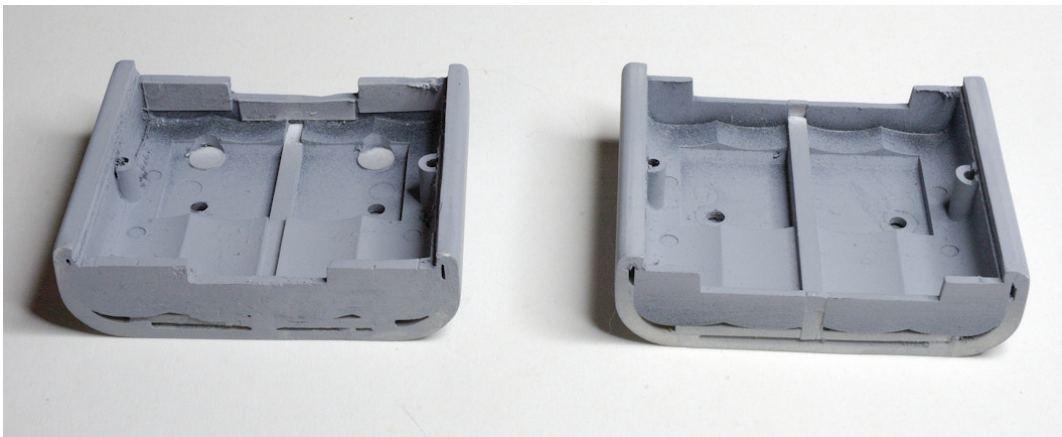


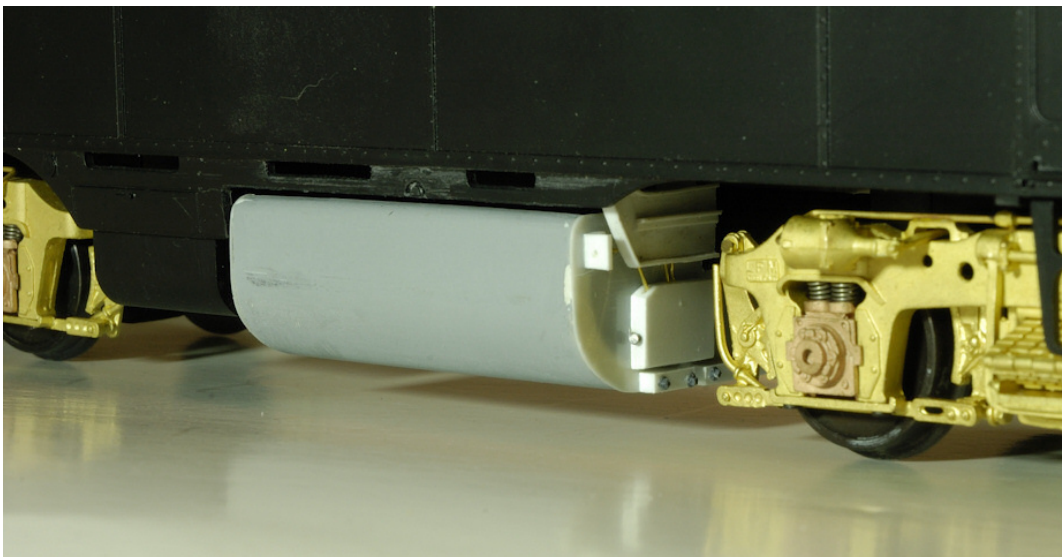
## P&D F Units

**audiogram** #1 February 14, 2016, 10:34pm

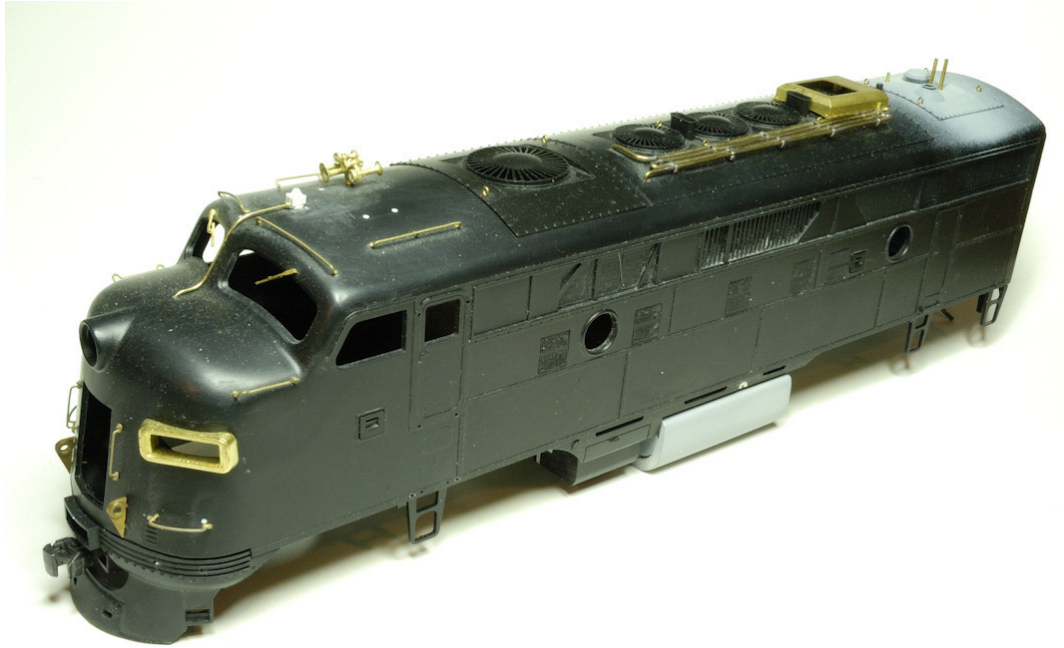
Last February I got a Red Caboose GP9 from eBay and the instructions were missing (as well as a few parts). Bob was kind enough to send me a scanned copy of the instructions. I would like to return the favor by sharing some of my work. The GP9 is on hold while I am working on an ABBA set of P&D F units. One AB pair are F9's and the other two units are late model F3's. They will be for my freelance railroad, but detailed according to Southern Pacific practices



The F9's will have 1500 gallon fuel tanks. The 3mm wide piece down the middle is to widen the original tanks because they are too narrow for the space between the side skirts. I had to do something similar with the battery boxes. The lower curves of the tanks were made with PVC pipe cut into quarters. The tanks will be filled with BB's to help add weight.



This is the fuel tank with about half of detailing complete and mounted on the F9 B unit.



This is the F9 A unit. The piping on the roof sticks up a little at the rear because it is not glued down yet. This won't happen until after the unit is painted.

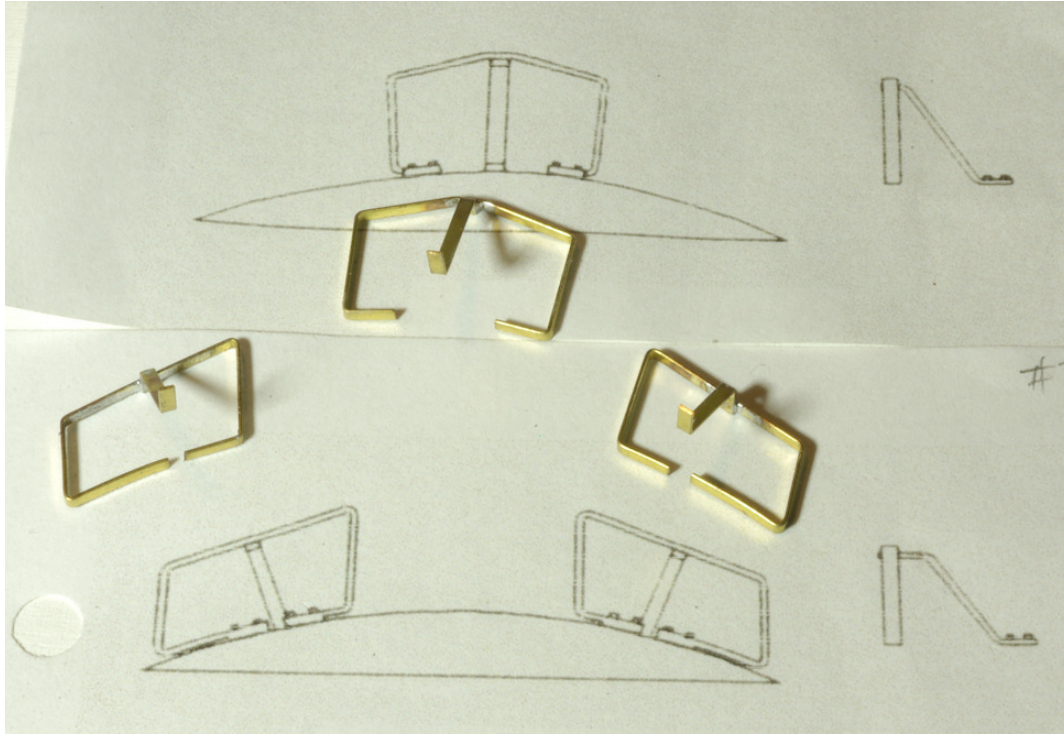
It seems I can only post three pictures at a time, so I will continue in another message.

Robin

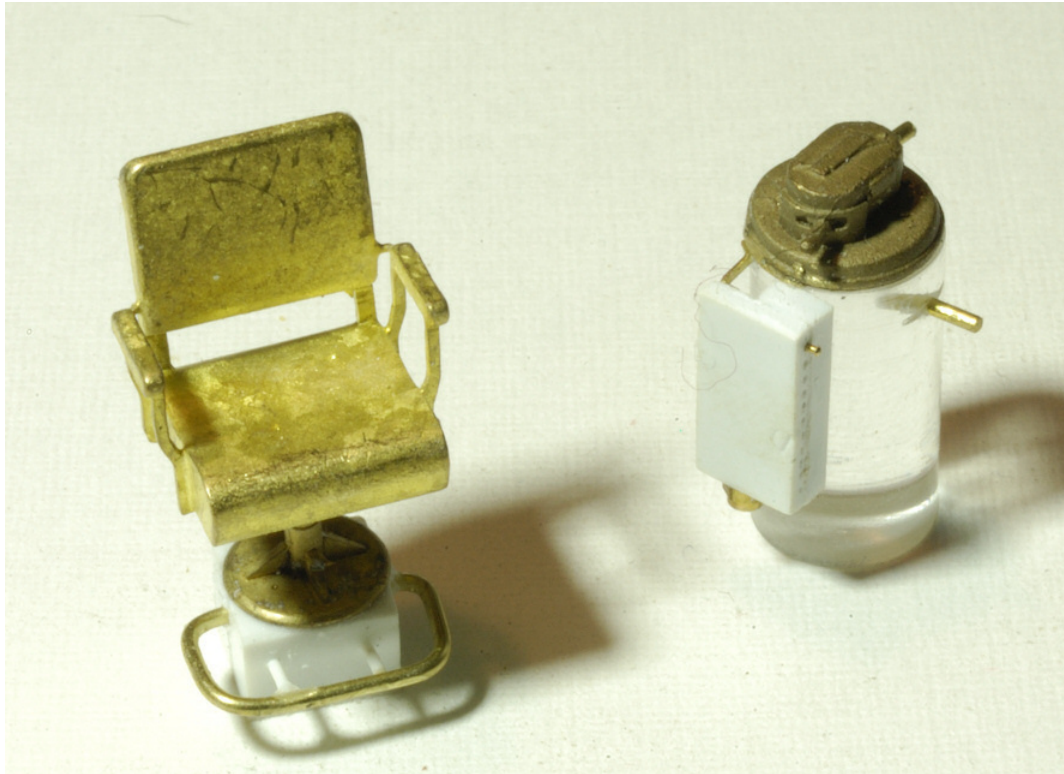
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**audiogram** #2 February 14, 2016, 10:34pm

The A units will have ice breakers on the roof. These breakers haven't had the bolts or mounting pads added yet.

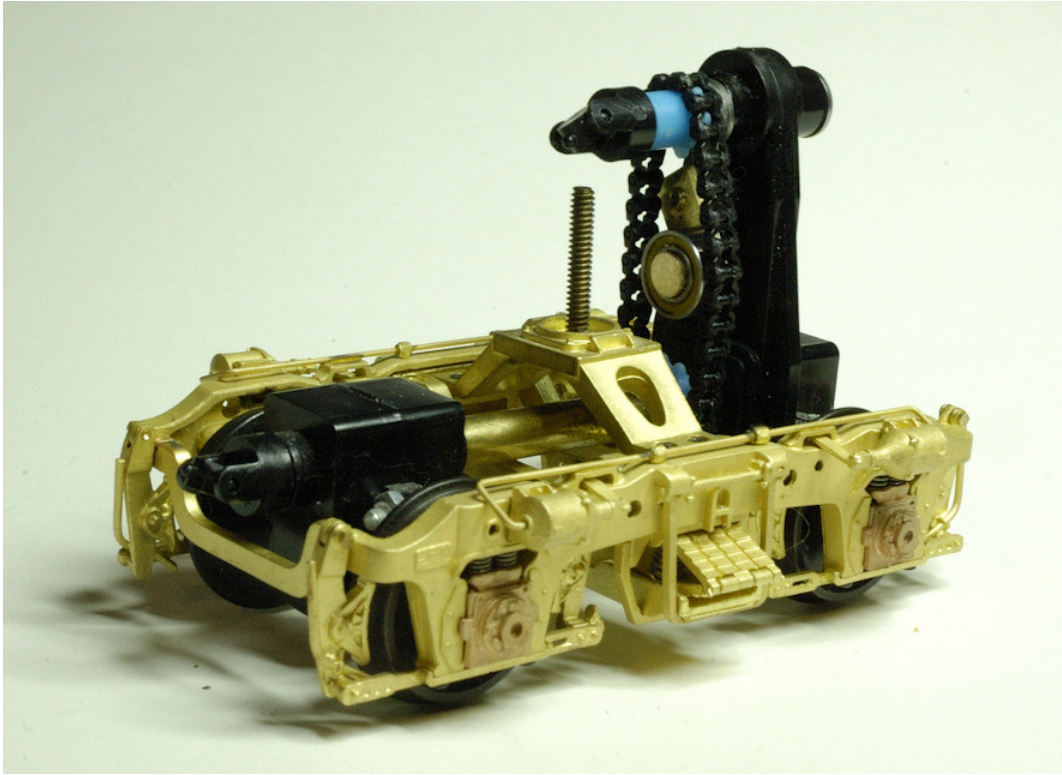


Many railroads had an extra seat in the cab for the head end brakeman. The switch box on the control stand wasn't quite right (for SP, anyway) so I decided to rebuild it.



All four units are powered and all had loose drive chains, so I added ball bearings to tighten the chain by pushing it aside a little. This idea came from an article in O Scale Trains Magazine.





Hope you all had a good Christmas. I'll post more pictures later, if you like.

Robin

---

**Bob** #3 February 14, 2016, 10:34pm

Beautiful work there, Robin! By all means, please post more photos.

What are you modeling on the end of the fuel tank? Is that an oil recovery tank of some kind? I've seen some tanks on Rio Grande Gp40-2s, but 5771 at the Colorado RR Museum doesn't have anything like that. I'm not familiar with SP customization. I'm also guessing that this engine is freight only so it doesn't have the split fuel/water tanks to support a steam generator.

By the way, do you have a good drawing of the brake air cooling coils on the roof? What did you use for the pipe fittings?

---

**Craig** #4 February 14, 2016, 10:34pm

Very nice Robin. Excellent work. Can't wait to see the next round of photos!

---

**audiogram** #5 February 14, 2016, 10:34pm

Thanks for your comments. I wanted to upload two more photos, but I get a “Sorry, the board attachment quota has been reached.” message. How do I get around this? Do I need to start another Post?

Robin

---

**Bob** #6 February 14, 2016, 10:34pm

Robin -

Your suspicion is correct. Any single post can have at most 3 photos. Just reply to yourself and add more photos. We won't think that you are talking to yourself (though some folks wonder about me...)



Bring on the photos! We would love to see more of your work.

---

**audiogram** #7 February 14, 2016, 10:34pm

[quote="Bob"]Robin -

Your suspicion is correct. Any single post can have at most 3 photos. Just reply to yourself and add more photos. We won't think that you are talking to yourself (though some folks wonder about me...)



Bring on the photos! We would love to see more of your work.[/quote]

Bob:

That's what I did (replied to myself). I clicked “Browse” to upload a picture, then I clicked “Add the file”. The window with the progress bar appeared as if the picture was uploading. When it was done, the message appeared, but not the picture. Just in case, I tried this with different photos with the same result.

Robin

---

**Bob** #8 February 14, 2016, 10:34pm

I shot an email to the webmaster asking about this problem. Googling the error suggests that there is a limit to the total number of attachments that can be uploaded to the forums, and we just hit that limit. Either that, or some maintenance that the webmaster did earlier this week had an unintended side effect.

---

**audiogram** #9 February 14, 2016, 10:34pm

Bob:

I quickly discovered the size limitation but that was easily fixed by using a little compression on the pictures. I haven't heard anything from the webmaster and I still can't upload anymore pictures. I wanted to answer your previous questions with a couple of pictures. Maybe for now I should just start a new thread??

Robin

---

**audiogram** #10 February 14, 2016, 10:34pm

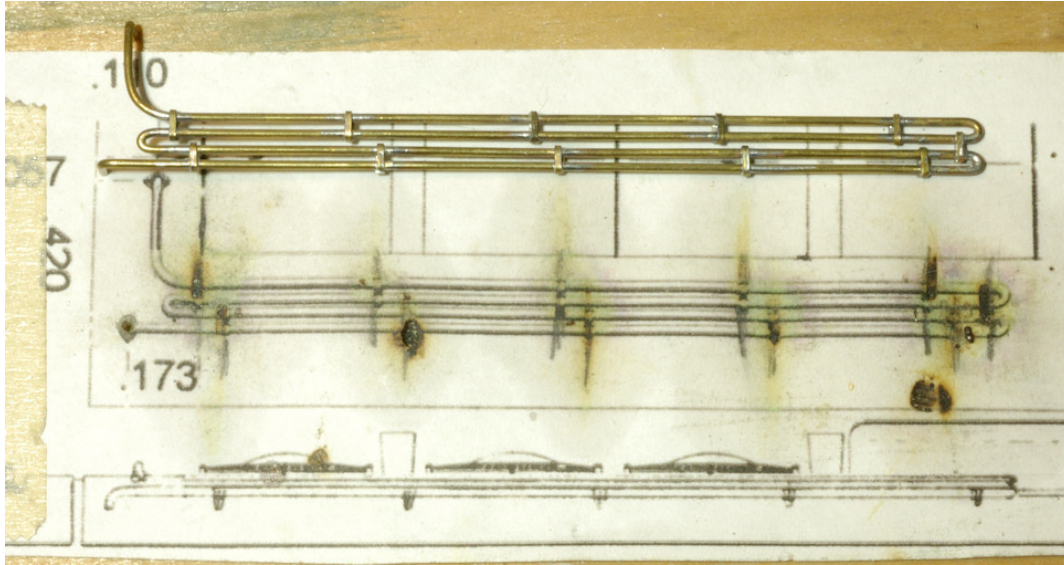
Bob:

I discovered by accident that I can now add more pictures. To answer your questions:

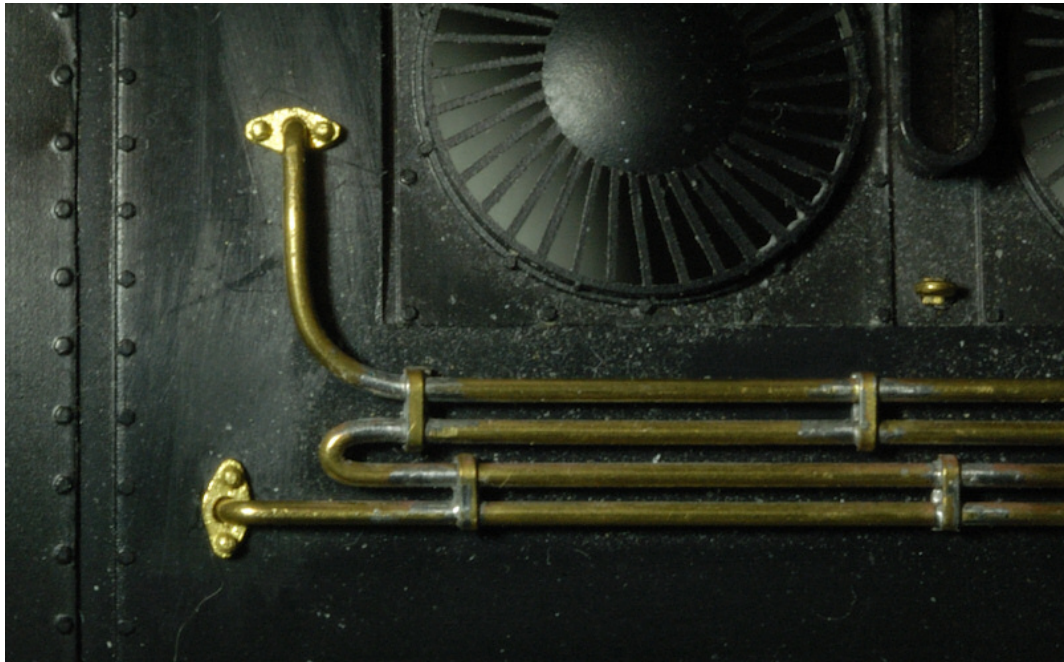
The 2mm square strips on the bottom of the end of the tank is the fuel tank sump. The NBW castings represent plugs that can be removed to drain the tank. The box with the cut corner is the emergency fuel cutoff. The knob on the side is the reset knob. On the standard 1200 gallon tank these items are mounted on the bottom of the tank. On the 1500 gallon tank they are mounted on the end for clearance reasons. There are still some details I need to add to the end.

These units are for passenger service. The steam generator uses the same fuel tank as the engine. On B units the area where the cab would be leaves plenty of room for a large water tank in the car body. A units have a limited water capacity which is why on the Southern Pacific, standard F7 A units didn't have steam generators and F powered passenger trains usually used an ABB combination.

The ice breakers were bent using the drawing shown in a previous post. The drawings came from an HO Hi-Tech Ice Breaker set. The drawings were scanned and blown up to ¼" scale. The same was done with the cooling pipes on the roof using drawings from an HO Highliners F unit kit.



Bob: If you would like a copy of the drawing, send me a private message.



The pipe was bent from 1mm brass wire. The flanges (missing from the previous post A unit photo) shown in this photo where the pipes go through the roof are Precision part #5155, which is a packing gland for the valve stem on a steam locomotive cylinder block. I had to cut off the back, then drill it.

Hope everyone had a good Christmas.

Robin

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**Bob** #11 February 14, 2016, 10:34pm

Robin -

Thanks for posting the additional photos. The web maestro did his magic to fix the problem with attaching photos.

You will have a beautifully-detailed locomotive when complete. And yes, I would appreciate a copy of the cooling coil drawing, PM sent. Please keep us posted on your progress for this build.

All the best.

---

**audiogram** #12 February 14, 2016, 10:34pm

Bob:

Thanks for your comments. I will post more pictures when I have something worth sharing. With my work load right now, I have very little time to work on my trains. I was hoping to enter the A unit in the "O Scale Trains" "Year of the Kit" competition, but as you can see, the entry deadline came and went with the unit not even half complete.

You asked a couple of questions in your private message which I thought I would answer here in case others might be interested.

As far as I can tell the cooling pipes were only added to F9 production units. SP never had any F9's, except for F7's which were rebuilt to F9 specifications (without the pipes). The pipes were very rare on SP units. I can recall seeing only one photograph with them. They may have been retrofitted to some units. They may have felt that black pipes on the roof while running under to desert sun probably heated the air rather cooling it. Other railroads sometimes used variations in the piping which suggests they may have also been retrofits. One railroad has one loop on one side of the fans and another loop on the other side.

Although these units follow SP practice, I purposely deviated in a few details. On the SP, only FP7 A units had steam generators; winterization hatches were very rare on the SP, as well as the cooling pipes; and SP didn't use the extra horizontal grab under the train number board, although the Cotton Belt did.



I had an experience which reminded me of how uncertain research can be. On the P&D units, the main air reservoir is tilted with the forward end being slightly lower than the rear end. All drawings I've ever seen of F units, including EMD drawings in the F unit operating manuals show the tank as not being tilted. How could P&D make such an obvious mistake? A week or two after discovering that mistake I came across a photograph in one of my books about F units. It was taken from the erection floor at EMD, looking up at the bottom of an F7 A unit and guess what... The air tank is tilted! It may have been a change made after F units had been in production for a while. It might make it easier to blow condensation out of the tank. Now I wonder how P&D got it right with all the drawings showing it wrong.

Regards,

Robin

---

**Doug\_Heitkamp** #13 February 14, 2016, 10:34pm

Robin,

Thanks for posting the pictures of your F units. They motivated me to get off the dime and get a set of A-B-B-A body shell kits ordered from P&D. Mine will be done in the Santa Fe freight cigar band scheme. Like you did with the ice breakers and piping, I'll be scratchbuilding oversize fuel tanks, battery boxes, etc. by scaling up HO scale parts (High-Tech details). I'm looking forward to seeing more of your progress.

Thanks!

Doug Heitkamp

Centennial, CO

[proto48.blogspot.com/](http://proto48.blogspot.com/)

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**audiogram** #14 February 14, 2016, 10:34pm

Doug:

Thanks for your comments. I really enjoy working on the P&D units. They are fine kits, but don't have much time to work on them right now. I'll post more when I have been able to do more work.

I hope you will post pictures of your Santa Fe units as you go. Do you plan to add the red stripe that

appeared between the blue and yellow? I always liked that version of the paint scheme.

Robin

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**Doug\_Heitkamp** #15 February 14, 2016, 10:34pm

Robin,

My F unit body shell kits arrived today! What a great way to start the weekend. I'm anxious to get started on them. Unfortunately, I won't be doing the early Santa Fe cat whisker paint scheme with the red stripe. I agree, it sure does look good and is a favorite of mine. I have sets of decals stashed away for the day I can start on some FT's and use them. I'll post pics once I get far enough along.

About your F units - Are you building your own underframes or using what comes with the stock P&D units?

Bob & David - Greetings! What did you guys use for the underframes, tanks, and battery boxes on the A&O F's?

Looks like it's time for me to get up to the Railroad Museum and start taking pics and measurements of the D&RGW F units up there.

Thanks,

Doug  
[proto48.blogspot.com/](http://proto48.blogspot.com/)

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**Bob** #16 February 14, 2016, 10:34pm

Doug -

David and I bought complete kits from P&D. They came with a brass chassis, fuel tank, brass cast and equalized trucks, bolsters and (usually) a plastic simulated frame. My B unit did not come with the frame I-beams but that was easily solved with Evergreen styrene. The battery box door is molded on the side skirts, which we left intact. If you trim the skirts then you will need to scratch build a few details such as the rest of the fuel tanks, battery boxes, traction motor cables, etc.

I liked them so much that after building 3 I bought 6 more. All of mine are the single tower drive, which leaves room for P&D's A-unit cab kit. There is a drive shaft that runs through the fuel tank that I

don't find objectionable. The dual-tower drives don't have that shaft but the front chain tower prevents cab detailing. Also there is plenty of room behind the A-unit cab and above the motor (may want to trim the unused motor shaft end) for a big hi-bass speaker, either 1.77 or 2 inch diameter, in a sealed wood or styrene enclosure.

You can order any missing parts from P&D. If you need the exploded drawing, send me a PM with your email address and I'll email it to you.

By the way, P&D sells two very nice cast brass grab iron sets.

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**audiogram** #17 February 14, 2016, 10:34pm

Doug:

My F units were also complete kits. All units are powered so that I don't have to put too much weight in them for pulling a 14 or 15 car passenger train. The trucks included in the kits are brass and are the best looking Blomberg trucks I have ever seen.

I am using the cast grabs from P&D; they really look good. Check their parts listings. They have a number of other parts that you can add to your units, including nose mounted lifting lugs as used on later F units and winterization hatches, if needed. You might contact P&D and see if they are willing to put together powering kits for you. It might be cheaper than buying individual parts and it never hurts to ask.

If you haven't already, I recommend you do a search on this forum. There are a number of very useful pictures showing how the A&O F units were built, including the 2" speakers mentioned by Bob. They will inspire you, as they did me.

Robin

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**Craig** #18 February 14, 2016, 10:34pm

The two inch speakers are a must.

I believe that they are grin generators for us model folks 😊

**Doug\_Heitkamp** #19 February 14, 2016, 10:34pm

Guys,

Thanks for all the info. I decided to go with the body kits and fabricate my own underframe/tanks/battery boxes in order to put all that I can into these from a model making point of view. I know it's a harder way to go, but that's just me. Inspiration for the project comes from the Santa Fe F units David Hussey did in HO scale.

[http://www.pbase.com/dh30973/funit\\_shots](http://www.pbase.com/dh30973/funit_shots)

What I am going to try is to have both trucks powered, but with the drive line above the floor/frame in the body. This is no problem in the B units. The powered A units will be the engineering challenge, at least under the cab end. I've also got 3 of the Red Caboose GP's to do (I need a GP7, GP9, & GP20). I've purchased the GP9 re-power kits from P&D Hobbies with the brass trucks as well as the brass frames from Des Plaines for those. In addition I've purchased the Proto48 conversion parts for these trucks from Protocraft.

My plan is to modify the GP drive to fit in the F units. At a minimum, I'll need to fab "short" towers to hold the upper gears. I'm currently drawing this stuff in AutoCAD and will be happy to share with everybody. I'll be placing a follow up order with P&D to get the extras that I need.

I'd also like to add that I have enjoyed all of the posts that have been made in these forums. I've read them all. I really like the threads on fixing the P&D/Weaver Gear Towers and adding sound in the GP9. Nice work!

Thanks,

Doug

[proto48.blogspot.com/](http://proto48.blogspot.com/)

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**Bob** #20 February 14, 2016, 10:34pm

Doug -

By all means, let us see your drive train work as it proceeds.

I imagine you could lower the motor part way into the fuel tank to relocate both drive shafts. Serv-O-Link has a nice web-based calculator to find the proper shaft spacing for different sprockets.

By the way, the sliding Delrin shaft couplings can bind after considerable use. A little graphite can



help.

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**audiogram** #21 February 14, 2016, 10:34pm

Doug:

I believe P&D lists a Santa Fe style pilot for the F units. You might want to check these out.

Robin

---

**Doug\_Heitkamp** #22 February 14, 2016, 10:34pm

[quote="audiogram"]Doug:

I believe P&D lists a Santa Fe style pilot for the F units. You might want to check these out.

Robin[/quote]

Yep - Got 'em!

Thanks,

Doug

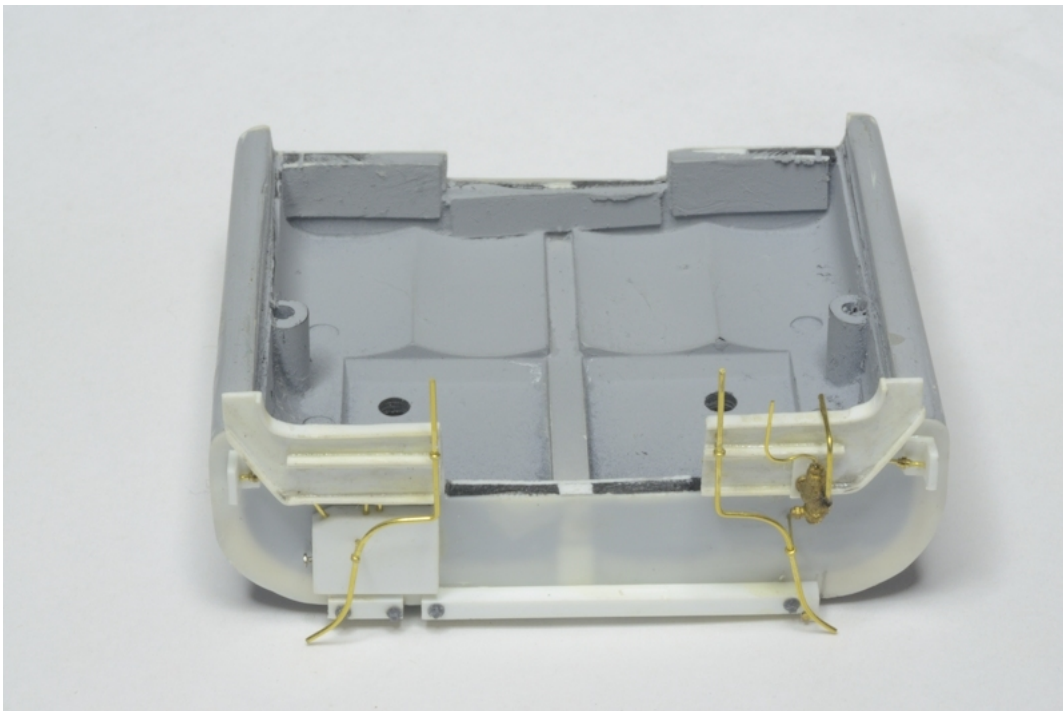
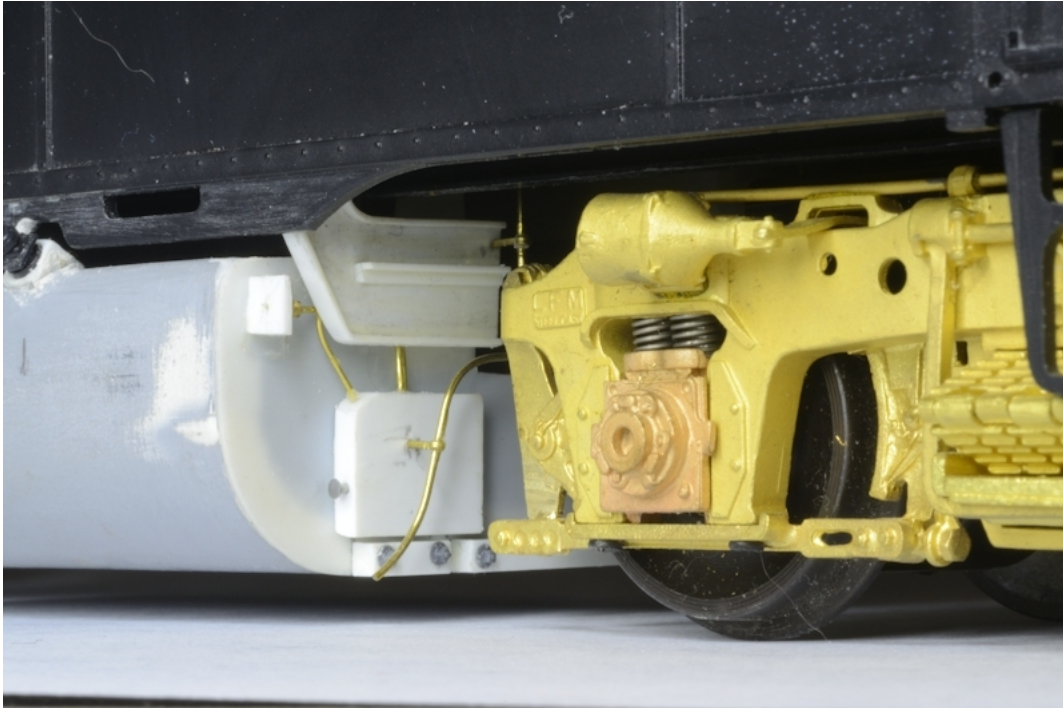
[proto48.blogspot.com/](http://proto48.blogspot.com/)

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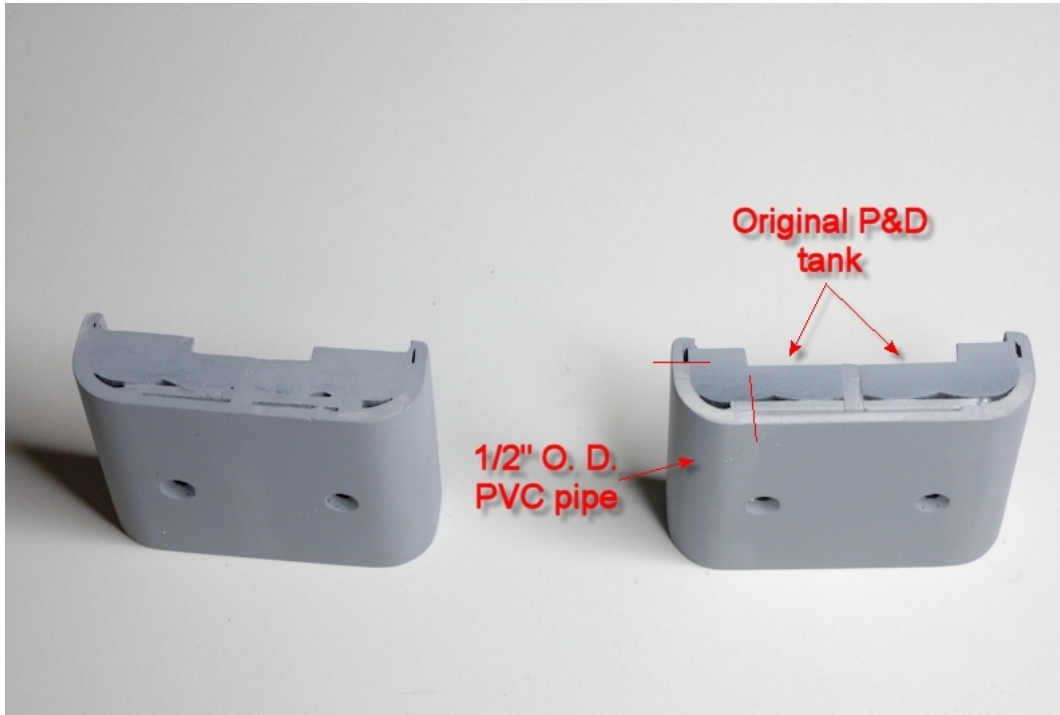
**audiogram** #23 February 14, 2016, 10:35pm

Hope everyone had a good Christmas.

I have finally been able to do a little more work on my F units. The following two photos show details added to the 1500 gallon fuel tank.



From this next photo you can see that the tank was built by gluing parts around the outside of the original P&D tank. You can also see that I added some styrene in the middle of the tank to widen it because the original P&D tank is actually too narrow. I did the same with the battery boxes (not shown).



There seems to be a limit to the number of photos I can post so I will end here and try to post more in a moment.

Robin

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**audiogram** #24 February 14, 2016, 10:35pm

Below is shown two photos of the left side of the prototype. I still have to add the pipe with the valve and chain to the model.



It looks like my limit is three pictures so I'll have to continue in another message.

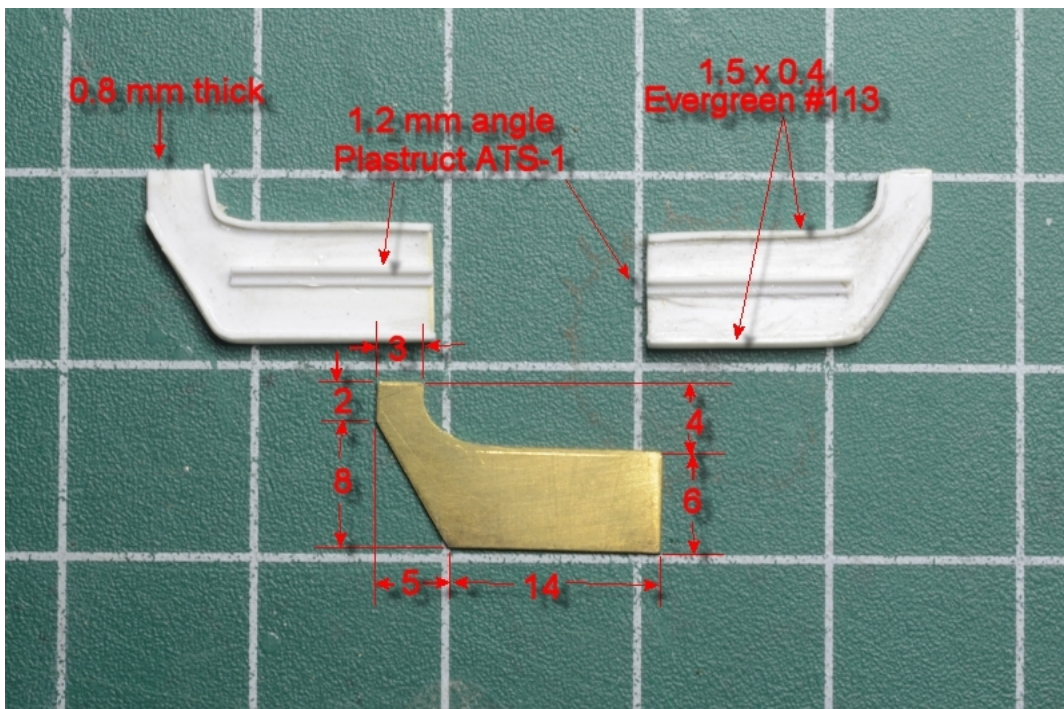
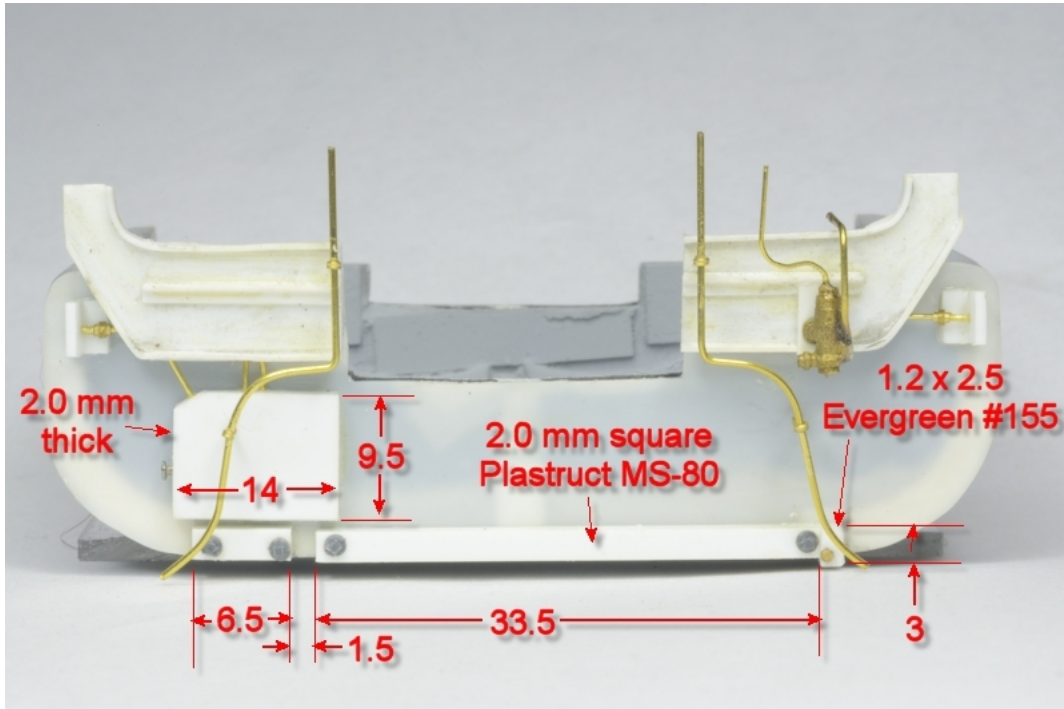
Robin



audiogram #25 February 14, 2016, 10:35pm

The final three photos:

The following two pictures show some of the dimensions I used to build the tanks. I lived in Japan for twelve years and as a result I really prefer to work in the metric system so all dimensions are shown in millimeters.



The above photo shows the brackets for hanging the fuel tank. On the prototype, the two styrene parts would be one piece. I had to leave a space between the two parts for the P&D drive shaft to the forward truck. The brass piece is the pattern I use for cutting out the styrene brackets.

The following shows the completed ice breakers. They will be glued in place after the units are painted. This unit is a late model F3 which will have stainless steel side grills. I have one photo of the roof of an Espee F unit which shows small circular plates bolted on to the roof, probably used to cover the holes left when the original air horns were removed.



I'll post some more photos when I am able to do more work.

Have a happy New Year.

Robin

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**Bob** #26 February 14, 2016, 10:35pm

Beautiful work and detailing of a unique SP locomotive!

It appears from the first prototype photo that SP rebuilt this somewhat unique unit with a wider than normal fuel tank. The biggest clue is that some of the original side skirt profile remains, and that's established by the battery box cover. It curves inward, but the side of the fuel tank extends far



outboard. The stock P&D tank is certainly not close for this prototype.

For reference this ex-BAR F3 in Jim Thorpe sports a standard fuel tank.



Here's D&RGW F9 5771 at the Colorado RR museum. As far as I can tell, a stock P&D tank is dimensionally OK for this prototype, but does lack many details. This is the rear of 5771's fuel tank. Aluminum paint makes it easier to see the details.



Please keep sharing your progress with us. It is quite inspiring!

---

**DaveJfr0** #27 February 14, 2016, 10:35pm

Robin,

Amazing work and thanks for showing close-up photos of your work with dimensional data.

time to get working on my own using yours as a guide. It's hard to tell what Southern used exactly for the brackets and other tools, but getting close is better than nothing at all.

Also, your roof detailing is amazing. I am assuming those are actual nuts.

---

**rnb3** #28 February 14, 2016, 10:35pm

Robin,

Very clean modeling! Your work is awesome and I can't wait to see the finished product!



Dave (DaveJfr0),

Great to see you over here! You should post some of your work too! A couple shots of that Southern power would be nice!

---

**audiogram** #29 February 14, 2016, 10:35pm

Thanks for your kind comments. The main reason I wanted to join this forum was because of the consistent high quality work I've seen here.

Bob: The standard P&D tank is actually a little too narrow. There is a scale 3" gap between each side of the tank and the skirt. This photo shows how I corrected this with the battery boxes.



The large 1500 gallon fuel tanks were actually very common on Epee units, but only two of mine will have them. Many were delivered with large tanks and Espee converted many other units.

Dave: As far as I know, all F units used the same brackets for hanging the fuel tanks and battery boxes so you are safe using them. The bolts are simulated bolts from Scale Hardware

(<http://www.scalehardware.com/>). If you look very closely you might be able to tell that I added washers under the bolts. It may have been wasted effort since you can hardly see them. Scale Hardware also sells very small threaded nuts and bolts.

Happy New Year!

Robin

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**ErikLindgren** #30 January 11, 2017, 8:37pm

Just beautiful Robin...



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**audiogram** #31 January 11, 2017, 11:58pm

Thanks! I'm still working on them but the work is slow. I will post more pictures when I have more to show.

Robin

---

**GNR** #32 January 30, 2017, 7:35pm

Not meaning to nitpick on the A&O f units. How come the A units don't have ladders on their noses like WM 233. I know there is a rule that after 1960 locomotives needed a safer way into the nose. Might be something to add to later f units.



---

**Bob** #33 January 30, 2017, 8:34pm

Scott -

Welcome to the A&O forums. I was not aware of that requirement.

I copied nose grab placement from ex-BAR ARHS chicken wire F3s I photographed in Jim Thorpe PA back in 2001 and 2002. These had a single grab on each side of the hood, with the "looped" ends hooking on an external ladder.





These units were more recently running at Steamtown and I hope they haven't been sidelined due to being "run into the ground" like the big steamers.

---

**GNR** #34 January 31, 2017, 1:15am

Here are they f units you are talking about. Still running strong.





RRPictureArchives.NET Image Contributed by Paul Koprowski

As for the grab ladders i am digging through my notes tonight on when and how they were done.  
Scott

---

**Bob** #35 January 31, 2017, 1:33am

Are they all running? I believe I read that at the Streamliners event only one A was operable. When I photographed them in Jim Thorpe, both of the As ran fine. I notice that during the Lackawanna refurb 664 lost its remaining nose grab iron.

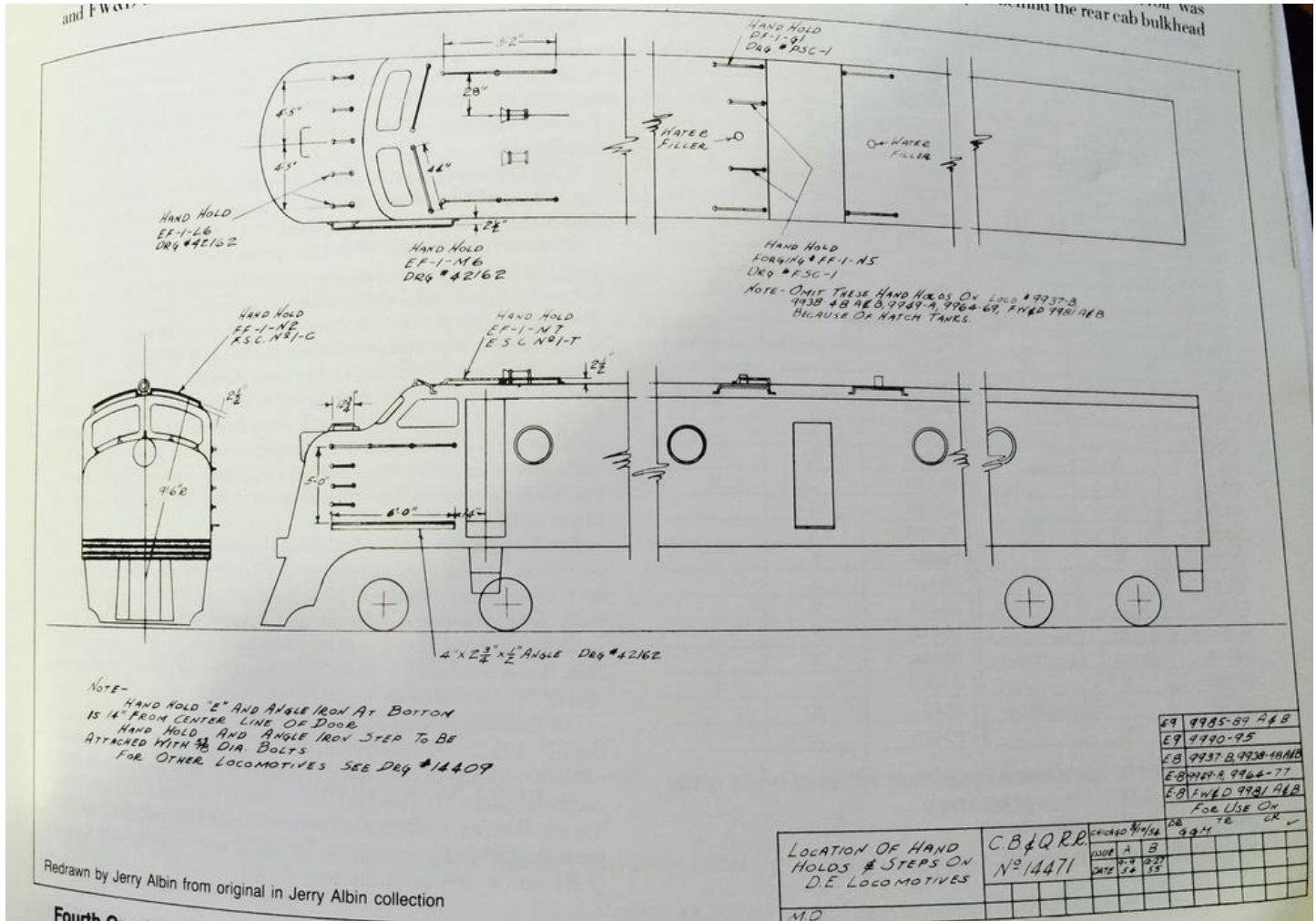
If you find the grab iron info I'd appreciate looking at it. Some roads such as the D&RGW had a toe creep and grabs that started higher on the nose than the WM unit.

**GNR #36** January 31, 2017, 2:07am

This is the spec sheet for CB&Q maintenance steps. I have seen the steps and toe creep you referred to. I think the full ladders lit more distinct.

As a side note the CB&Q sheet shows grabs on the roof radiator fans.

Scott



**Bob #37** January 31, 2017, 2:22am

Scott -  
Thanks for passing along the drawing!

Is the date 1954? It is hard to make out. If so that would be about the same time as the locomotives were purchased from EMD. Do you have any info for an FRA rule?

Inquiring minds want to know!

---

**audiogram** #38 January 31, 2017, 3:51am

I heard/read somewhere that a law or rule had been created requiring railroads to provide a safer way to climb up onto the noses of F units. That's what the extra grabs were for. I don't remember when this became a requirement, but my feeling is that it may have been the early sixties. Anyway, this photo shows the ladder Espee used before the grabs were required.



This one shows that hooks that fit into the "looped" grabs.



Robin

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**GNR** #39 January 31, 2017, 6:40pm

Robin nice photos very helpful in detailing a shop.

Bob, this an article that started me trying to find the fra mandate. Anyways page 4 has the list of modifications done.

[http://www.fsmrrc.org/uploads/6/4/5/9/64599163/pennsylvania\\_rail\\_road\\_f\\_units.pdf](http://www.fsmrrc.org/uploads/6/4/5/9/64599163/pennsylvania_rail_road_f_units.pdf)

Scott



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**GNR #40** February 16, 2017, 12:38pm

In fact the Interstate Commerce Commission (ICC) issued a ruling in 1958 requiring that by 1960 all cab diesels (these weren't "cowl units," those came later) have some permanent way for railroad workers to reach the windshields for cleaning. These locomotives soon sprouted a variety of steps, grab irons, and ladders to comply with this requirement, and that accounts for what you observed.

So long,

Andy  
Andy Sperandeo MODEL RAILROADER Magazine

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**Strummer #41** February 16, 2017, 3:56pm

Interesting read; thanks for sharing...

Mark in Oregon

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**YoungBrent #42** September 25, 2017, 2:28am

Very well done. What would you suggest for P&D F units to model D&RGW unit that pulled the California Zephyr?

I would include a picture but it isn't obvious how to do that.

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**CentralFan1976 #43** November 17, 2017, 10:32am

I'd see if you could find a set of Sunset / 3rd Rail 2-Rail F7s...

Santiago did a great set, just by adding a few details.

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See the work here:

### 3rd RAIL F7 MODIFICATIONS

Well lets just start a thread for all your F7 mods.... First things first... the coupler has to go, and the gigantic hole in its nose. 2 Rail pilot and a Kadee coupler will get me started. Had to do some grinding/sanding to get the pilot to fit...

Thanks and good luck!

-Mario

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**Bill** #44 January 13, 2018, 12:51pm

David and Crew:

I would like to thank you for allowing me to join the A&O Forum. I find the information very useful for building my own 2 rail C&O Cabin Creek Coal branch railroad. The technical information you guys provide will help me to avoid some of the previous problems you have already encountered. I have several Weaver and Red Caboose locomotives to improve as I detail them. I grew up as the youngest operator on the V&O Railroad as I lived nearby Allen McClelland. I hope to get to Colorado this summer for a railfan trip. Thanks again.

---

**David** #45 January 16, 2018, 3:22am

Hi Bill,

Welcome aboard!

You and I are among the blessed to have been able to operate the V&O in days long ago. It forever shaped my thoughts on model railroading.

I'm glad that the Forum is helpful. Some very skilled folks post here, which is very humbling. I'm blessed to be able to defer some of the challenging/difficult-for-me aspects to others on my crew. It's a unique scenario.

When a long-promised changeover is completed, I will finally be able to update the Construction page. Perhaps much to the amazement of many.

We'll look forward to your additions, telling/showing us what the Cabin Creek is becoming.

And, I'll look forward to meeting you this summer. Who knows, it might just coincide with an A&O op session.

All the best,

David