



The Keystone Modeler

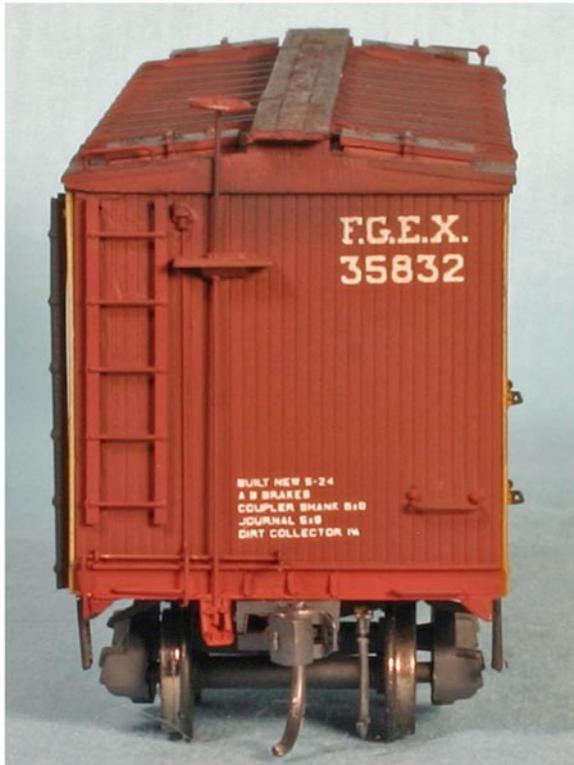
Pennsylvania Railroad Technical & Historical Society

No. 84

Spring 2013

Inside:

- "As-Built" BLI T1 Duplex Review
- Enhancing BLI I1SA Decapods
- FGE 1921-22 Wood Reefer





The Keystone Modeler

Pennsylvania Railroad Technical & Historical Society

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End view of FGEX #35832 in HO-scale by Bruce Smith. (Bruce Smith)

FRONT COVER, RIGHT

Detailed tender of BLI HO-scale I1 SA #4471 by Barry Yankolonis. (Barry Yankolonis)

FRONT COVER, BOTTOM

Broadway Limited Imports' new model of the as-built T1 4-4-4-4 Duplex in HO. (Tim Garner)

The Keystone Modeler

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Disc 8	Spring 2011 to Winter 2012	TKM Nos. 76 – 79

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There was an announcement on the Railroad Museum of Pennsylvania's web site and in the *Milepost* this month that the Strasburg Township Planning Commission had approved the design of the new roundhouse to be built at the Railroad Museum of Pennsylvania. The roundhouse will be a wonderful addition to the museum. Its design is adapted from the roundhouse which served the Reading Railroad's yard at Cressona, PA, and it is fitting that the museum's turntable, which also came from Cressona, should be united with the new structure.

Of course, the new roundhouse is designed for display rather than the servicing of locomotives, so it will not include dangerous equipment and open pits like a working roundhouse. Most importantly, from the point of view of modelers, historians, and those of us who have bemoaned the exposure to the elements of so much of the historic locomotive collection, the new roundhouse will house six locomotives. In a climate-controlled structure, the M1B, L1, K4S, E6S, B6SB, and H10 will finally be protected with walls and a roof. One of the walls, however, will be largely glass to facilitate viewing the locomotives. The turntable will also be renewed so that it can be used to turn and exhibit locomotives.

According to Charles Fox, Administrator of the museum, groundbreaking for the roundhouse should take place in the spring of 2014. More details can be found at the museum's web site, www.rmmuseum.org.

The Philadelphia Chapter is hoping for a good turnout at this year's Annual Meeting. Please bring something to show in the Modeling Room. Remember, there will be no contest, so there is no pressure. Even models that are not yet completed can be shown just so we can see what you're working on.

In this edition of *TKM*, we have Tim Garner's review of BLI's new as-built T1, Barry Yankolonis' decapods, and Bruce Smith's latest reefers.

Jim Hunter, Editor

The 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 \$35.00 to:

PRRT&HS
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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

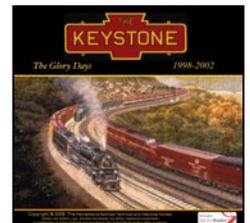
Copies of PRR equipment drawings are available from the Society's microfilm collection. To order drawings, you must know the drawing number and title. Ordering information and lists of arrangement drawings are available on the Society's website. Go to www.prrths.com, select National Society, and then 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:

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McVeytown, PA 17051

THE KEYSTONE CD 5

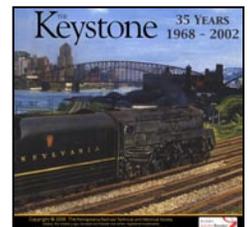
The Keystone CD No. 5, *The Glory Days*, covering 1998 to 2002, is now for sale at the price of \$75 for members. New Jersey residents add \$5.25 sales tax. Order CDs from:

Al Buchan
785 Cornwallis Drive
Mt. Laurel, NJ 08054-3209



THE KEYSTONE DVD 1

The Keystone DVD No. 1 covering 35 years of *The Keystone* from 1968 to 2002 is available. The navigation of this product is being upgraded as are some of the administrative notes and text. The improved edition will be ready for ordering soon. Those few who have already purchased the DVD will be able to trade it in for a new one when it's available. The price of this DVD is \$375. *This DVD requires a computer with a DVD drive. It is NOT a video disk that can be played on a DVD player for viewing on your TV.*



PRR Product News

ATLAS MODEL RAILROAD CO.

<http://www.atlasrr.com/>

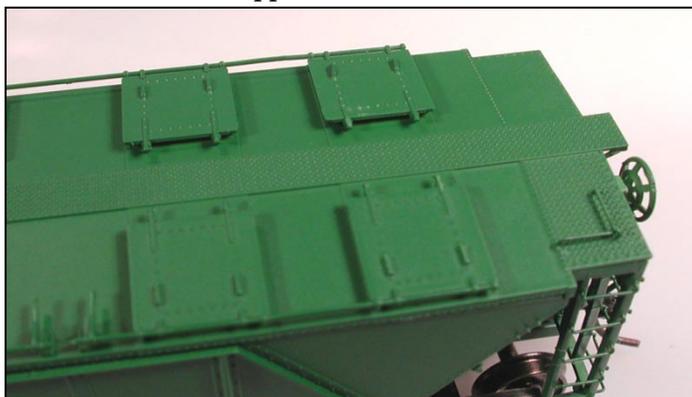
PRR ALCo S-2—N Scale

Atlas has announced that the next version of the ALCo S-2 switcher will be equipped with a LokSound Select dual-mode decoder for operation on either standard DC or DCC. Tooling is currently being modified to fit the decoder. Initial release is scheduled for the fourth quarter of 2013.

BOWSER MANUFACTURING

<http://www.bowser-trains.com>

PRR H30 Covered Hopper – HO Scale



(Bowser Photos)

Bowser has available on their website sample images, including the two below, of two versions of the H30 covered hopper. The first release of these models will be the low roof walk version, the earlier prototype. The high roof walk version will be made a subsequent release. The first release is currently scheduled for fall of this year.

PRR/PRSL Baldwin S-12 (BS-12m) Diesel Switcher – HO Scale



(Bowser Image)

Bowser plans to have available in December a version of the Baldwin S-12 switcher equipped with trainphone. A PRSL version will be available as well. There will be models of both versions equipped for DC and for DCC/sound.

BROADWAY LIMITED IMPORTS

<http://www.broadway-limited.com/>

PRR Steam and Diesel Locomotives – HO Scale and N Scale



J1 2-10-4. (BLI photo)

Since the last issue of *TKM*, in HO **Broadway Limited** has made available the as-delivered version of the T1, the K4s with new road numbers, and the E8. Next up is the NW2 due in June, followed by another run of the J1 2-10-4 and the SD9 both in July of this year. Sadly, the much anticipated H10s 2-8-0 has slipped to December 2013. The N scale E8 is due in September.

EASTERN SEABOARD MODELS

<http://www.esmc.com/>

PRR G32C Gondola—N Scale

Announced in the Autumn 2012 issue of *TKM*, the ESM G32C is scheduled for release in June 2013.

PRR G41A Coil Car—N Scale

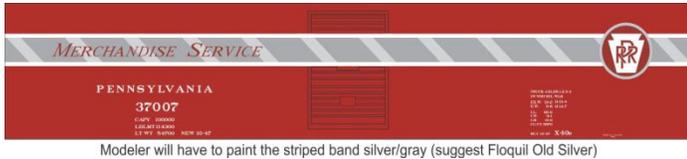
ESM has acquired the rights to this car from Rail Yard Models and is in the process of improving the car and load. Among the improvements are stainless steel etchings to replace the delicate resin detail parts and provisions for BLMA 100 ton trucks. The model is scheduled to be released in the 4th quarter.

JERRY GLOW DECALS

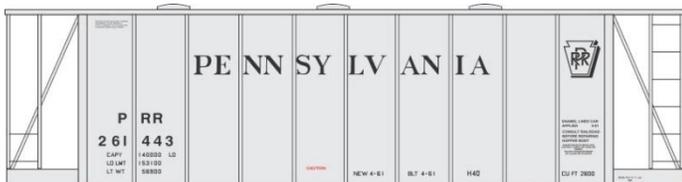
<http://home.comcast.net/~jerryglow/decals.html>

PRR Decal Sets – HO Scale

New from **Jerry Glow** are these decal sets.



PRR X40B Decal Set—HO Scale



PRR H40 Airside Covered Hopper Decal Set—HO Scale



PRR Y4 Test Weight Car Decal Set—HO Scale (3-images, Jerry Glow)

MOUNT VERNON SHOPS

<http://www.mountvernonshops.com/>

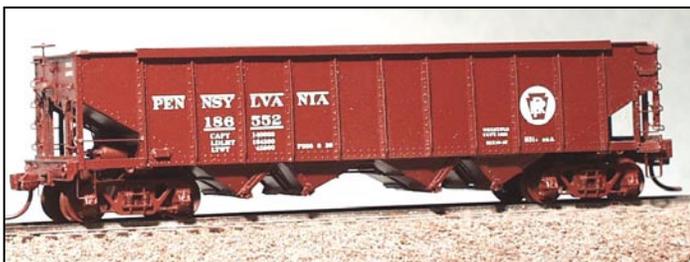
PRR Decal Sets—HO and N Scales

John Frantz has announced an HO-scale decal set covering classes GLE, H21D, H30, H30A, H32, and H33 in the Shadow Keystone scheme. A set for the H34 is coming soon. A decal set for the E44 motor has also been developed in HO and N as well as an HO set for the F33 depressed-center flatcar.

WESTERFIELD MODELS

<http://westerfieldmodels.com/>

PRR H21 Hopper—HO Scale



(Westerfield Photo)

The new owner of **Westerfield** has released H21/ H21A hopper car in various versions: original, original with PRR keystone, sawtooth hopper, and modernized sawtooth hopper. **Westerfield** kits are unpainted urethane castings including custom decals, less trucks and couplers. Assembly instructions and a very thorough history of the prototype are included in each kit.

Resource Material

RAILWAY PROTOTYPE CYCLOPEDIA

<http://rpcycpub.com/>

RP Cyc Volume 26

This latest issue of RP Cyc includes among other articles an extensive discussion on rebuilds of the PRR X29 boxcars. Included are information, data, and photos. There are even photos of an X29D in its initial Circle Keystone scheme.

Upcoming Events

May 16 – 19, 2013 Lancaster and Strasburg, Pennsylvania
PRR&HS Annual Meeting

<http://www.prrths2013.com/>

May 31 – June 1 Collinsville, Connecticut
New England/Northeast Prototype Modelers Meet

<http://neprototypemeet.com/Welcome.html>

June 22-23 Timonium, Maryland
Great Scale Model Train Show

<http://www.gsmts.com/>

June 22 Richmond, California
San Francisco Bay Area Prototype Modelers Meet

<http://bayareaprototypemodelers.net/>

July 14-20 Atlanta, Georgia
NMRA Annual Convention

Cobb Galleria Centre with convention HQ at adjacent Renaissance Waverly Hotel

<http://nmra2013.org/>

July 18-20 Atlanta, Georgia
National Train Show, in conjunction with annual NMRA

Convention. Cobb Galleria Centre, 2 Galleria Parkway

<http://nmra2013.org/>

August 2-3 Collinsville, Illinois (Metro St. Louis)

St. Louis Railroad Prototype Modelers Meet

Info from John Golden at golden1014@yahoo.com

Advance Planning

January 9-11, 2014 Cocoa Beach, Florida
Prototype Rails Railroad Prototype Modelers Meet
<http://www.prototype Rails.com/>

May 1-4, 2014 Camp Hill, Pennsylvania
PRRT&HS Annual Meeting
http://www.prrths.com/conventions/PRR_Annual.html

July 13-19, 2014 Cleveland, Ohio
NMRA National Convention and National Train Show
<http://www.2014cleveland.org/>



Correction for PC70BR Café Coach Project

By Chuck Cover

I received many comments on the Café Coach article that appeared in the last issue of TKM. One of my modeling friends mentioned that I needed to take a look at the ends of the Café Coach. In the prototype photos of the car there are no grab irons on the outside of the car ends other than the two drop grabs along the bottom edge. There are no inverted V or 90 degree grabs on each side of the door. The Café Coach has vestibules on each end of the car. After looking at numerous photos and discussing it with other modelers it appears that

many (maybe most?) PRR passenger cars do not have grabs on each side of the door on the vestibule end of the car.

I missed this detail when I built the Café Coach. To correct it, I removed the "fairly nice" grabs that came with the Bachmann P70 coach, filled the grab holes, sanded the ends smooth, and repainted. The photo shows what the Café Coach ends should look like.



Product Review: Broadway Limited “As Built” T1 Duplex 4-4-4-4 Locomotive

By Tim Garner



Right side of the new BLI “As-Built” T1.

THE PROTOTYPE

Much has been written about performance of the T1 over the years. My favorite article is “An Appreciation of the T1 – The Engineman’s Perspective” by Neil Burnell in *The Keystone*, Autumn 2001. Here, we’ll focus mostly on the appearance of the locomotives over time and their service.

The PRR was searching for a new more powerful steam passenger locomotive in the late 1930’s that would eliminate the double-heading west of Harrisburg. The experimental S1 6-4-4-6 duplex locomotive of 1939 was designed to demonstrate the advantages of duplex drives espoused by Baldwin Chief Engineer Ralph P. Johnson. The promised benefits included lighter machinery (as much as 25% lighter than a conventional 4-8-4), shorter cylinder stroke, less wear, lower piston thrust, smaller more efficient cylinders, and a more stable frame than an articulated frame. At 140’ long, S1 was just a little too large for the railroad.

In 1942, Baldwin built two experimental T1 4-4-4-4 duplex locomotives for the PRR – #6110 and #6111. Unlike the S1 which had Walschaert valve gear, these engines had Franklin poppet valves and oscillating cams. That was due to PRR’s successful test of that equipment on K4s #5399. The road wanted these engines to make a through run from Harrisburg to Chicago with one coal stop pulling up to 880 tons at 100 mph on straight trackage. Only #6111 was equipped with a booster.

The streamlining on these locomotives was designed by Raymond Loewy. They featured a pointed “shark nose” front end, skirting over the top of the drivers, a low front housing covering the air pumps and aftercooler with three brass-rimmed portholes on each side, and a polished brass rim around the headlight. An angled keystone number plate was carried low on the front end. The color was standard dark green locomotive enamel with gold lettering and striping. They also carried a large gold PRR logo within a large circle

on the flanks of the tenders. Small numberboards and marker lights were along the top of the boiler on the front of the sand dome.

After thoroughly testing the engines, PRR ordered 50 more. During 1945 and 1946, Altoona built #5500 to #5524 and all 50 tenders. Baldwin built #5525 to #5549. The initial production models appeared the same as the two pilot models with a few key differences. The nose covering the smokebox was shorter and less pointed. The side skirting was raised above the top of the drivers to improve access for maintenance. The tenders were now equipped with Trainphone and the large keystone in a circle was left off the flanks. The brass portholes and brass rimmed headlight were retained.

Streamlining along the top of tenders covered the water hatches, but a section on each side could be moved out of the way to fill the tank. It is not obvious from photos I’ve seen whether the covers were lifted out of the way or pivoted toward the center of the tender. I’ve reviewed dozens of photographs and films of the T1’s early days. It appears that these hatch sections were removed or left open early in the T1’s service life along the Ft. Wayne Division, but lasted longer on the Panhandle.

If the photo captions are correct, PRR began to modify the look of the T1 locomotives near the end of the production run – possibly as early as May 1946. Changes to the front end gave maintenance crews easier access to certain appliances and a safer way to reach the running boards. First, the porthole cowlings and grab-irons gave way to a more open arrangement with ladders and railings. The area around the front pair of cylinders was exposed. An auxiliary headlight was added over the front grille and the keystone number plate was moved up to the nose. The headlight rim was painted dark green to match the rest of the locomotive. The numberboards and marker lights were moved forward to the nose in housings similar to those used on GG1 electrics.

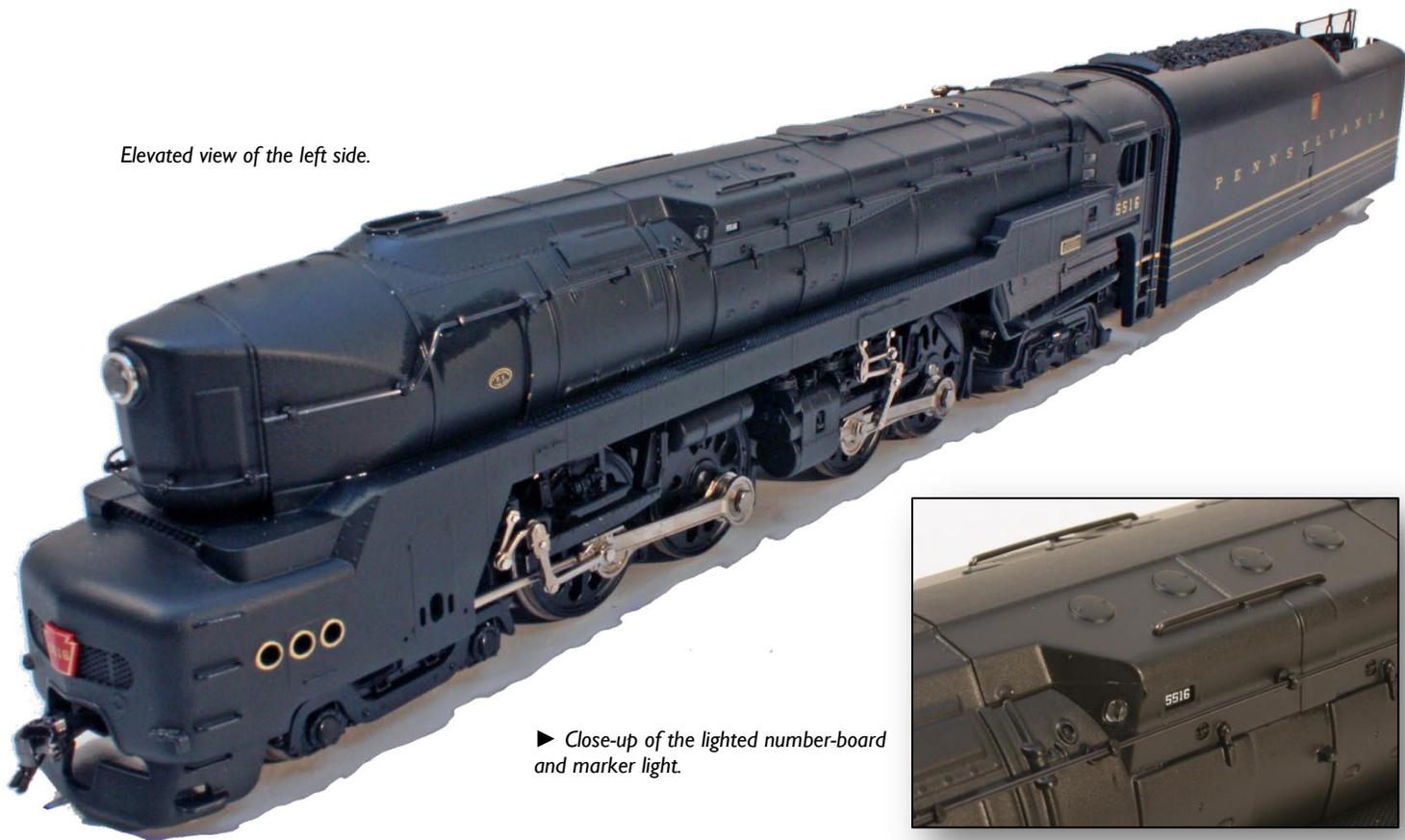


▲ Close up of right side of engine. The image is lightened to highlight the detail. The paint is darker than shown. ▼ The left side.



The front and rear of the engine. The prototype keystone numberplate was cast in brass with a crease down the center. BLI captured the crease, but not the raised numbers and rim of a cast numberplate. There are gaps in the gold paint over the crease. The model came with brown plastic magnetic couplers. I had replaced mine with metal Kadee couplers by the time I photographed the engine.

Elevated view of the left side.



► Close-up of the lighted number-board and marker light.



Later modifications to the tender included removing the streamlining above the rim of the tender tank and shortening the bottom skirting to expose the air and steam lines. All the T1 locomotives looked this way by the end of their service lives in 1952.

Important for modelers, it appears the original production styling for the T1 and the later modifications co-existed on the railroad for almost three years. The latest photo I've seen with the original styling shows #5517 in Ft. Wayne in November 1948, over 2½ years after the date of the first photo with the modified front end.

T1 locomotives were assigned to the PRR "Blue Ribbon" passenger trains in 1945 and 1946. By 1947, the first passenger diesels began to arrive. They quickly bumped the T1 locomotive to the less glamorous runs, mail and express. T1 locomotive would sometimes assist diesels on the Pittsburgh Division. A John Prophet image showed a T1 double-header heading up the East Slope at Horseshoe Curve with a mail and express train. It was reported that several ended up on Pittsburgh to Greensburg locals. The T1 locomotives were typically very dirty particularly, at the end of their careers, and none ran after 1952.

BLI AND THE T1

Broadway Limited Imports got its start in 2002 issuing very accurate models with sound and dual-mode DCC/DC

decoders built in. It's easy to forget how many great models they've produced over the years. A look through the list of discontinued products on their web site is impressive and it made me realize what a great service they've done for the hobby – especially for PRR modelers.

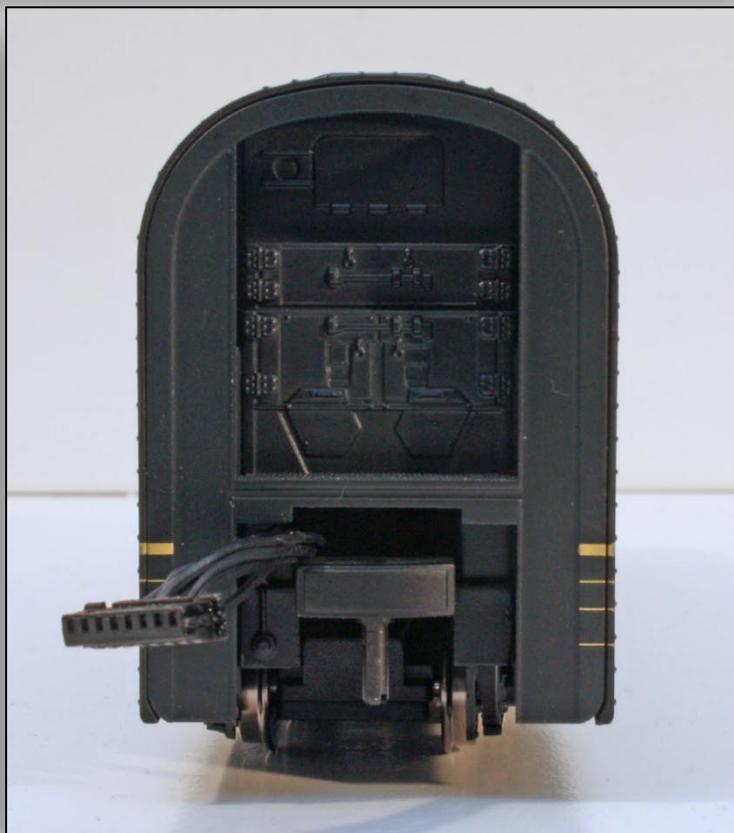
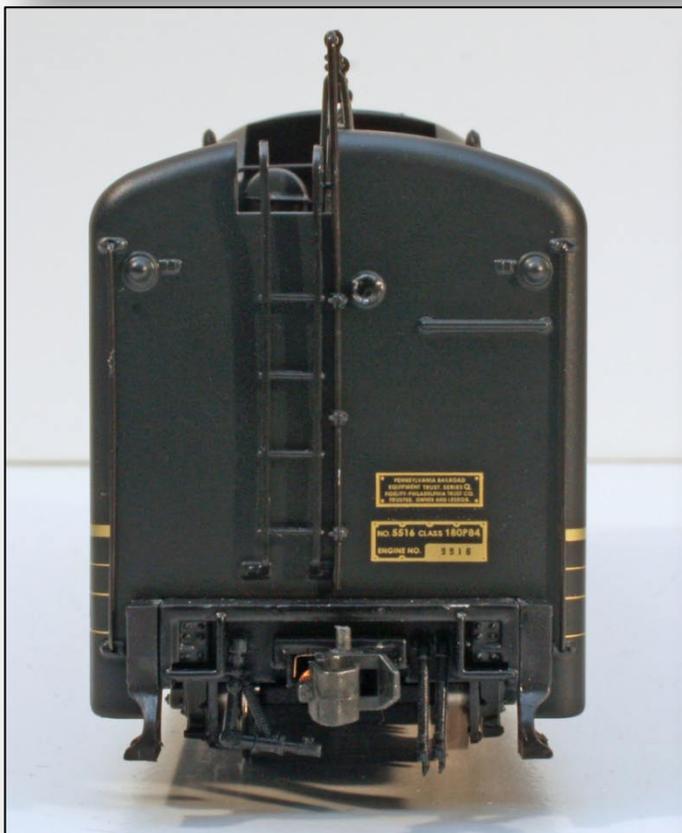
Based on the sequence of item numbers, BLI's first issue of the PRR T1 4-4-4 duplex passenger locomotive was its fourth HO steam locomotive. It was reviewed in *Model Railroader* in May 2004. The locomotive's performance and streamlined appearance made it a big seller for BLI. A second run with additional road numbers was produced in the Paragon Series. I was an early customer.



The cab detail includes a movable ventilation hatch. The whistle is closer to the cab on the "as-built" T1.



▲ Right side of “as-built” tender. ▼ The left side.



The back and front of the new tender. The back-up light comes on when the locomotive is in reverse. Note that the equipment trust and tender builder’s plate is completely readable. It would have been nice if the number plate was made using the same technique.



Looking down at the tender, you can see the detail of the Trainphone equipment and the seams of the cowl sections over the water hatches. In looking at period video, the cowling over the hatches was first permanently removed on the Ft. Wayne Division.

On a duplex locomotive, as on a simple articulated locomotive, the front and rear engines could get out of sync due to variations in wheel wear. BLI captured this in the T1 sound where the exhaust chuffs of the front and rear engines would sound as if they would get out of sync then return to sync as the locomotive moved around the layout. My first-run BLI T1 quickly banished my Bowser T1 into storage and is still hauling varnish on my PRR Willsburgh Division layout.

BLI reissued the T1 in its "Blue Line" series. It had sound and DCC-ready electronics at a slightly lower price. The change was reportedly due to a patent infringement lawsuit between MTH and BLI supplier, QSI, over a specific DCC fea-

ture. BLI subsequently developed its own DCC/DC/sound electronics.

In 2013, BLI has reissued the original T1 model as it looked in the 1950s and introduced a new "as-built" model. Both now come with BLI's Paragon2 features – notably smoke, additional sounds, and other electronic features. This review focuses on the as-built model.

THE AS BUILT T1 MODEL

BLI's promotional literature indicates the new T1 was produced with the assistance of the PRRT&HS. That partnership has produced a winner.



A weathered version of BLI's original T1 model on the left and the new "As-Built" model on the right. Note the differences in whistle position, sand hatches, numberboard position and size, pilot shape, and numberplate position.

Appearance

The accuracy and detail of this model is stunning. The porthole front end is beautifully rendered down to the simulated brass-rimmed portholes. The grab iron steps leading up from the pilot are separately applied parts. The white marker lights and numberboards along the top of the boiler are illuminated as is the headlight and white tender back-up light. All lights are LED. It would be nice if the headlight was more yellow, but I would rather have the long-life of the LED over the warm glow of an incandescent bulb.

Unfortunately, the headlight automatically comes on when you start the throttle whether you turn it on or not. You have to press the headlight function twice to turn it off. During the era the T1 locomotives operated, headlights were only turned on during darkness or fog. Daytime headlight use was not mandated until 1956.

Other detail differences between the "as built" model and BLI's original effort include changes to the sand dome details (hatches and grabs), whistle position, a lower tender skirt, and a more realistic coal load. Both models have a movable cab roof vent. The streamlining on the top of the tank includes grooves representing the cowling sections over the water hatches. If you wanted to model the locomotive with the hatches removed, it would not be too difficult using X-acto knives, a razor saw, and a file. The paint is darker than the original model and looks like a more accurate representation of dark green locomotive enamel to me.

If you are blessed with a layout with broad curves, you'll appreciate that the three-hole draw bar permits closer coupling between the engine and tender than the original two-hole version.

Performance

The new T1 appears to have the same smooth-running quiet mechanism of the original model. To accommodate sharper curves found on some model railroads, the second and third pair of drivers are blind (flangeless). The first pair has flanges and the fourth pair has flanges and traction tires. The traction tires provide a significant boost in pulling capacity over the original model. The new model easily handles a 14-car passenger train on my 2% grades while the original T1 model slips with as little as 8 cars.

The locomotive comes with Kadee-compatible plastic couplers. I immediately replaced them with Kadee scale metal couplers which I have found to be more reliable over the years.

The sound seems crisper than the original QSI sound system. The user can choose from three whistles programmed through the CV 224 - 0, 1, or 2. Number 1 sounds the most accurate to me. There is a variety of sounds controlled by DCC function keys which go all the way up to F28. The exhaust chuffs are correctly matched four per wheel rotation and get louder or softer depending on the load on the engine - a very nice effect. BLI has also retained the in-out-in synchronization effect for the exhausts of the front and rear engines.

The locomotive is equipped with a smoke generator that can be turned off using F7 or by flipping a switch inside the smokebox. The puffs are synchronized to the exhausts. The quantity of smoke varies in intensity with the load. The amount can be adjusted using CV236 for moving and CV237 for idle. BLI warns the smoke unit should not be operated without fluid to prevent damage to the unit. I've never been a fan of the appearance of model smoke, but I do like how it

works on this engine. There is a separate exhaust stream from each stack. The billows when the locomotive passes out of a tunnel or from under a bridge are impressive. I haven't set off my basement smoke detector yet, but it will happen.

The locomotive can also run in DC. The locomotive will begin functioning around 7 volts. BLI sells a DC Master Analog Control Module (BLI #1101) which can activate some sounds and program some CV's without a DCC system.

Recommendation

After running this locomotive on my layout for a couple weeks, I give it two thumbs up. It looks, sounds, and performs well. It looks perfectly at home pulling a string of cars

in streamline paint. I plan on weathering the running gear, modeling a drop coupler for the pilot and maybe opening the cowling over the water hatches.

If you like the performance and features of BLI's Paragon2 electronics, you'll be pleased to know that they have already shipped or will ship the K4s, I1SA, J1, T1 (as built and 50's version), and the new H10 2-8-0 this year.

FOR MORE INFORMATION ON T1 LOCOMOTIVES:

- Neil Burnell, "An Appreciation of the T1 – The Engineer's Perspective," *The Keystone*, Autumn 2001.
- Alvin Staufer and Bert Pennypacker, *Pennsy Power*, 1962.



This shows the difference between the "As-built" tender to the rear and the modified tender in front. The modified tender has a different mounting for the Trainphone receiving coils and the rear cowling is cut away. Piping along the lower edge of the tender is exposed on both sides.



Wedge shot of left side. The portholes are a distinctive feature. Note the builder's plate on the side of the smokebox and free standing grabs on the pilot.



The smoke on the T1 is difficult to capture with a still camera, but is quite convincing when the smoke unit is warmed up. Smoke escapes from both stacks, is timed with the exhausts, and varies in volume with the load on the engine. The smoke volume can be adjusted at rest and moving with CVs and can be turned off temporarily with a function key or a switch inside the smokebox front.



Adding a Few Decapod Details and Enhancing Performance

By Barry Yankolonis

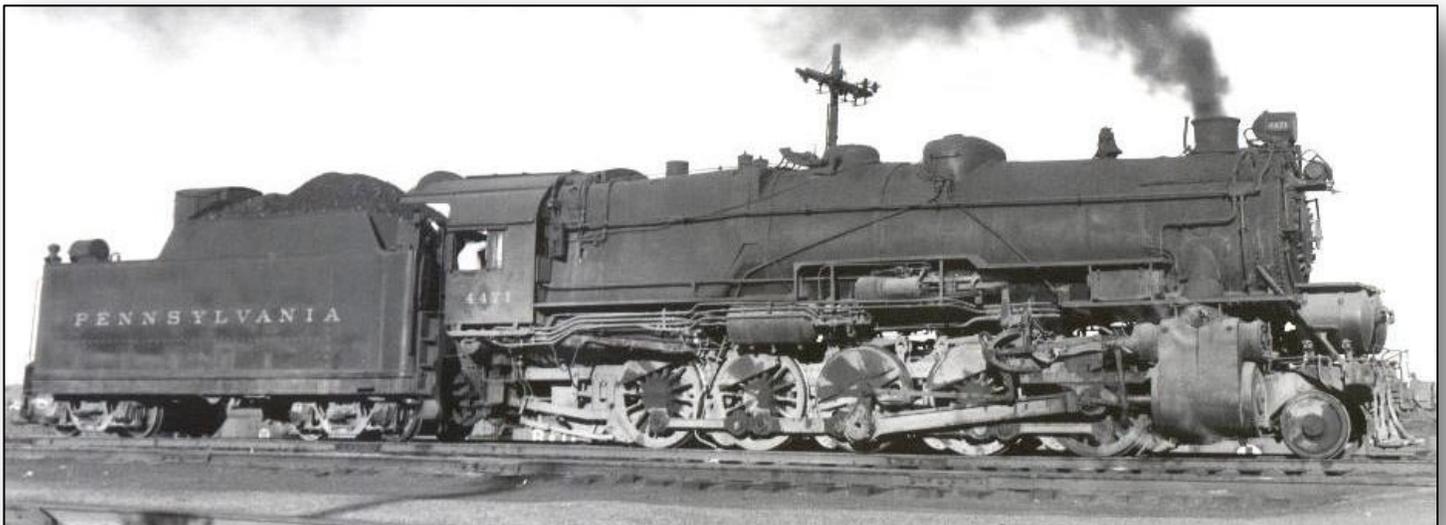


Engineman's site of the finished model of I1SA #4471.

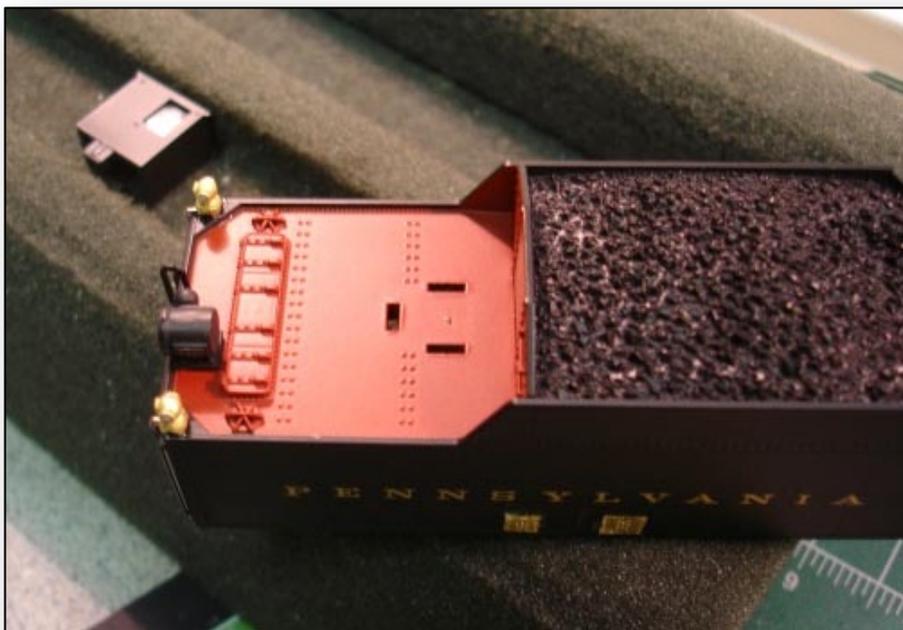
Over the past few years BLI has produced several runs of the PRR's I1SA Decapods. They are very nice engines and have great detailing. When they first came out, I purchased two, one with the 210F82A "coastal" tender and the other with the short tender, 90F82, the "as built" tender. After I received them, I compared them with two of my brass Key Decapods that I had purchased many years ago. I was pleasantly surprised and very pleased at how well BLI and the PRRT&HS Modeling committee had worked to make the BLI models as

detailed as possible, at a reasonable cost and very comparable in detail to the brass imports.

I couldn't let well enough alone, so I decided to add a little more to the engine and tender. This article will deal with some additional detailing I did to the 90F85 tender and its engine, #4471. I also did some mechanical changes to the engine which I will describe. I didn't want to do a complete repaint of the tender or engine so I limited myself to details that could be added, touched up with paint, and then weathered.



The prototype #4471 in the post-WWII arrangement.



(Clockwise from above) Barry has removed the doghouse from the tender body, replaced the marker with Precision Scale castings, and added patch panels to the tender wall. Using a pin-vise, Barry is drilling holes in the doghouse for handrails. Finally the handrails are soldered together on a wood jig.

I decided to start with the tender. I wanted to add handrails to the forward brakeman's cabin or "dog house" as it was more commonly called. I had seen other modelers do this in previous *TKM* articles, and it certainly added to the dog house's appearance. While in the midst of these changes, I thought about opening the door and possibly adding a brakeman figure standing by the door or entering the cabin. Before I could start I needed to resolve a few unknowns/"not-so-sure's". Namely, I wasn't too sure what the dog house interior color was; I thought it was green. I also wanted to get an idea on what the interior seat looked like. So going to the Yahoo Groups PRR Modeling site...I posted the questions. (A great site with very helpful participants and an excellent source of information, especially for a novice like me!)

Gary Mittner provided a link to an inside picture of a forward brakeman's cabin, and Bruce Smith, on a previous topic, had recommended the use of Burlington Northern Green for the interior green. So, two problems solved. Steve Hoxie was able to answer a question I had concerning whether the floor to the cabin was recessed into the tender deck or not. In turns out, for 90F82 tenders, the tank deck was low enough that the doghouse could be mounted on top of the tank deck. On tenders with higher tank decks, the doghouses were recessed into the deck to comply with height restrictions. So having my information, I proceeded with the work.

I removed the tender shell from the frame; it just pries off. I then removed the dog house from the tender deck. It is held on with 3 locking tabs of which only one had a little glue. I then patched the hole in the tender deck with a piece of styrene and some filler. At this time I still wasn't sure I was go

ing to open the door, but I needed to get the cabin off to do the handrails.

I then removed the existing tender marker lights and replaced them with Precision Scale PRR Claw Foot Marker lights. I left the small back-up light there. When I started removing the marker lights I realized they were brass. As a matter of fact, numerous details on the BLI Dec's are brass. The BLI markers were solid at the base and not cut out with the 4 claw feet as the replacement Precision Scale ones were. Otherwise I would probably have retained them. The existing BLI markers were a little hard to remove since they had a long brass post running down the inside corners of the tender shell and solidly glued. I attempted to cut through the glue and remove them, but to no avail. I finally had to cut them off and drill new holes for mounting the replacements. To secure the replacement markers, I drilled a small hole up the middle of the marker light from the bottom, between the claw feet. I glued in a short piece of wire to act as a mounting post and then inserted the marker into the hole in the tender and glued in place. This makes a more secure mount rather than relying on the small surface of the claw feet glued to the tender corner. Since the time frame I model is after the change in marker light configuration, there are no side lights, just blanker plates and the rear red lens. I filled the marker light side cavities with plastic rod and filed it smooth. I enlarged the marker back lens opening with a #52 drill and later added MV Products #220 red lenses, but this wasn't done until after painting and weathering were completed. I then bent short pieces of 0.008" diameter wire into a 90° elbow and added them to the existing marker light conduit at the back of the tender. This represented the conduit going into the base of

the marker lights. Don't forget the small middle, no longer used back-up light.

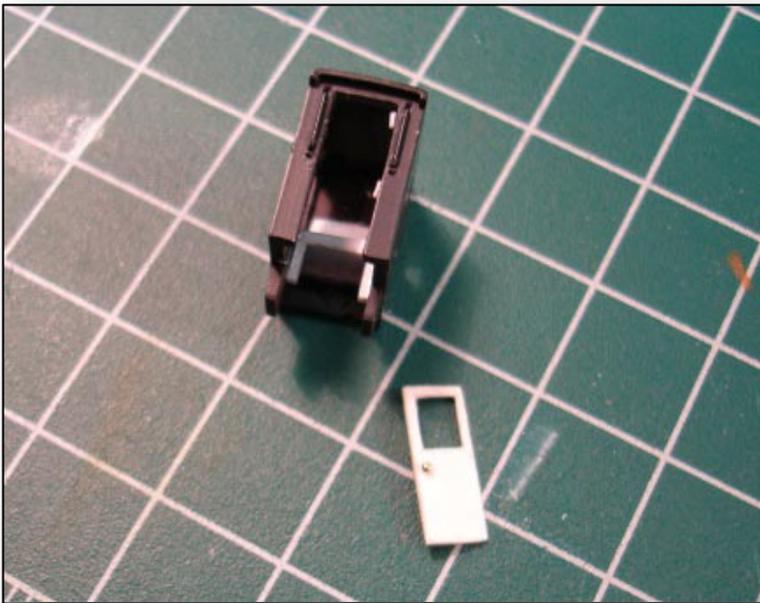
The dog house was next. I marked off and drilled holes to mount the handrails on the sides. I built a jig to solder the handrail after bending the wire to shape.

I decided to take a leap of faith and do the door opening. I measured the door and window opening and made a thin cardboard template and traced it on a .020" piece of sheet styrene and carefully cut it out. When cutting the window opening be careful not to cut through the surrounding door. (Don't ask me how I know this.) I cut the existing door from the dog house and trial fitted the replacement door. I then added a door knob made from a small brass rivet purchased from Scale Hardware. Next, I fabricated a small bench from styrene, rounded the "cushions" and glued them into the interior. I cut 3 small pieces of styrene rod and glued them to the door frame to represent hinges, but more to give a good gluing surface for the door.

The door was glued on later. I removed the windows from the dog house, trimmed off the extra plastic mounting flange around the window and set them aside. You'll have to trim the back window flange closely since the handrail is very close to the window. If you don't, when you try to reinstall the window the flange might touch the handrail coming through the wall and the window will not seat properly. If you're really ambitious you could scratch build some new windows and not have to worry about trimming the existing windows. I didn't want to take the time since I was trying to finish the

model before our modular club ran at the next train show. Following that, I masked the window openings to avoid overspray on the outside and painted the interior green. I then reinstalled the windows, and masked them from the outside, glued the door on in the open position, installed the side handrails, and painted the door and grab irons, and set the dog house aside.

The next thing I thought about was to attempt to put some patches on the tender sides, something often seen in pictures where repairs have been done. Most of these repairs were to the internal beams that ran from one tender wall to the other to give the walls support from water pressure and the coal load pushing outward on them, and, I'm sure, to also give some rigidity to the tender shell. They were located at the bottom and top inside the tender cistern. For the repairs I decided to use K&S Engineering 0.001" thin shim brass. It's available in their #258 shim pack. I initially thought about using rivet decals available from various hobby suppliers, but I decided against it due to the complex rivet pattern where the patches are seen. I used a round toothpick to burnish the brass shim material over the area on the tender where the patch would go to emboss the rivet pattern. Then I used a small pounce wheel to make the rivet pattern that ran around the outside edge of the patch. I cut the patches from the sheet brass and mounted them to the tender locations. I used a photo of #4471 to assist in locating the patch repairs on the tender. I only had right side photos, so "winged it" for the left. It took me several attempts, but finally succeeded to my satisfaction. I think???



(Clockwise from above) The doghouse with the cast door removed and simulated hinges added. The new door is in the foreground. Tender patch panels are embossed on thin brass sheet then are cemented in position on the tender body.

Next came the brakeman figure. I used a Woodland Scenics' figure in their Auto Mechanics #A1914 set since it was the closest to the pose I wanted. I cut an arm off it and grafted an arm off another figure to obtain the pose I had in mind. I drilled a small hole in the grafted arm and a corresponding hole in the figure. Sticking a short wire post in the arm, I glued it to the body marrying up the arm pin with the hole in the body. This would give the newly attached arm a strengthened joint. I added Squadron white putty to smooth the arm joint. I used a small dental burr chucked in a Dremel to sculpture the arm and reshape the hat on the figure. I repainted and set him aside for later.

This completed the tender modifications, so it was reassembled; the decoder was retested and the tender set aside for painting (weathering).

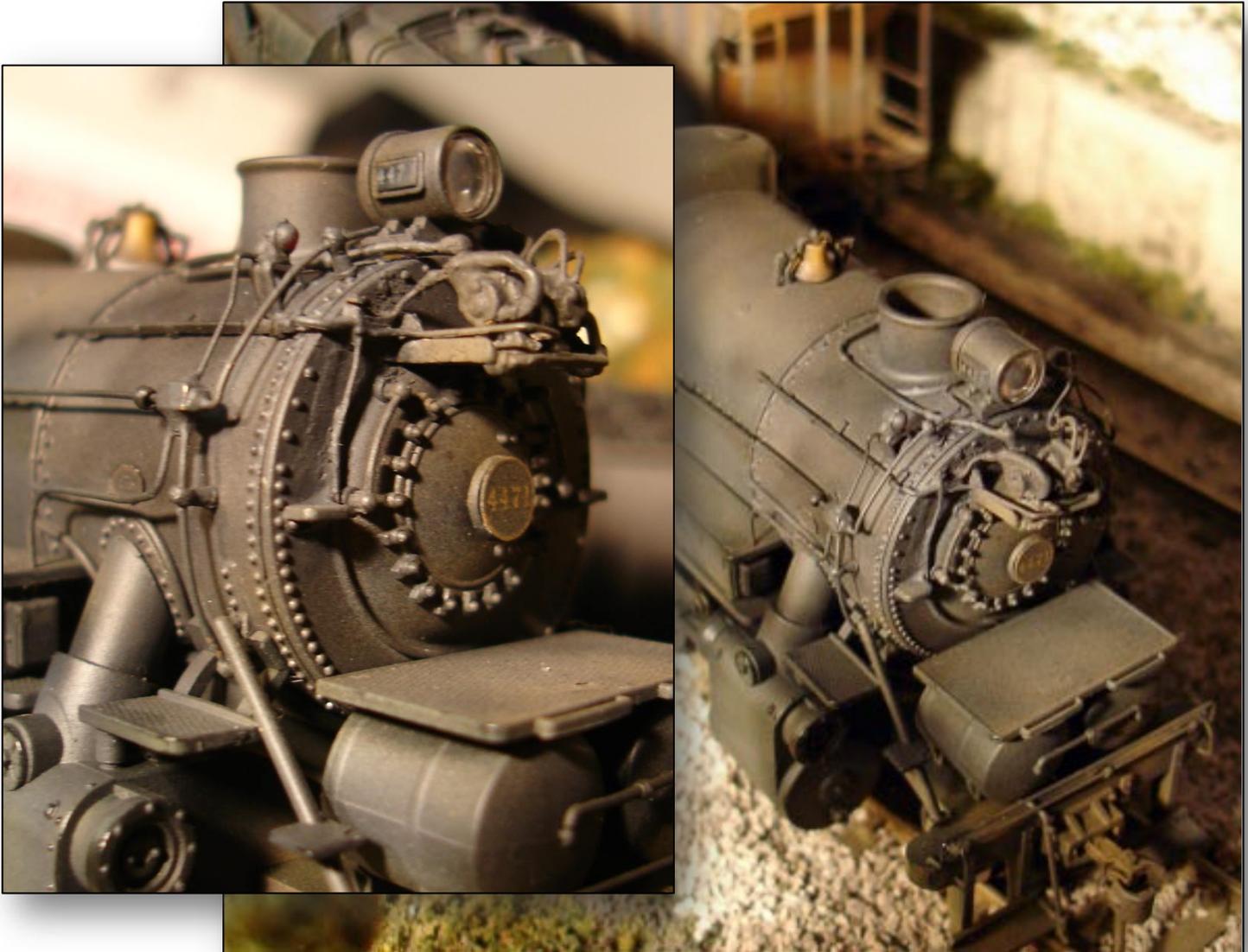
Now I turned my attention to the engine. I initially had no intention of doing much to the engine except replacing the molded on steam lines to the generator with wire, and adding small brass globe valve, and doing some work on the engine suspension and drive train. I also planned on replacing the incandescent headlight bulb with an SMD LED. However, after closely examining the #4471 photo, I realized that the engineer's side of the engine had some noticeable differences from how the model was done.

The first thing I did was to disassemble the engine by first removing the boiler from the frame (two screws under the cab and one up front under the pony truck) and then removing what I will call the wheel retainer plate. This plate is mounted under the frame with several screws, retains the wheels and bearings in the frame and has the brake shoes molded to it. Be careful when removing the 1st and 5th drivers that the suspension springs under the axle bearings don't fly out. Yes, I had the dreaded cracked axle gear! I ordered a replacement from BLI. This shouldn't be a problem on the newer BLI production runs. After I removed the suspension springs on the 1st and 5th set of drivers I would replace them with the NWSL Wimpy springs. To do this required enlarging the original spring holes to .079" diameter in the frame. A number 46, 0.081" dia. drill was used to enlarge the holes. I used a small drill press and mounted the frame in a vise while doing the drilling. You have to be careful since there isn't much material on the frame, and if your drill bit isn't centered in the existing hole you could drill through the frame wall. After you're done drilling make sure you do a thorough job of cleaning out the drill bit chips. The retainer plate has small pads under each wheel bearing. When installed, the wheel bearings rest on these pads. That's OK for the 2nd, 3rd, and 4th driver since they are not sprung, but for the 1st and 5th sprung drivers, it restricts, if not totally prevents, any suspension movement as the engine moves along the track. This defeats the purpose of the sprung drivers. To remedy this, I filed off the small pads for the 1st and 5th drivers to eliminate this restriction. You also need to take a Dremel burr and hollow out a little more clear-

ance on the wheel retainer plate to accommodate the large brass axle joiner/insulator in the middle of the axle. There are already molded indentations; you just need to increase the depth slightly to allow for the increased suspension movement of the two axles. Be careful you don't take too much off and go through the retainer plate. This modification was discussed at length on the BLI Forum several years ago. Unfortunately, the forum is no longer available, and I don't recall much discussion about it on the BLI Yahoo web site. Basically, what this modification does is allow the front and rear sprung drivers to have more vertical suspension travel to assist in better traction for the engine. You don't have to use the particular springs I used but the ones that come with the engine are definitely too stiff...at least on the first BLI run of engines.

While the wheels were off I also redid the driver quartering... verifying left lead. These were very minor adjustments to the factory quartering. I also added additional weight to the boiler/engine. Using A-Line thin lead sheets, I was able to add additional weight between the existing boiler weight and the top of the boiler shell. I added some weight in the steam chests, and between the motor and the gear box and also alongside the motor on the frame.

I replaced the incandescent head light bulb with an SMD LED. To give the effect of an incandescent light bulb I painted the led with a few coats of TAMIYA clear orange acrylic paint. I ran the two LED magnet wires down through the original wire hole behind the headlight and soldered them to a very small piece of circuit board I had salvaged off a printer ink cartridge. (Look on your used up printer ink cartridge if you don't refill them. Usually there are small circuit boards on them that control the ink flow. I pull them off, ohm them out, and I can usually find a portion that might have traces that are connected to a brass pad and sometimes even a soldering pad hole.) I like to solder the very fine leads from the smd led to a small circuit board of some sort and then solder 30AWG wire to that board. I then attach a small JST (Japan Solderless Terminal) connector to the end of the 30 AWG wire. This will connect to the frame lighting harness and facilitate boiler removal for maintenance. It also limits movement of the fine led leads. I stick this small circuit board to the front of the boiler weight, if it's close, with two sided foam tape. That way if I have to disconnect it, the 30 AWG wires are taking all the movement. I replaced the troublesome spring contact circuit board that was on the engine frame. This spring contact circuit board makes the connection from the headlight wiring harness to the lighting harness in the boiler. I extended the existing frame lighting harness by soldering two 30 AWG wires (color code them after you determine the positive wire) to where the frame harness used to connect to the spring contact circuit board. Put shrink tubing over the solder joint. I put a JST connector on the other end of the extended frame harness. Make it long enough so when



Close ups of the steam and electrical connections to the generator and electrical conduits to the marker lights.

the engine is reassembled it will go under the boiler weight and reach up into the front smoke box area. If you have an engine with smoke, the real-estate in that area might be a little cramped, so you might have to route it differently. I inserted another resistor in one of these leads. My engine already had one factory installed resistor in the lighting harness so I needed to add another to get enough of a current drop for the smd led. I measured 4.5 V on the headlight harness with the incandescent bulb. Depending on your particular smd led specs, you may need to adjust accordingly with the proper resistor.

While the boiler was off I made some modifications to it. I like to replace the molded on generator plumbing on the smoke box front. I already did it to my two K4's and will do it to my two M1A's. To remove the molded on valve and plumbing, I used a Mission Models Micro Chisel, a very small modeling chisel with a very sharp, small, 1mm chisel blade. I shaved off all the molded on plumbing from the front step on the



smoke box front going up to the valve and generator. The step location will help cover the transition area from the added pipe detail to the molded on pipe. I used a Precision Scale small globe valve to replace the molded on one. With a # 77 drill bit, I drilled the small pilot hole in the valve body a little deeper and soldered in a small piece of .018" wire to represent the pipe going from the valve to the generator. I soldered another piece of wire to tee from this wire (pipe) going down. This wire comes down the front of the smoke box retracing the chiseled off pipe, going beside the step and joins the remaining molded on pipe that continues down the smoke box. Slightly below the T section I soldered another short piece of .018" wire to represent the second pipe going to the generator. This pipe goes into the lower part of the generator from the front. The pipe that was molded with the globe valve was carefully bent, trimmed and matched to the pipe coming out of the boiler side that feeds steam to the generator through the valve.

Be careful on the generator plumbing layout. In looking at numerous I1 pictures, every conceivable way of running these steam lines to the generator was used. The only thing common on all of them is the line coming from the boiler side goes to the valve, and there are always two pipes going to the generator, but the configuration varies. Look at the picture of the prototype engine you are modeling to see the configuration. Yeah, "Standard Railroad of the World"....

I added .010" wire to the engine front marker lights to represent the conduit coming from the junction boxes on the front handrails to the marker lights. I used .010" wire to extend the electrical conduit from the top right handrail stanchion going behind the head light to simulate the conduit continuing to the other side. The conduit on the fireman's (left) side goes from the top (behind the generator) junction box to behind the headlight. I have found that annealing wire helps with bending it into different shapes. I annealed .0125" wire to use for the two cables coming from the generator to the electrical junction box behind the generator. I then carefully shaped it to represent the 2 cables. To me, this was a tedious process trying to get a natural looking drape to them since the wires come out of the junction box, make an approximately 90° bend down, droop/sag, and take on a skewed off-set angle to the generator. This is another area where configuration varies. Some engines look like they had metal conduit making 90° bends and straight runs from the generator to the junction box. Some engines had one cable coming down, some two. From the best I could tell from the photograph I had, #4471 had two.

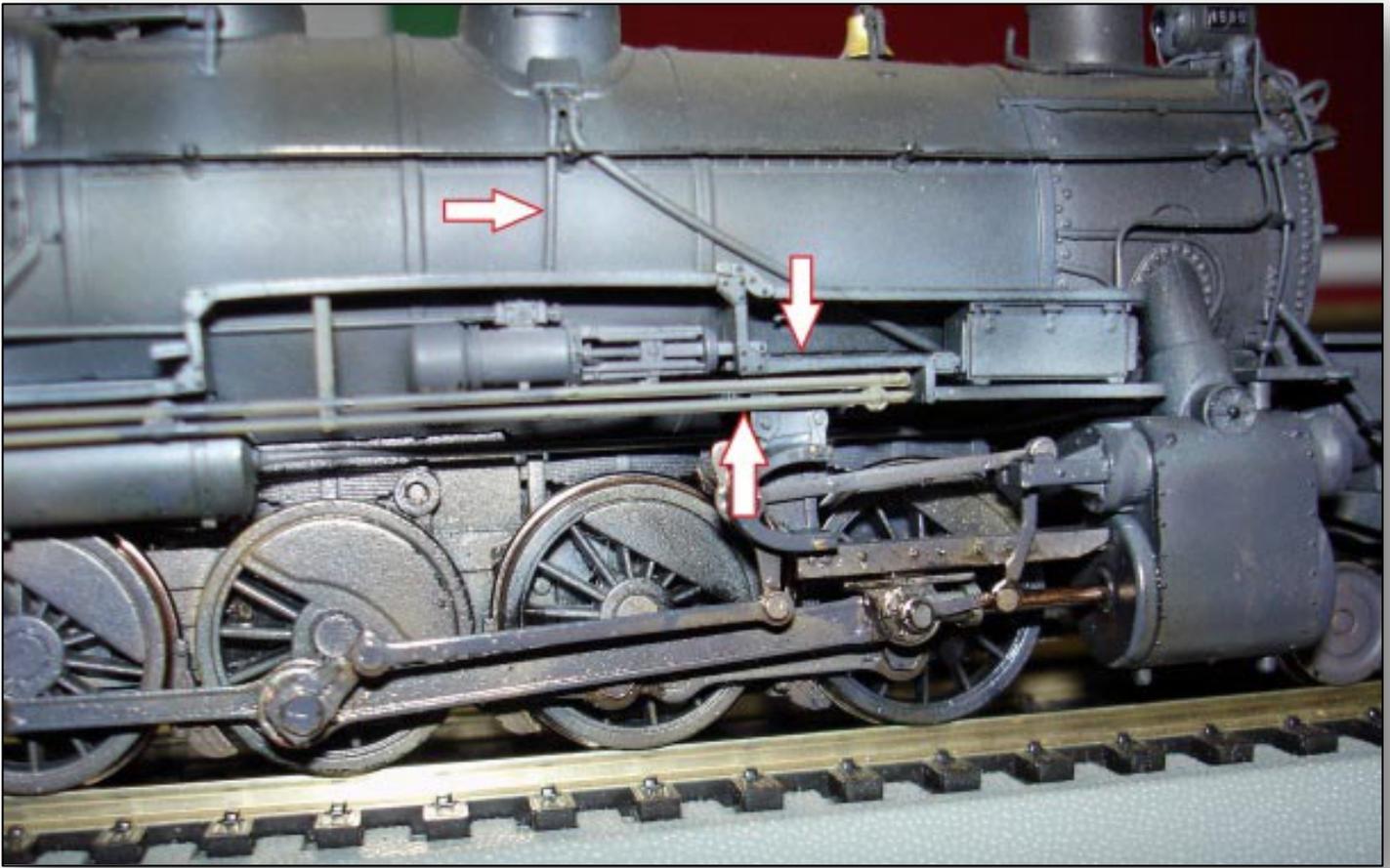
The next area I worked was the initially unplanned part. This particular engine had its engineer side sanding pipes going to the #4 and #1 drivers, unlike what was modeled on the

BLI engine. To start, I cut the existing #3 driver sanding pipe off and patched the hole in the boiler side where it was attached below the sanding valve. I annealed a piece of .025" wire and carefully rolled it around a dowel of slightly smaller diameter than the boiler. To get the proper bend I rolled it at an angle in a spiral fashion to model the path it would take down the boiler side and carefully bent it to go through the walkway just in front of the Belpaire Firebox. After cutting a small notch in the walkway to allow the pipe to pass through, I marked a location on the side of the boiler where the pipe passed by. I drilled a small hole in the boiler at that location, and, correspondingly, I soldered a short piece of wire to the pipe at the same relative location. When I attached the new sanding pipe, I glued it to the sanding valve and stuck the short wire mounting bracket into the newly drilled boiler hole and fastened everything with CA (cyanoacrylate). This gave the new pipe a sturdy mount.

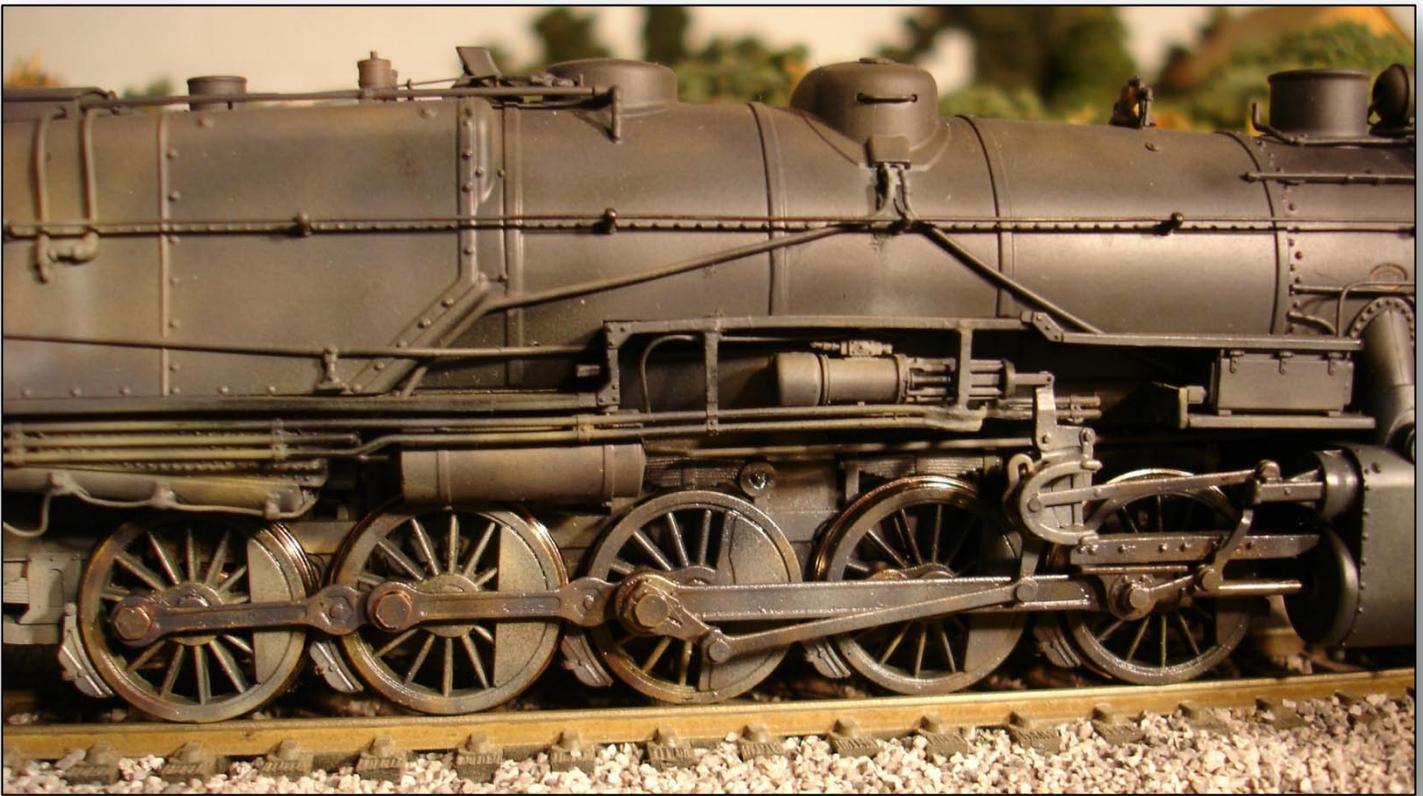
I initially filled in the cut out in the walkway at the location of the removed #3 driver sanding pipe. Later in looking at a prototype picture of an I1 (from Bruce's Decapod presentation, engine # 4543) that had the moved sanding pipe, I noticed, to my chagrin, it still had the cut out in the floor board at the old sanding pipe location! So I went back and undid my walkway patch job!

The #4471 picture also showed the walkway in front of the power reverse was different from what the model had. The model had a walkway extension dropping down in front of the power reverse and continuing forward to the back of the train box. #4471 did not have this. I also noticed that the air lines were routed differently, crossing and then going behind the power reverse linkage at this location. The walkway modification was easy, just trimming off the unwanted portion. Rerouting the air lines was a little different story. I attempted to bend the plastic pipes by heating them in hot water and bending them. I was able to bend them, but in the process didn't quite get them bent at the proper angle. They were slightly skewed up at the bend. I kept working them and finally got them bent to my satisfaction, going behind the power reverse linkage. This does shorten the length the pipes travel along the boiler, but that's fine, because they bend in towards the boiler at the right spot.

I also added an additional hanger for the air lines as depicted in the photo. I added the air line (.025" wire) from the mid-engine air tank forward to the back of the right air tank on the pilot. This wire exits the mid-engine tank front, angles inward towards the frame, runs along it, makes a slight outward bend to get around the saddle for the steam cylinders and then angles back towards the center and enters the back of the pilot air tank (engineer's side). I also added a small air (.010") line from the mid-engine air tank to the power reverse.



Original placement of #3 sand pipe, walkway and air lines on model.



Modifications to sand pipe, walkway and air lines.

The next area was the hose (steam or air?) hanging from the sides of the fire box ashpan. I drilled .0125" (#82) holes in the ashpan at the appropriate locations for the hangers. I then took a wine bottle cork foil wrapper and cut it into small, approx. 3/64" W X 1/8" L strips, and drilled #82 holes in them at one end. I then bent them into small J-shaped hangers by carefully using an Xacto knife and rolling a bend in them over a small diameter wire.

I had some 0.4mm small brass rivets from Scale Hardware that I used for fasteners. I placed them in the holes in the tin foil hangers, stuck them in the holes in the firebox and glued with CA. I then took .015" diameter soldering wire and starting at the back end of the firebox, made a loop to hang down and then attached it to the remaining hangers on each side, going forward to the front of the ash pan and then inboard and ending. I formed small sags in the wire between each hanger to capture the effect of a hanging hose.

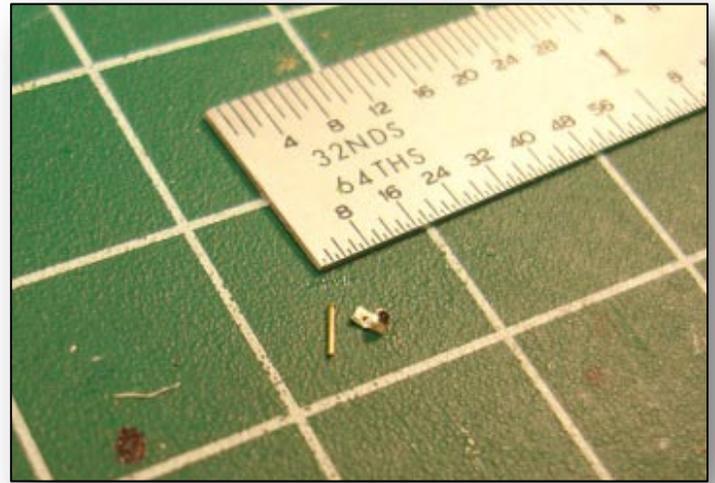
The last thing I did was to add the appearance of the water hoses coming from the tender to the injector and feed water heater.

I used 28 AWG solid wire to form the "water hoses". I stripped some insulation off and pulled the solid wire out to create a short section of hose with no wire in it. This was to allow enough flexibility in the hose that any tender movement hitting the hose would not cause interference problems and possibly derail the tender. I left enough wire in the hose to form a drooping loop and a short piece protruding from the end that would be attached to the castings on the model. I drilled holes in the castings and put the short protruding wire in the hole and CA'd the hoses.

This completed all the modifications, and I reassembled the engine. I did touch-up painting to all the additions using Floquil Weathered Black. You could use Grimy Black also. I did some of the touch-up painting before attaching parts to the model, such as the sanding pipe and the long air line from the middle air tank.

Let me preface the next section on how I weathered the engine. Weathering is, to me, a very, very subjective topic. To one modeler, another person's weathering is overdone and, to another, maybe there is not enough or it is not the way they would do it. After looking at a multitude of pictures over the years, I settled in to a method I felt represented what I had seen. By all means, I'm not saying this is the best or the correct way, but it's the way I do it. I don't consider myself an expert with an airbrush or weathering for that matter.

After cleaning off the engine and tender, I started the weathering process with Floquil Depot Buff. I put a light dusting on the side of the Belpaire firebox, the ashpan and on down to the middle and last set of drivers and the frame



Firebox hose hanger from a foil wine bottle seal.

structure aft of the wheels. I'm trying to capture the subtle tannish color you see on the firebox side, ashpan and the wheel area, especially after sanding and ashes have been dumped. Next I lightly sprayed Floquil Rust over the top of the engine and around the ashpan firebox area. I sprayed a fine line on the row of rivets down the tender sides and some streaks down the side of the tender to simulate over spill from the water hatch. After I did the other colors I went back with rust and lightly sprayed an area on the tender deck around the water hatch and on the hatch to represent rust from water spillage. I sprayed some rust on the back of the tender where it would have splashed up from the wheels of the freight car behind it during rainy weather. I next followed with light dusting of Floquil Grime, Grimy Black and Weathered Black. I use Floquil Concrete to stimulate deposits from steam leaks around some of the boiler fittings and various plumbing. I finished off with Floquil Engine Black around the smoke box area and on top of the engine and tender deck. After the paint was dry, I crushed some West Virginia Bituminous coal into fine/small pieces and sprinkled it over the tender molded coal load and added some spillage on the tender deck on either side of the dog house. I've seen pictures of coal spillage in this area piled against the dog house as high as the back of the coal bin slope sheet. I then used the standard white glue, water and detergent mixture to drizzle over the coal to hold it in place. To simulate water spilled around the tender water hatch I brushed on (more like puddled) Johnson's Pledge (Future) floor wax. It takes a couple of coats to build up the shine. I glued the brakeman on the deck bending down to get into his dog house. I replaced the two factory engine crewman with other figures which had more animated poses. This finally finished up the project, and it was ready to run.

I hope I was able to furnish some ideas on things you can do to make your Decapod unique from other models, closer to prototype, and maybe improve its running.



The completed engine-to-tender water hose connection.



Views of the completed tender.



Modeling FGE/WFE/BRE Refrigerator Cars

Part 2: The 1921-22 FGE Cars

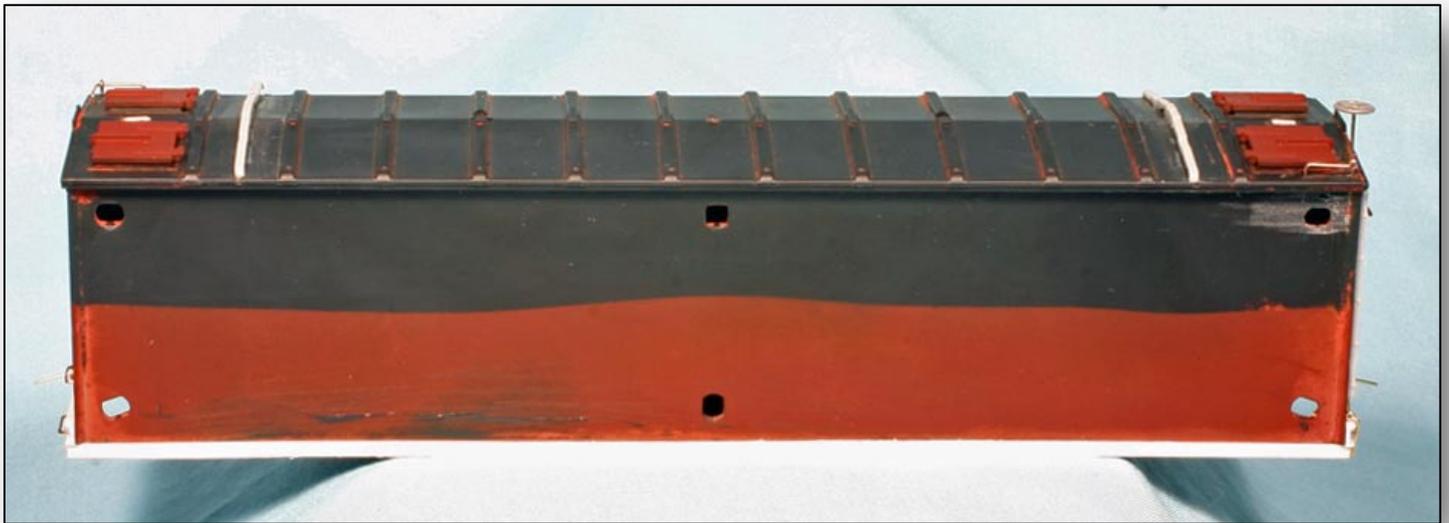
By Bruce Smith – model and photos by the author

In the previous installment, I described how the Accurail refrigerator car could be used to model a signature car of the steam era Burlington Refrigerator Express (BRE) fleet. Continuing our examination of the reefer fleet for “our companies”, in the next two installments, I will look at two of the signature cars for Fruit Growers Express (FGE).

When it was formed, FGE inherited a significant number of older refrigerator cars creating a very diverse fleet. Needing newer, more modern and standardized cars, FGE created a standard design in 1921. More than 3900 cars were built, beginning in 1922. These cars occupied the 32100-35999 number series. This design was followed in 1927 by a slightly larger car with more than 3800 cars built in 1927-28, occupying the number series 36000-37999 and 50000-51999. The major spotting differences between the 1921 and 1927 designs are the height and side sill. The 1921 cars were 10'2" from the rail to the eave compared to 10'7" for the 1927 cars. The 1921 cars had 6" side sills with the cross-bearers visible below it, while the later cars had 8" side sills and hidden cross-bearers. Following WWII, the 1927 design was modified by increasing the eave height 4" to 10'11". The length and width of the 1921 and 1927 cars was nearly identical, and both were equipped with what would become nearly universal hardware on FGE refrigerators, such as metal hatch rests.

There are several ways to model the 1921 FGE design in HO scale. These include modifying the Intermountain model, which is a model of the modified 1927 car, building the Sunshine Models resin kit for this car (34.1), or modifying an Accurail car. For this installment, I used the 4800 series Accurail refrigerator car to model the 1921 FGE reefers. As noted in last month's article, this model is fairly accurate for a BRE car. While the car has been released in FGE paint, it is missing a number of key details that will be addressed in this article. This kitbash was based on Greg Martin's Kahn's "Shake and Take" project from Prototype Rails, Cocoa Beach, 2007, with some modifications. For these cars, the notable spotting feature was the 6" side sill and 10' 2" eave height. The Accurail model is nearly perfect for eave height, length and width. So let's get started!

The first step is to modify the “core”. This is the part to which the sides are attached. First, I shaved off the strip that is located just below the sides when they are attached to the core. Then a piece of 0.010" x 0.060" strip styrene was added to model the side sill. This piece was cut a bit longer than the car side. It is best to use the sides to help you glue this side sill in place. The 0.060" strip is a little too tall, so when it was dry, I sanded it the bottom edge so that it was even with the original sill bottom.



This photo shows the new side sill added to the bottom edge of the core. Additional details applied in later steps are also seen including end sills and hatch rests.

SIDES

Just like the BREX car in the last issue of TKM, I shaved off the grab irons and ladders, rescribed the boards as needed, drilled new holes for wire grab irons and glued the grab irons in place. Then I drilled holes just above the legs of the grab iron for Tichy nut-bolt-washer (nbw) castings and glued them into place. The long ladders from the Intermountain parts sprue were selected to replace the cast on ladders, but I did not glue them in place as they will be painted separately. Looking at photos, it is clear that many of these cars had a sheet metal plate above the door that I added with 0.010" styrene. Archer rivets were added in each corner after grit blasting.

ENDS

As was done for the BREX car, the grab irons and ladders were removed and the siding was rescribed as needed. The corner gussets were also removed, along with the poling pockets and the brake staff support. As with the sides, wire grab irons and Tichy nbw castings were applied to the ends. The FGE cars require a new end sill. This was fabricated from 0.100" Evergreen channel. The end sill rests on top of the overly long new side sills, which were then trimmed flush with the channel. Once the side sills were trimmed, triangular gussets were added between the side sill and end sill. To make these, a short piece of 0.020" x 0.060" strip was glued to both and then cut it on a diagonal with a pair of nippers. Use care in gluing these to the side sills as the 0.010" styrene will deform with too much solvent cement. Three triangular gussets were also added in the end sill above the coupler using the same approach. For the end ladders, the shorter Intermountain ladders were selected. I drilled holes for these ladders and glued them onto the end, as they will be painted the same color as the end. Again, just like the BREX car, the brake platform from the Accurail car was used. In addition, I added a Tichy retainer valve (you can also use a Precision Scale retainer valve) and bent 0.010" brass wire for the retainer line. The brake staff support is the bottom half of the large Tichy staff support and was glued to the bottom of the channel. The

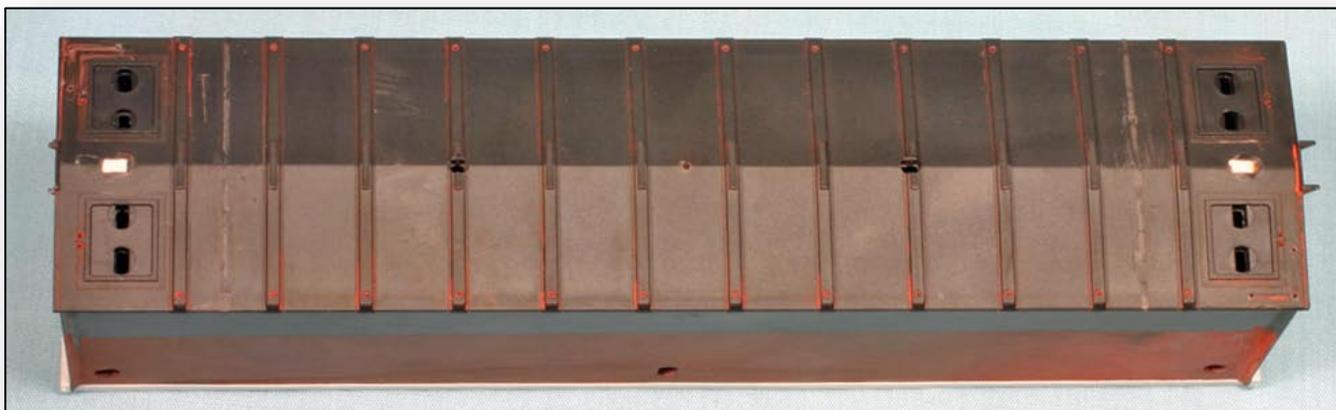
brake staff was made from 0.015" brass wire and the brake wheel is from Tichy. In order to model the uncoupling lever, 2 brass eyes (Detail Associates 2206) were added above the channel and I bent an uncoupling lever from 0.012" brass wire.



An end-on view of the B end of the 1922 built FGE reefer. Note the new end sill, corner gussets, wire grab irons, uncoupling lever, retainer valve and line and end ladder. New roof details such as grab irons and hatch rests are also visible.

ROOF

The roof was treated the same way as the BREX car. The hatches and running board were removed and the hatches were saved for later use (although Intermountain hatches could be used here). The molded-on grab irons and hatch rests were shaved off. The holes in the roof were filled with sprue, the excess was shaved off and the roof sanded smooth.



The hatches and roof walk were removed and the grab irons and hatch rests were shaved off. The photo also shows the roof walk holes after being plugged with sprue.

Wire grab irons were added around the hatches. Because of their shape, they need to be bent from straight wire. The middle support for these is a Detail Associates 2206 eyebolt. In order to get the unique shape of the hatch rests I used the Intermountain parts. These were glued in place with solvent cement. Scale 2" x 6" lumber was used for the roof walk boards. These were added to the car after it was grit blasted.

UNDERBODY

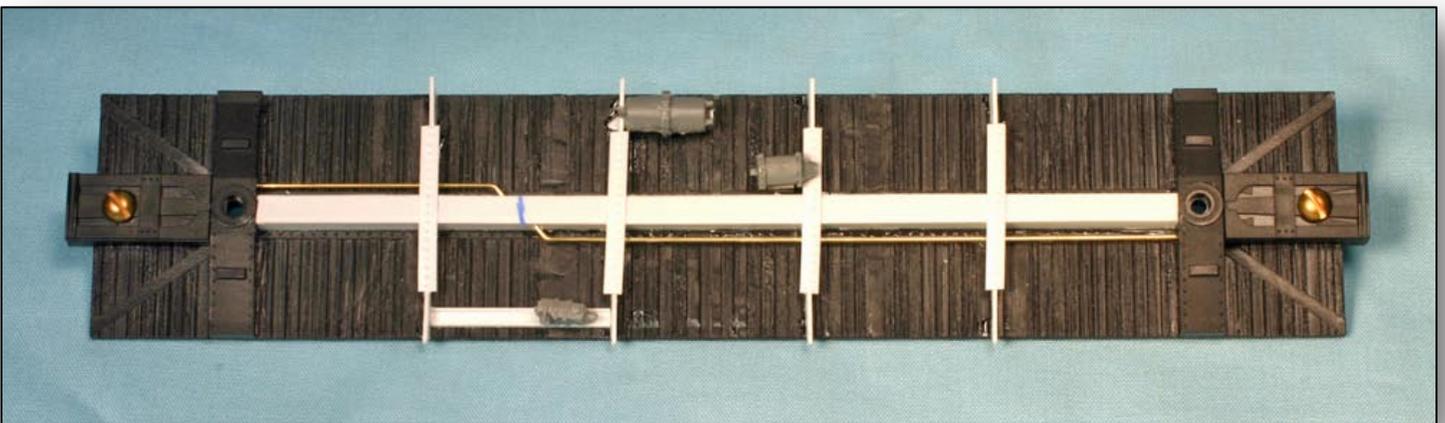
There was some major work to do here! First, all of the cross-bearers and cross-ties and the supports for the AB reservoir and valve were removed. A new center sill was fabricated from 2 pieces of 0.020" x 0.125" strip styrene, which were glued into the grooves for the Accurail center sill. This was then capped with another piece of 0.020" x 0.125" strip styrene.

New cross-bearers need to be made from 0.020" x 0.125" strip styrene. To do this, I cut 8 pieces slightly longer than needed to go from the center sill to the side sill. These eventually have a complex shape, with a slope from the center sill

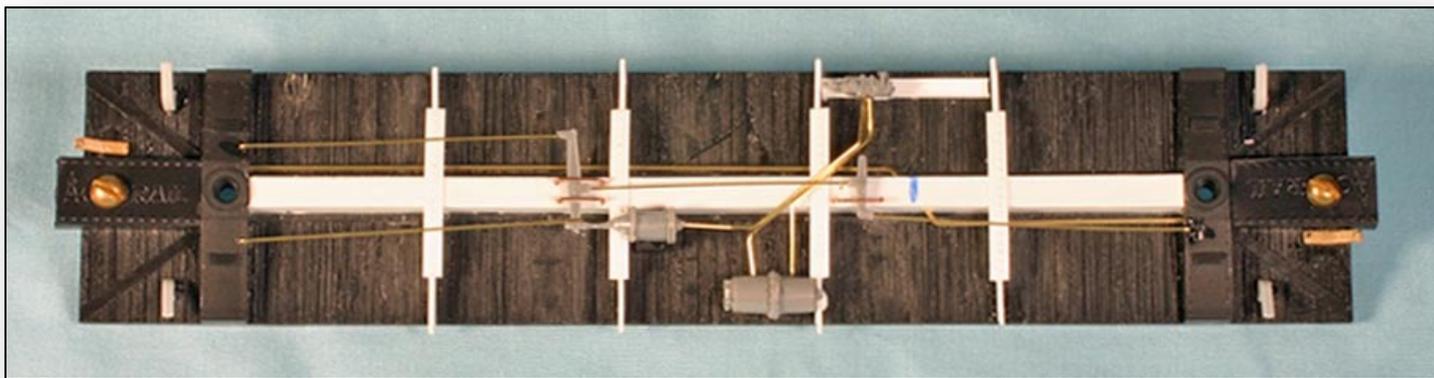
to about 1/2 way to the side sill, then a level portion, with the end overlapping the side sill. To start, I cut out a rectangular shaped piece to allow the cross-bearer to sit down flat on the underbody, while overlapping the side sill. Once I cut one, I used it to measure and cut the other 7. Next, I cut a rectangle from about halfway down the piece to the end overlapping the side sill to get the reduced height. Finally, I connected the corner at the center sill with the lower corner of the rectangle to make the angled pieces. A hole was drilled in a cross-bearer for the train line, and then that was used to align the holes in 3 more pieces, as well as the bolsters and center sill (between the 1st and 2nd cross bearers on the "A" end). A piece of 0.019" brass wire was bent and threaded onto 3 cross-ties and a second piece on the 4th and then the cross-ties and train line were glued in place. The crossties were then capped with strips of 0.010" x 0.080" strip styrene with embossed rivets (I used a pounce wheel). You could also use decal rivets added just prior to painting. With the underbody in place, I trimmed the ends of the cross-bearers even with the side sill.



This photo shows the first steps in revising the underbody of the 1922 built FGE car. Most underbody details have been removed and the new center sill is in place.



The underbody now shows the addition of cross bearers, train line and AB brake components.

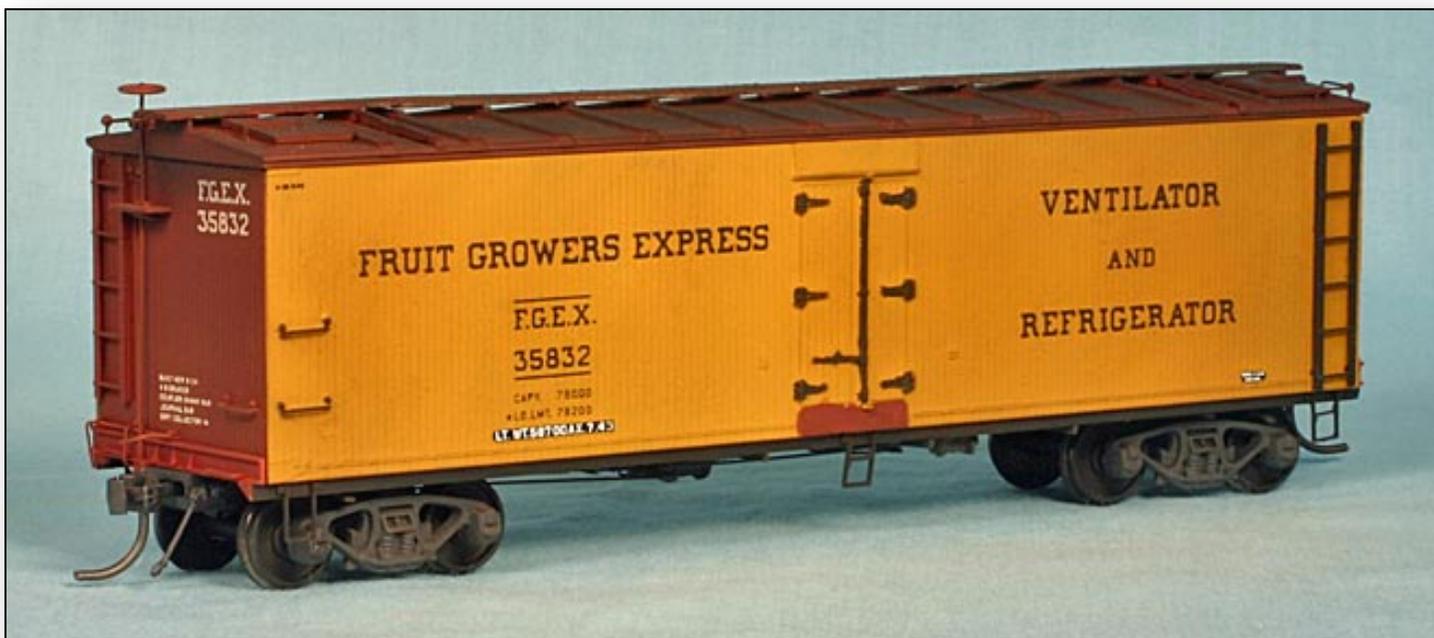


Additional details have been added to the underbody including brake rods, levers, piping, air hose brackets and bunker drains.

To model the brakes, I glued a Tichy AB cylinder, with a small styrene support, to the existing support. A Tichy AB reservoir was attached on the same side as the cylinder, between the 2nd and 3rd cross-bearer, using the 2nd cross-bearer and a support piece of strip styrene. The AB valve was attached to the opposite side between the 1st and 2nd cross-bearer using a piece of 0.100" Evergreen channel. After the glue dried, I routed pipes from the cylinder and reservoir to the AB valve. The brake levers and rods were assembled using Tichy levers and 0.012" brass wire. For a secure attachment, I drilled holes in the bolster for the wire to fit into (when bent at a right angle). I also drilled holes for 18" grab irons for the hangers for both brake levers and installed these last. Finally I added Intermountain ice bunker drains and Precision Scale air hose brackets to the area between the bolster and the end of the car.

FINAL DETAILS, PAINT, DECALS, AND WEATHERING

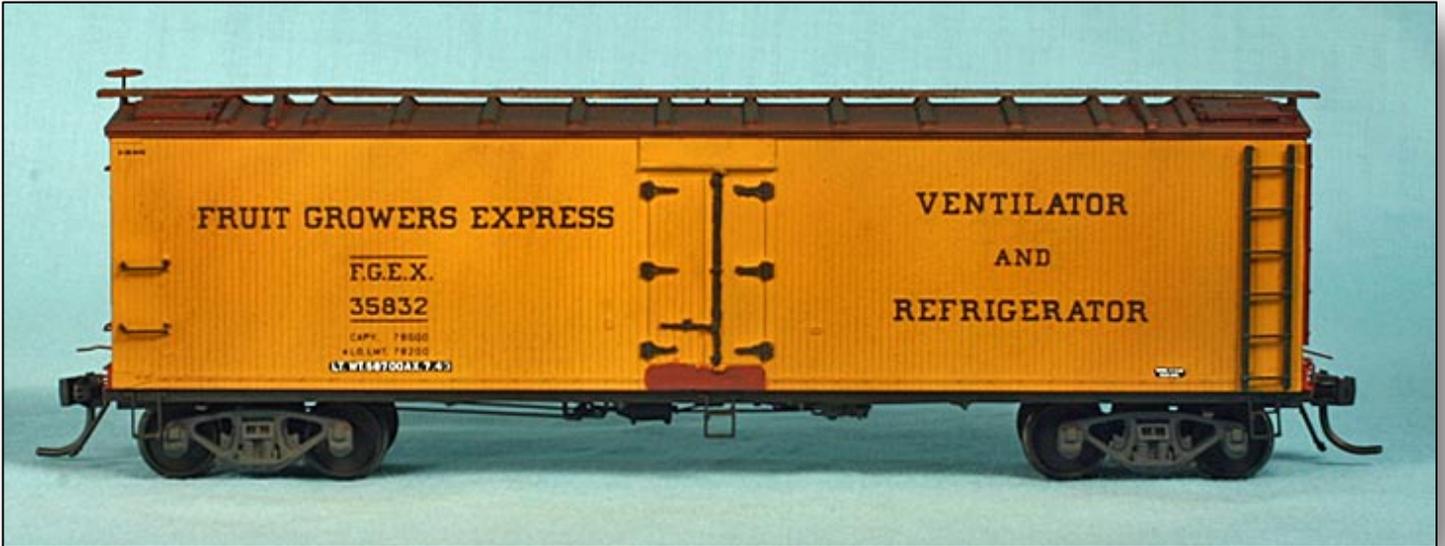
The car was then grit blasted, washed, and then the Archer decal rivets added. The Accurail car is easy to paint, since it disassembles into the parts perfectly for paint separation. Prior to painting, the roof walk boards were installed. The sides were painted with a 1:1 mix of Poly Scale Buff and Signal Yellow, the ends, roof and kickboard under the door were painted with Poly Scale Mineral Red and the underbody was painted with Poly Scale Steam Loco black. Cal Scale air hoses were installed in the brackets (although today I would use the rubber Hi Tech Details air hoses). A coat of Future was applied to give a gloss finish. Decals from Speedwitch (Ted Culotta) were used, although the set is not specifically designed for this car so some cutting and moving of decals was required. The decals were sealed with a coat of flat, and the



The complete, painted and lightly weathered 1922 built FGE reefer is ready for use.

car was weathered with acrylic paints, airbrushed onto the roof and underbody and applied as a wash to the sides and then wiped down with cotton tipped applicators in a vertical motion. In this case I kept the weathering fairly light to represent a car repainted recently. I often add dry transfer chalk marks to duplicate those applied by yard and train crews to indicate routing and in route handling instructions however in this case I left them off as not all cars showed them. These

cars represent a mainstay of the FGE fleet and thus ought to be one of the most common refrigerator cars on a PRR layout, and certainly ought to appear on layouts that model many other railroads. In addition, this conversion can be used to model cars of this type that were transferred to FGE's subsidiary National Car Company (NX). In parallel with the FGE project, I also built NX 2427. This car was most likely in meat service.



Another view of FGE #35832. See an end view on the front cover.



FGE 1922 cars were transferred to National Car Company service as represented by this model of NX 2427.

