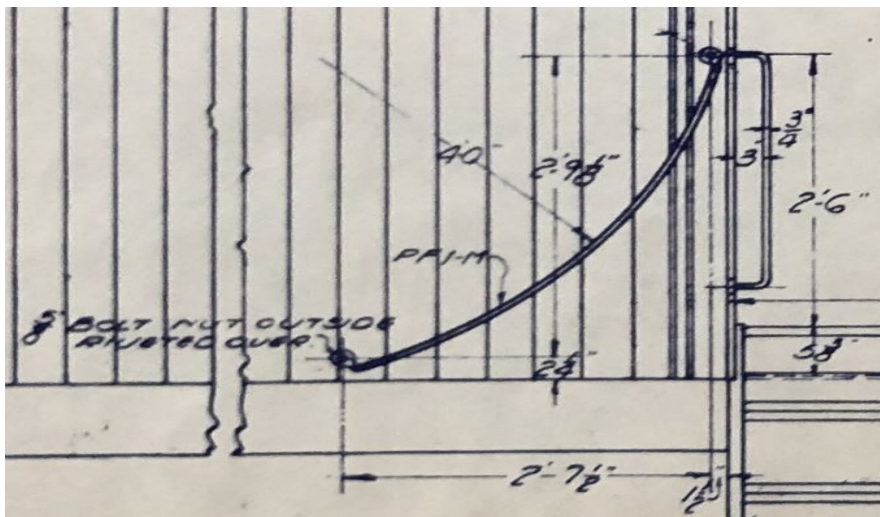


Figure 0.17: Corner Railing Dimensions on the Prototype

This gives the modeler a pretty good idea where to drill holes on the corners for railings and hand holds.

The bulk of your time will be spent carefully adding the detail parts. In order to get to that point a few more super structure things need to be finished. The roof is an open design for the cupola. The original wooden roof was a single solid molded piece with shaper machining on the ends for the canopy over the platforms and doorways. After researching what type of finish could be achieved on the roofing that would mimic

the prototypes, I went with a thin FLEX for laminating to the core. This procedure is quick and easy with some spray contact cement. The FLEX needs to accommodate the cupola opening in the roof because the next item to assemble is the cupola.

To make life easier, we supply a jig to glue up the sides on the cupola followed by putting the roofing on the cupola. Interior roofing skin or wood scribe is to be glued and then laminate the FLEX piece to finish off the exterior. I would recommend to sandwich the wood piece between the interior skin and the exterior FLEX to maintain a uniform surface. The wood will give some added stability and strength to these thin skins.

Finally, supplied with the Western Caboose Kit are the 5' wood beam equalized trucks in kit form #3847K with 33" wheel sets. Wheels sets are insulated on 1 side of the axle.

Painting recommendations from the original kit instructions as posted on our website in the CB&Q documentation area follows.

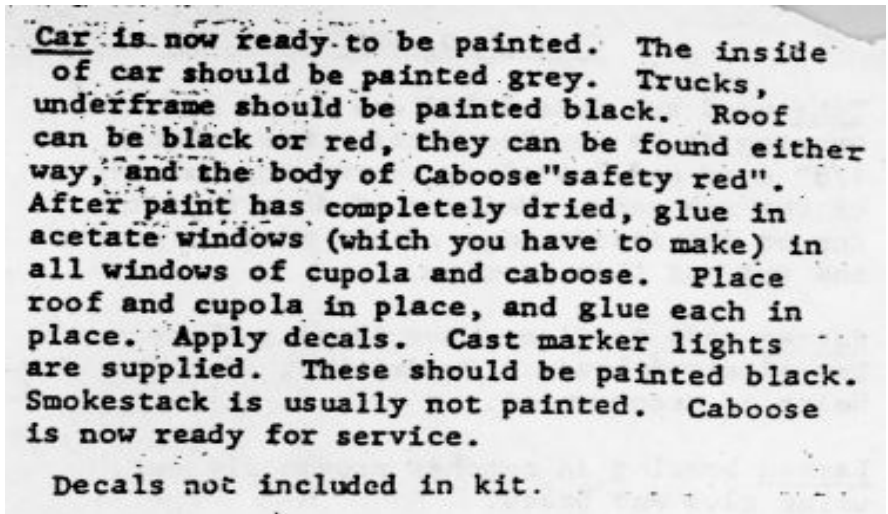


Figure 0.18: Painting Recommendations

I also recommend reading the original instructions on our website that includes some good tips and guidance still applicable on certain points today by clicking on the following links.

[Original Instructions Page 1](#)

[Original Instruction Sheet Page 2](#)