



The

Milepost

Volume 41, Number 12 – December 2021

The official newsletter of the Pikes Peak Division

Rocky Mountain Region – National Model Railroad Association.



NEXT MEETING:

Friday, December 12th, 2021 at 7:00 PM

Classic Homes Corporate Office, 2138 Flying Horse Club Drive

Colorado Springs, Colorado

Calendar of Events

January 8th, 2021 (Friday) – Cancelled but Zoom

NMRA-PPD monthly meeting held on Zoom.

February 12th, 2021 (Friday) – Cancelled but Zoom

NMRA-PPD monthly meeting held on Zoom.

March 12th, 2021 (Friday) – Cancelled but Zoom

NMRA-PPD monthly meeting held on Zoom.

April 9th, 2021 (Friday) – Cancelled but Zoom

NMRA-PPD monthly meeting held on Zoom.

May 14th, 2021 (Friday) – Cancelled but Zoom

NMRA-PPD monthly meeting held on Zoom.

June 11th, 2021 (Friday) – Cancelled but Zoom

NMRA-PPD monthly meeting held on Zoom.

July 9th, 2021 (Friday)

NMRA-PPD monthly meeting.

August 13th, 2021 (Friday)

NMRA-PPD monthly meeting.

September 9th, 2021 (Thursday)

NMRA-PPD monthly meeting.

Contest: Freight cars

Program: {to be determined}

October 8th, 2021 (Friday)

NMRA-PPD monthly meeting.

Contest: RR Structures

Program: {to be determined}

November 12th, 2021 (Friday)

NMRA-PPD monthly meeting.

Contest: Anything Xmas RR

Program: {to be determined}

December 12th, 2021 (Friday)

NMRA-PPD monthly meeting.

Program: Xmas Party

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The Milepost, Volume 41, Number 12, December 2021, is published monthly, as an electronic document (Adobe PDF file), by, and under the authority of, the Pikes Peak Division (Rocky Mountain Region), of the National Model Railroad Association. Our meetings are usually held on the second Friday of each month at the Classic Homes Corporate Office, 2138 Flying Horse Club Drive, Colorado Springs, at 7:00 PM. Please come to one of our meetings. We would love to meet you. All scales are welcome. Besides our

monthly meeting, we have swap meets, train shows, and other model railroads (and railroad) activities. All content in this journal is copyrighted to its respective owner unless otherwise noted. Please do not use content from this newsletter in other publications, newspapers, magazines, books, websites, etcetera, without explicit case-by-case permission. The editor of *The Milepost* is Mr. David Bristow. He can be contacted at the e-mail address of: dave@bristow-family.org Thank you.

Editor's Thoughts



As I mentioned last month, I received a note from Elizabeth reminding me that I had agreed to conduct a clinic/presentation on Arduinos and other microcontrollers. While I work with various microcontrollers, I did not have a set of slides I could just dust off and repurpose for the TECO Show. Hmm, I had an hour to give a “clinic”, which after giving the subject and the idea of a clinic, it became clear to me that would be difficult to accomplish. After consulting with Elizabeth, it was decided that a presentation would suffice. You see to accomplish a hands-on clinic each person would need access to a PC and an Arduino. So, I went googling and powerpointing and created a set of slides that covered the many types of microcontrollers and how they might be used in model railroading. When I was asked if I had my PC, I assumed there would be a projector available. Turned out that there was one, but my clinic/presentation time slot was being used by Dave Naples. Elizabeth solved the problem quickly by changing my time to follow Dave.

That turned out to be for me, wonderful as it allowed me to listen to Dave’s presentation on the Moffat Road Railroad Museum. You couldn’t want a more knowledgeable or enthused person presenting! My son a relator came across a magazine, which he showed me and asked if I knew the person on the cover. Dave Naples is featured in the “Colorado Country Life” December edition! The article focuses on Dave’s efforts to create, curate, and grow the museum with a bit of emphasis on Christmas.

On Saturday Dave had a handful of folks, while I had two. On Sunday Dave had even more and I had none.

While I was disappointed, I did enjoy Dave’s presentations and now I have material for a couple of articles dealing with microcontrollers. Stay tuned!

David

December Superintendent Notes

"Wavy Rails"



Nominations & Elections Will be Held



The consensus of the nominating committee is that all existing officers will be nominated except for Superintendent who is taking a break (to work on long-delayed projects). Wade Mountz who stood his ground, when it was announced in a whisper that all those who did NOT want to be considered for nomination should take one step backward, is the lucky nominee.

Any member who wants to throw his or her hat into the ring for any position needs to find a pair to nominate and second him or her. All PPDNMRA members are eligible.

Christmas Party Time is the Program of the Month



Kristin will be coordinating the food portion and Tony the gift exchange portion.

Schnabel at Decommissioning on San Onofre



And, yes, A few years back, BNSF hauled off the old nuclear reactor from the shuttered San Onofre nuclear power plant in Southern California. That car can handle up to a million pounds.

If driving a Big Boy around your layout is not enough of a challenge, get yourself a HO Bachmann Schnabel car --- it can handle 22" radius curves. There are also O-scale models.

<https://www.youtube.com/watch?v=2SEnQJZtQZc>

Natural Tunnel State Park --- on the Bucket List!



And, yes, State Park Rangers and Volunteers make sure everyone stays out of trouble during special events (apparently violating all the rules that Operation Lifesaver Volunteers preach). Since the line is active, normally all standard safety rules and signs apply.



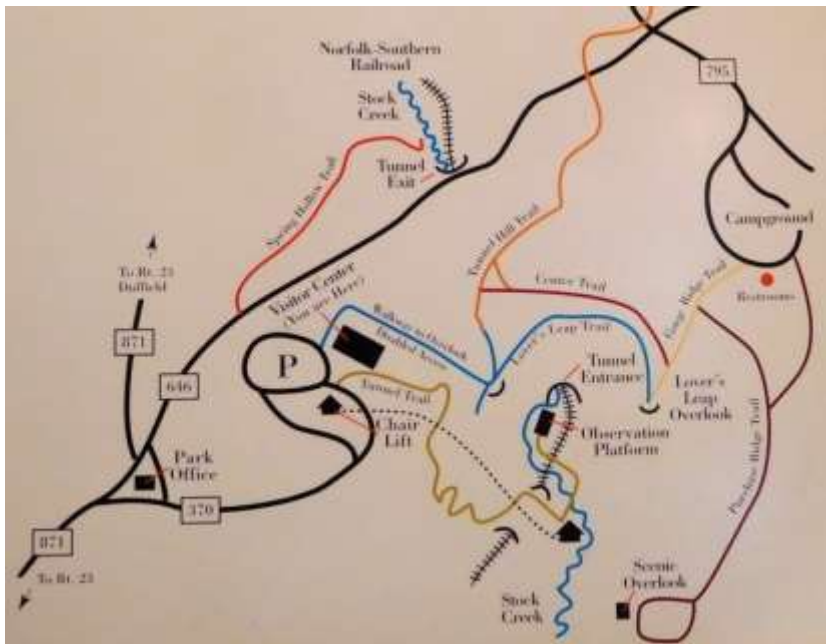


The Spirit of Model Railing is Alive, Well, and Challenging

Kristin and I attended the Train Show at the Loveland Event Center in our Operation Lifesaver Roles. Lots of visitors, layouts, and vendors a couple of weeks ago. At the other end of the scale, we were at the River Church in Lakewood where there were no vendors but over a dozen smaller layouts of all scales and varieties run by enthusiastic kids including an elaborate Lego layout.

On a challenging note, we found out that Chapel Hills Mall will no longer be having an Event Center per the Fire Department. The TECO board is exploring other options. TECOshow.org will post future developments so stay tuned.





As you can see, there are two tunnels in the park. Stock Creek runs through the long, natural tunnel. Here is a “toy train” overhead view for a sense of scale:



With these few pictures, you don't get a complete view of how convoluted the topography of the park is. Check out the official link and an unofficial tour for that:

<https://www.dcr.virginia.gov/state-parks/blog/lets-go-on-an-adventure-natural-tunnel-state-park>

<https://www.youtube.com/watch?v=6ihk2mZ9NVo>

Any events scheduled for 2022 are subject to cancellation.

- January 28-29: TECO at????
- April 23-24: TECO #41 at?

Information on Colorado and neighboring state events is posted on TECOshow.org.

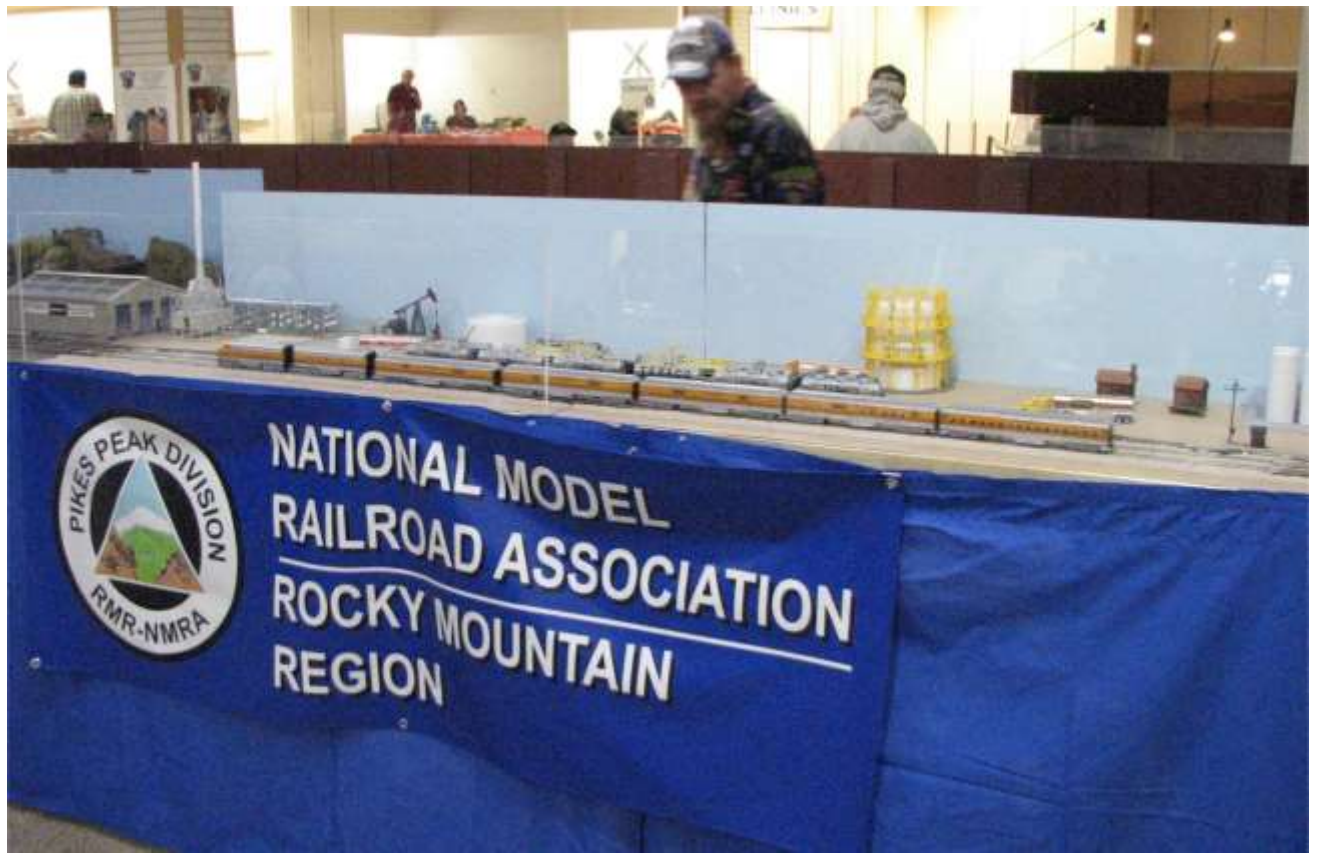
Check out the Rocky Mountain NMRA Callboard: <https://www.rmr-nmra.org/callboard.htm>



Notes from The Siding

By John Emmot

Maybe if I start early, I'll remember enough stuff to make it interesting. We have had a TECO show since the last set of Notes. The end of the COVID restrictions seemed to be a pretty good beginning for the future. We were able to fill the downstairs Mall space with layouts and vendors. With about 850 through the door, we were encouraged. Not a record, but lots better than it could have been. The usual layouts were present with the Nginers using their new Ntrack setup. Much smaller and easy to handle, but still a very nice display. The PPD had a 44 by 36 foot 'L' layout. The new banners were hung by the layout with care. Several pieces were absent with their owners away, but we had additions from Rob Allan and Dave Blackham. Rob had his old-time town and mining scenes and Dave did an initial test of his in-progress oil refinery (they ran well) and he also brought the Castillo modules. SlimRail did their usual sterling double setup of On3 and HOn3. John Ziegler brought a new Lionel setup. The YMR had its standard HO modules. The Denver Lego Users Group assembled a huge display of Lego trains and buildings. We used all of the vendor tables we could get for a good complement of sellers. The Grand Door Prize went to a very happy winner at the end of the show. That is the end of the good TECO news. When Elizabeth called to confirm our contract for the January 2022 show she was informed that the Chapel Hills Mall will not be hosting such events in the future. So TECO is searching for a new venue for the next shows. Stay tuned for developments.





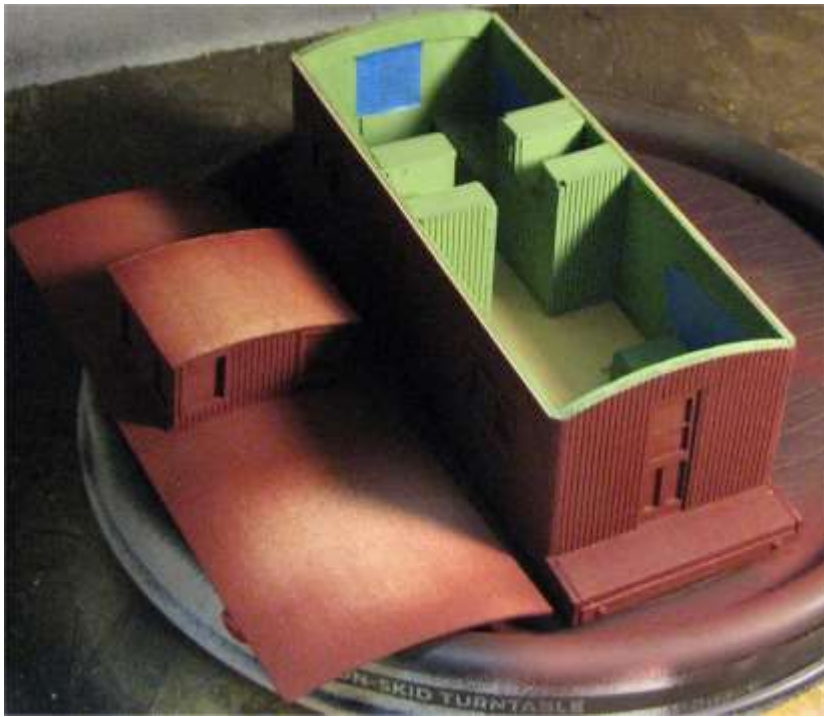


Now that we are past the worst restrictions of COVID, the Division will again host a Christmas Party for the December meeting at the Classic Homes meeting room. The first order of business will be the election of officers for 2022. We hope a good representation of local NMRA railroaders will attend the traditional celebration. All of the old rules for gift exchanges will be in play. (See current and previous minutes in the Milepost) The Division will provide fried chicken for the main meal course with side dishes from the attendees.

Speaking of the TECO Grand Door Prize, here it is set up in my family room. Runs well, though my wife says not that much track under the Christmas tree.



And just an update on the O-scale D NW & P caboose for the Moffat Road Museum, it is painted. Still some roof and handrail work to do.



To wrap this up, I spent the whole day in Calhan on Saturday working on the display cars. We started with the new steel bay window caboose. The coupler knuckles (85# each) were installed in both ends of the car. Thanks to Bill Lugg (the younger) the job was possible and accomplished with relative efficiency. We both learned that a real coupler is an intricate piece of engineering. They are now in place and operable. We used some parts that came with the caboose and also some parts from the coupler pair from Pueblo. The roofline is now back to the original. The radio antenna was reinstalled and the signal light was put back in place. It will need some wiring and lenses to be operable again. And the stovepipe was straightened in place. Looks good from the ground, but needs the cut welded before use. A 'keeper latch' was put on the passenger car trap to hold it in the up position. That will ease entry to the platform from the lower stair. Locks and latches were installed in both end doors of the passenger car to enhance its security. Wooden covers were put on all of the windows on the last workday. Weather and water continue to degrade the interior until the roof is covered. Eian was also able to stand up a three-light RR signal by the track. I understand it will be solar-powered and change aspects on a timed schedule. And the main reason for the workday Christmas lights were strung on both cabooses to celebrate the season.





Well, I'm run dry. Hope to see lots of folks at the Christmas meeting celebrating 'round the roundhouse.



November 2021 Minutes

Secretary, John Emmot

The regular monthly meeting was called to order live by Superintendent, Joe Costa at 6:05 in the break room of the TECO venue at the Chapel Hills Mall. There were 14 folks present. There was no ZOOM link for this meeting.

The minutes of the October meeting were approved as published in the Milepost.

Treasurers Report

Tony Pawlicki had provided a digital update on activity in the PPD bank account to the officers before the meeting time and on handouts at the meeting. It included the drawing receipts and his expenditures for the presents for the Division Christmas party and the \$151.55 credit card expenditure for the new PPD banners. The statement was accepted as submitted.

Old Business

Kristin discussed the plans for the Christmas potluck. The Division will use the \$100 not spent for the picnic to purchase fried chicken and supplies for the Christmas party. She will send a reminder of the 'dishes' the participants signed up to bring before the party. You may bring a favorite dish or treat whether you have signed up or not. It was decided that the Division would NOT provide a cake.

Chairman Reports

Joe began the meeting by passing out the certificates for the October contest winners.

New Business

Joe reminded everyone that the elections would be the first order of business at the meeting/party. In addition to the potluck, the traditional exchanges will take place; Ladies/nonrailroad and railroad. You must put in a gift to participate in either or both of these. They will be followed by gifts from the drawing for those who have participated through the year.

Contest

There was no contest.

Program

There was no program.

Meeting adjourned at 6:20.

A Tale of Three Bulkhead Flats

By Tony Pawlicki

Introduction

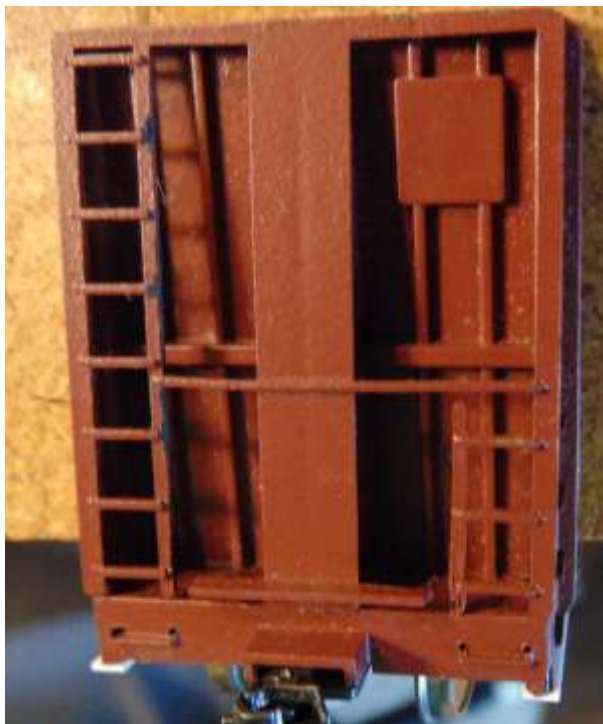
With apologies to Yogi Berra: "You can see a lot just by looking...and sometimes you wish you hadn't looked." This story is a case where a ridiculous number of differences turned up when enough looking was done (29 items covered in section Modifications to The Original Model subsection Specific Modification seen on page 27 – yikes!). Sort of a "shaggy flatcar story."

Model #1: Once upon a time, Athearn offered a model of a 66' bulkhead flatcar in several paint schemes/road numbers, including Burlington Northern (BN) and Cotton Belt (SSW). This was quite close to the BN classes 621250-621449 and 621450-621649.

Models #2 and #3: With extensive modifications, notably to the bulkhead bracing schemes, the stock Athearn models provided starting points for modeling BN 621743 and SSW 88325.

Visually, the most dramatic differences are among:

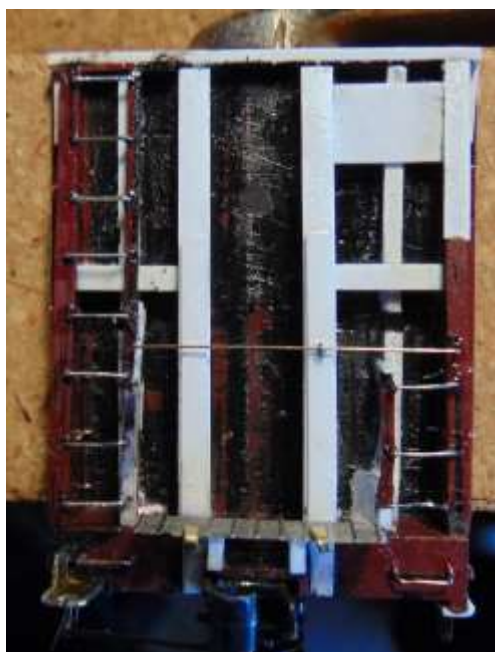
- The three distinctly different **bulkhead bracing** schemes (photos SSW A End Before Outer (stock model), BN B End After, and SSW A End After)



SSW A End Before Outer



BN B End After



SSW A End After

- The three distinctly different **bottom sill reinforcing plate** states (none for the stock model, different lengths for the BN vs. SSW models) and, related to this, the three distinctly different treatments of the **stirrup steps** (normal for the stock model, different schemes for coping with the reinforcing plate for BN vs. SSW) (photos Athearn Bulkhead Flat (stock model), BN Left Side, and SSW Left Side)

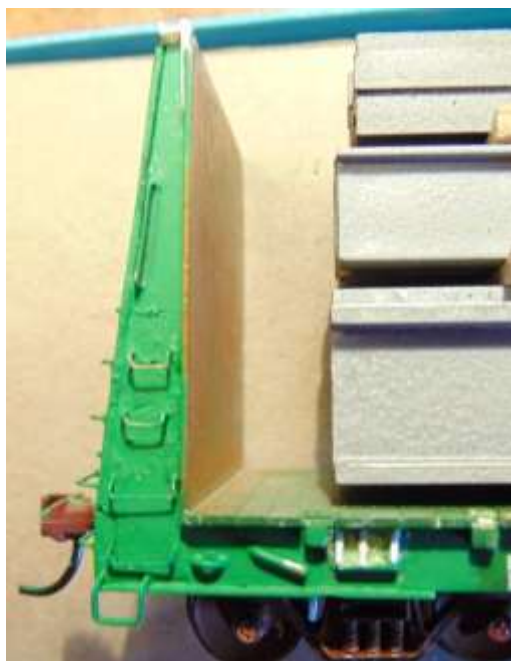


Athearn Bulkhead Flat

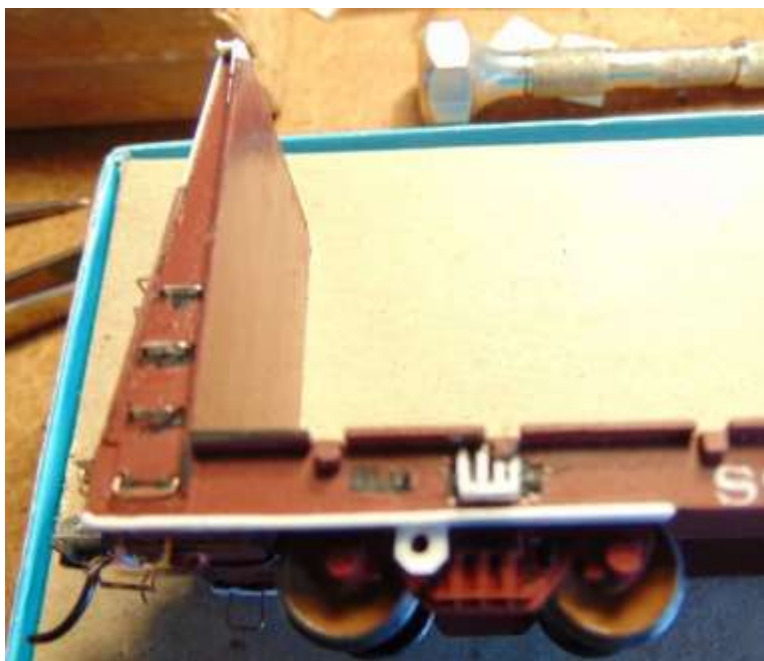
- The **truck placements** (stock and BN as close to ends as practical, SSW two feet further in from ends)
- Various miscellaneous differences can be spotted in photo BN and SSW side by side.

This article describes:

- The research that identifies the distinctive features of the three models (including a variety of post-delivery modifications not universally applied)
- A systematic comparison of the features of the three models
- The actual modifications made to convert the stock models into the prototype-specific models, plus compromises made and their rationale.



BN Left Side



SSW Left Side



BN and SSW side by side

References

Notes

- Abbreviations for references used within this working paper are shown in [square brackets].
- References are listed in alphabetical order.
- Photos from Web sites are NOT shown in the associated Milepost article due to copyright issues.

BN621013.pdf, FFRPW photo showing B-end and side detail of car in class 621000-621049. Two closely-spaced narrow vertical central braces.

BN621139.pdf, FFRPW photo showing B-end and side detail of car in class 621100-621199. Two closely-spaced narrow vertical central braces.

BN621296.pdf, FFRPW photo showing A-end and side detail of car in class 621250-621449. Single wide vertical central brace.

BN621634.pdf, FFRPW photo showing B-end and side detail of car in class 621450-621649. Single wide vertical central brace.

BNSF Railway Freight Cars, Vol. 2, by Robert C. Del Grosso (2008). [DelGrosV2]

Model Railroader magazine. [MR]

Model Railroader's How-To Guide: Detailing Freight Cars (2005). [MRDFC]

Official Railway Equipment Register, official roster of active service railcars in North America. [ORER] I have a copy of Volume 107, No. 3, January 10, 1992. [ORER92]

- Page 75 identifies BN 621743 as AAR Car Type F343 (over 92.5 tons), in midst of otherwise nearly identical F243 series 621650-621849 (under 92.5 tons). (BN 621712 is an oddball, 76-ton capacity container car of class L008.)
- Page 75 identifies several series spanning 621000-621649 (except 621050-621099, shorter at 48' 11" and 57' 11" interior and exterior lengths) as 56' 8" interior length, exterior lengths ranging from 64' 5" to 66'. Thus, there are prototype bulkhead flatcars with the same length as the original factory model.
- Page 699 identifies SSW 88000-88399 as AAR Type F243 with 90 tons capacity with 389 cars of the series active.
- Pages 1646-1647 defines the meanings of the AAR Car Type codes.

Official Railway Equipment Register, official roster of active service railcars in North America.

[ORER] I have a copy of Volume 126, No. 2, October 2010. [ORER10]

- Page RR-67 shows series BN 621650-621849 as AAR Type 243, 53' 1" truck centers with 96 cars active, but only BN 621677 as AAR Type F343.
- Page RR-689 identifies SSW 88000-88399 as AAR Type F243, 48' 2" truck centers, 60; 7" and 70' 2" interior and exterior lengths, with 167 cars of the series active. Several F343 and F443 cars are scattered throughout the series, but SSW 88325 is not among them. The status of SSW 88325 is not determined. The 9 October 2020 photo of SSW 88320 (carrying a load) shows at least one car of the series was still active as of that date. Series 87500-87999 are also bulkhead flats of the same interior and exterior lengths; no bulkhead flats of 56' and 66' interior and exterior lengths are listed.
- The truck center differences are consistent with SSW 88325 having its trucks approximately 2 feet farther inboard than BN 621734.

PixReBN621734.docx, a collection of screen-shots (Windows 7 "Function – Print Screen") of online photographs of cars in the series BN 621650 – 621849. Each screenshot is accompanied by (to the extent available) road number, date, Web site, and aspects of interest in the photograph.

Railroad Model Craftsman magazine. [RMC]

SSW88001_RCP_CutLever.pdf, photo from RCP of SSW 88001, 21 May 2019, showing cut lever area with a notable feature that bottom grab iron under the left ladder is straight grab (vs. right side's drop grab, from other photos) to leave room for cut lever bracket mount.

SSW88303_26Apr1986.pdf, photo from FFRPW showing B-end and side detail of another car in the same class.

SSW88316_5Feb2005.pdf, photo from FFRPW showing side view of another car in the same class.

SSW88320_9Oct2020.pdf, photo from RCPW showing side view of another car in the same class, with much additional data:

- Series 88000 – 88399
- Gross weight 263,000 pounds (i.e., 131.5 tons)
- Builder Thrall

www.athearn.com, the Web site of the Athearn railroad model manufacturer. [ATHW]

www.railcarphotos.com, a Web site of freight car photographs. Each photograph is accompanied by a data sheet (not always fully populated) identifying the builder, build date, car series, load limit, lightweight, gross weight. [RCPW]

www.rr-fallenflags.org, a Web site of railroad rolling stock photographs. [FFRPW] Relevance:

Numerous photos of BN 621000-621649 (excluding 621050-621099), the 56' 8" interior length cars, show:

- Variations in bulkhead back designs: 621000-621049 and 621100-621199 having 2 closely spaced but separate main central vertical braces while 621250-621449 and 621450-621649 a single wide vertical brace; all have two smaller vertical braces on each side of the central vertical braces. Thus the model's use of a common flange for the 2 closely spaced main central vertical braces is prototypical for 621250-621649 but not for 621000-621199.
- Variations in bulkhead top corner treatments (square, angled, round)
- Variations in whether a short end ladder is present

- 13, 14, or 15 (most commonly) stake pockets, matching or similar to the model's 13
- In some cases, alternating stake pockets are reflectorized (for grade crossing visibility, presumably)

www.rrpicturearchives.net, Web site containing well-organized (by railroad and car type) photographs of railroad rolling stock and other items. [RRPAW]

Miscellaneous Data

Athearn is the manufacturer of the BN 621734 model, some years ago. The same model body was (14 June 2014) in production (announced July 2013, sold out as of 9 October 2014) but with correct road numbers for the body. The road numbers are BN 621452, 621556, and 621634, in the series (621450-621649) before the 621650-621849 series. (This is readily identifiable by length, bulkhead side profile, bulkhead side grab irons placement, bulkhead back reinforcing structures, and brake wheel orientation (slanted vs. vertical).) [ATHW]

Model and real-world prototype cars have 2 trucks of 2 axles each (i.e., not specialized 6-axles cars).

RCPW data sheet for BN 621671 provides the following data:

- Builder/Build Date = Greenville Steel Car (GSC), January 1977
- Car Series = BN 621650-621849
- Load Limit/Light Weight = 182,200 (pounds), 80,800
- Gross Weight = 263,000 (aka Gross Rail Load (GRL)) (= max. allowed for normal railcars at time of manufacture) [SSW is the same]
- AAR Car Type = F243 (second character "2" means Load Limit in range 155,000 – 184,999, i.e., 77.5 to 92.5 tons) [SSW is the same]

From this we conclude:

- "100-ton" wheelsets are appropriate (vs. the stock model's "70-ton" wheelsets). [SSW is the same]
- The ORER's isolation of BN 621743 as the sole AAR Car Type F343 within the car series implies that the Load Limit is probably only slightly above the 92.5-ton dividing line. (On the model, we have changed 621734 to 621743 on the sides and ends.)
 - This is presumably due to a slightly lighter Light Weight. For example, a 93-ton load limit (= 186,000 pounds) implies a Light Weight of 263,000 – 186,000 = 77,000 pounds, which would be 3,800 pounds lighter than nominal for this car series.
 - The model shows LT WT of 22,300 which is erroneous, though if both "2" values were typos for "7" the resulting 77,300 (3,500 below nominal) would imply a Load Limit of 185,300 pounds, just 300 pounds above the minimum for F343.
 - The model's Load Limit is shown as 176,400, inconsistent with F343. (Capacity is shown as 176,000; this item of data was eliminated as redundant in 1990, per MR, Nov. 2012, p. 21.)
 - A consistent picture is AAR Car Type F343 with 185,300 Load Limit, 77,300 Light Weight. [SSW is F243, 100-ton trucks still appropriate, consistent with photos]

RCPW photo of BN 621671, 4 September 2011, Denver Colorado, shows:

- Air reservoir and triple valve locations.
- Crossover grab center eyebolt protrudes substantially from upright it is welded to (model 621734 lacks eyebolt and grab is not well away from the upright).
- Brake chain detail.
- Cut lever and bracket detail.
- Center eyebolt support for crossover grab broken loose from right-center upright.
- Short end ladder detail (stile is angle iron, tied to bulkhead cross-rib).
- Center bulkhead upright is composed of two separated members (in contrast to the stock model of 621734, using a single common broad flange on the upright braces). [SSW is the similar, 2 separated members on prototype vs. single broad upright on factory model]
- A clear view of 4 identical stout evenly spaced horizontal bulkhead channel (or rectangular tubing) ribs on either side of the center upright-pair. The third rib from the top is BELOW the crossover grab height. [SSW is much different, per photos]
- Bent side grab iron.
- Grab irons are offset to accommodate the slant of the bulkhead (from bottom: 1, 2 directly in line, 3 offset inboard, 4 offset further inboard). (This contrasts with the stock model of 621734 where all are

in a direct line.) [SSW is different, all grabs vertically aligned, no offsets, so factory model is already correct]

- The bottom sill reinforcing plate runs from the end to about $\frac{3}{4}$ of the way from the first to the second stake pocket. The stirrup step bends out around the reinforcing plate, which protrudes outboard of the main sill member. [SSW has a similar but longer reinforcing plate but a home-made stirrup step is below the reinforcing plate]
- The end cross member is a channel with flanges facing outward and a short vertical channel at its center. The cross member's bottom is even with the flatcar deck. [SSW has no such channel cross member, just a solid plate]
- **AEI below Consolidated Stencil** (basically near 3rd stake pocket from right, as low on side sill as possible). [SSW has AEI just below the deck, between 3rd and 4th stake pocket from right]

RCPW photo of BN 621744, 21 April 2012, Seattle, Washington, shows:

- Horizontal ribs on bulkhead appear to be 8" x 4" (or larger, perhaps 12" x 6") channels (or rectangular tubing), all the same. [SSW is much different]

FFRPW photo of BN 621658, 10 March 2012, Griffith, Indiana, shows:

- **AEI to the left of Consolidated Stencil.**
- The reinforcing plate on the left bottom of the sill extends to the car end.
- The left bulkhead does NOT have side reinforcing plates welded on (and so there are no rosette weld holes). [SSW is the same]

FFRPW photo of BN 621782, 10 March 2012, Griffith, Indiana, shows:

- Empty car, apparently in company with BN 621658 and BN 621786 (probably NOT on the way to being scrapped as the road number is not white-lined) (BN 621663 was being used as a bridge on 14 October 1999 per another Fallen Flags photo.)
- **AEI is far to the right of Consolidated Stencil.**

FFRPW photo of BN 621786, 10 March 2012, Griffith, Indiana, shows:

- **AEI below Consolidated Stencil.**

FFRPW photo of BN 621820, March 2009, Casa Grande, Arizona, shows:

- Car is clearly in revenue service.
- **AEI to right of Consolidated Stencil.**

FFRPW photo of BN 621839, 8 January 2012, Galesburg, Illinois, shows:

- Brake wheel detail
- Wear on bulkheads evident (flanges bent; large areas of rust where loads have battered the flat area of the bulkhead – these patterns vary widely from car to car based on other photos)
- Slanted grab iron on left-hand bulkhead (model has it only on the right-hand bulkhead, BN prototype photos always show it on both sides of both bulkheads) [SSW has it only on right-hand bulkhead]

RPAW photo of BN 621608 (different but similar series of bulkhead flatcars), 20 March 1982, West Colton, California, shows:

- ACI label placement on the right bulkhead above top horizontal grab iron. (So that's where to look to see whether early photos of the proper series show any use of ACI labels.)

RPAW photo of BN 621658, 11 September 2010, Tulsa, Oklahoma, shows:

- Cut lever detail.
- Stirrup steps.
- Short end ladder.
- Side grabs.
- Yellow safety stripes.
- Consolidated Stencil.
- Roping staple. [SSW has vertical plate solid pulling loop at bottom of sill reinforcement, between first and second stake pockets from left]
- Note absence of vertical grab on bulkhead side across from slanted grab. (Stock model of 621734 has both, prototype only has slanted grab.) [SSW is same]

- ***AEI to the left of Consolidated Stencil.***

RPAW photo of BN 621666, 18 July 2012, Foley, Missouri, shows:

- Stirrup step mounting location.
- Brake chain fulcrum (seen through stirrup step).

RPAW photo of BN 621671, 25 November 2011, Hanford, California, shows:

- Roping staple on diamond-shaped patch/base (patch/base not part of original delivery, but appears to be a common, though not universal, repair technique)
- I-beam load (among other loads that show many of these cars still in revenue service after 2010)
- Absence of vertical grab on bulkhead side across from long slanted grab (confirmed by many other photos). (Stock model of 621734 has both, prototype only has slanted grab.)

RPAW photo of BN 621685, 1 June 2013, Williams Junction, Arizona, shows:

- Partially abraded white vertical stripe centered on bulkhead face, stopping a foot from the top
- Square top corners of bulkhead
- Roping staple
- End number
- Stirrup step detail
- Lack of tack board (or perhaps it is a number board) below end number (contrary to the stock model of 621734)
- Perforations/reinforcing plate welds on side of bulkhead (not part of original delivery; seen in several patterns on many cars in later years; when reinforcing plate overlaps area where roping staple belongs, the staple is removed from original side sill and reinstalled on reinforcing plate)
- Absence of vertical grab on bulkhead side across from slanted grab. (Stock model of 621734 has both, prototype only has slanted grab.)
- Four stout horizontal ribs in bulkhead (model has 4 thin vertical ribs, one horizontal rib). [SSW differs from both: one horizontal rib on each side, one full-height vertical rib on each side]
- A wide external strap across 3rd horizontal rib from the top is NOT present on the original design (see BN 621774, 621799); it is not common, but not unique either – see FFRPW and RPAW photos of BN 621839. [SSW has no such feature]
- Side grabs are drop style except for the slanted grab at the top that is straight. [SSW has top 3 straight grabs, bottom a drop grab]
- ***AEI to the left of Consolidated Stencil.***

RPAW photo of BN 621783, 8 March 1977, Calumet Park, Illinois, shows:

- A brand new car in a string of 4 brand new cars.
- View angle does not show area where ACI placard would be placed (required up to 1 Jan. 1978; perhaps not applied until BN took delivery, in any case)
- Solid white vertical stripe centered on bulkhead face, running to the top
- End number
- End short ladder
- Stirrup step detail
- Reinforcing plate on the bottom of sill stops short of stirrup step.
- Lack of tack board (or number board) below end number (contrary to the model of 621734)
- No perforations/reinforcing plate welds on side of bulkhead (presumably added as needed later during maintenance)
- Roping staple angled grab and stirrup step painted white
- Absence of vertical grab on bulkhead side across from slanted grab. (Model of 621734 has both, prototype only has slanted grab.)
- No end cross member below the top of side sill (in contrast to the model of 621734, which has both such a cross member and grab irons on it below the end ladders), though there is a 45-degree gusset. The end cross member is a channel with flanges facing outward and a short vertical channel at its center (none of this shows on the model of 621734); see the detail of RCPW photo of BN 621671, 4 September 2011, Denver Colorado.
- No extension of bulkhead flange below the deck (in contrast to the model of 621734 that has a large angled extension of the flange). [SSW has a large angled extension of the flange]

RPAW photo of BN ?, next to BN 621685, 2 October 2011, Porter, Indiana, shows:

- A clear view of the bad-order tube (the second style, applied later during maintenance?) (location varies from car to car – this one is between bolster and second stake pocket)
- There appear to be text and an arrow pointing to the bad-order tube
- Roping staple applied to reinforcing angle plate

RPAW photo of BN 621827, 30 October 1983, Oneonta, New York, shows:

- A clear view of the right bulkhead side with no ACI label.
- Consolidated stencil between fourth and fifth stake pockets from the right.
- Reinforcing plate on the bottom of sill stops short of stirrup step.

RPAW photo of BN 621839, 6 April 2011, Cass Lake, Minnesota, shows:

- Rust/dark debris on tops of horizontal reinforcing ribs on the back of bulkhead.
- Fresh stenciling of road number above top right horizontal reinforcing rib on the back of bulkhead.
- Wide external strap across 3rd horizontal rib from the top; this is NOT present on the original design.

RPAW photo of BN 621846, 3 June 2006, Alliance Yard, Texas, shows:

- A clear view of the cut lever and bracket.
- A clear view of the crossover platform.
- **AEI to right of Consolidated Stencil.**

RPAW photo of BNSF 545498, 7 August 2009, Denver, Colorado, shows:

- Identical car (to the BN series in its later years) in all visible details, including rosette-welded bulkhead side reinforcing plates and bottom of sill reinforcing plates.
- Car type as F243.
- DelGrosV2, p. 104, shows this as part of series BNSF 545457-545634. Spot checks of this series on RPAW and RCPW confirm these cars match.

Patterns

This section identifies various patterns (for the BN cars, unless otherwise noted), most directly derived from the data gathered above.

Timeline for Freight Car Markings, Appliances, and Practices:

- **1961:** ICC allows tank cars without running boards (so larger tank diameters are possible). (MR, Oct. 2020, p. 46)
- **1964:** First use of Automated Car Identification (ACI) labels. (MR, Dec. 1983, p. 171.)
- **1964:** High-cube boxcars built after late 1964 were not required to have running boards. (MR, Sep. 2020, p. 57)
- **1966:** Automatic slack adjusters required for new construction. (RMC, Dec. 2019, p. 57)
- **1966:** Retaining valve located below side sill required for new construction. (RMC, Dec. 2019, pp. 55-57)
- **1966:** Roller bearing trucks required on all new/rebuilt 100-ton cars. (MRDFC, p. 91.)
- **1966:** ICC *allows* roof walks to be removed.
- **1966:** New cars ordered after April 1966 or delivered after October 1966 must *not* have roof walks (apart from those needed for hatch access, e.g., covered hoppers).
- **1966:** Brake wheels required to be mounted low on all *new* cars. (MRDFC, p. 91.) Existing high brake wheels are allowed to remain unless repair is required (then must be lowered).
- **1966:** End railing (crossover grab iron) between tops of short end ladders required. (MR, Sep. 2020, p. 56)
- **1966:** Crossover platforms required by FRA on boxcars and covered hoppers. (Railway Age, www.railwayage.com/regulatory/safety-appliances-evolution/, May 13, 2014)
- **1967:** Automated Car Identification (ACI) labels officially introduced. (MR, Dec. 1983, p. 171.)
- **1968:** American Association of Railroads (AAR) required roof walk removal (apart from those needed for hatch access, e.g., covered hoppers) by 1978 for cars in interchange service. Deadline eventually extended to 1983; extended to retirement for boxcars captive to owning railroad. (Sometimes roof walk remained but ladders were cut down to prevent access.)

- **1968:** Roller bearing trucks required on *all new* cars (was previously only new/rebuilt 100-ton cars). (See MRDFC, p. 91.)
- **1970:** Legislation limits tank cars to 34,500 gallons and 263,000 pounds (131 tons). (MR, Oct. 2020, p. 46)
- **1970:** Incentive Per Diem (IPD) boxcar per diem pricing rules go into effect. (MR, Aug. 2020, pp. 32-37.)
- **1970:** 1 January 1970, Automated Car Identification (ACI) labels are required on all interchange cars. (MR, Dec. 1983, p. 171.)
- **1970:** DOT/FRA mandates hazardous material tank cars be equipped with Type F interlocking couplers (single-shelf). (K118, 2004; MR, Aug. 2020, pp. 32-37.)
- **1972:** Consolidated stencils first used. (MRDFC, p. 91.)
- **1974:** Railbox receives its first boxcars. (MR, Aug. 2020, pp. 32-37.)
- **1974:** Consolidated stencils required by 1 July 1974. (RMC, Dec. 1978, p.62.)
- **1975:** Tank cars built to 1919 ARA standards must be removed from service by Jan. 1, 1975. (MR, Oct. 2020, p. 46)
- **1975:** AAR adopts top and bottom shelf couplers (Types SE and SF) as Standards for tank cars. (K118, 2004)
- **1978:** DOT/FRA mandates hazardous material tank cars be equipped with Type F interlocking couplers (double-shelf). (MR, Aug. 2020, pp. 32-37.)
- **1978:** 1 January 1978, Automated Car Identification (ACI) labels no longer required on interchange cars. (MR, Dec. 1983, p. 171.) Some captive service fleets actively maintained the capability.
- **1978: 23 March 1978,** start applying U-1 wheel inspection dots to cars using 33" wheels (mainly 70-ton cars); white = bad, yellow = OK. By **1 January 1979**, all defective wheels were supposed to have been replaced. Inspection dots were occasionally applied to cars that did not have to be inspected, so might appear on a 100-ton car. (MR, Dec. 1982, p. 179.)
- **1990:** CAPACITY marking was eliminated as redundant. (MR, Nov. 2012, p. 21. This MR note explains CAPACITY, LIGHT WEIGHT, and LOAD LIMIT.)
- **1994:** Automatic Equipment Identification (AEI) tags (transponders) were mandatory by 31 Dec 1994. (MR, July 1999, p. 35.)
- **1995:** Solid-bearing trucks banned from interchange service. (MR, Aug. 2020, pp. 32-37.)
- **2004:** The Federal Railroad Administration (FRA) requirement for yellow safety stripes along the bottom of car sides took effect. (DelGrosV2, p. 7.)
- **2016:** Consolidated Stencil requirement is dropped. (Perhaps AEI transponders now provide the data?) (MR, Aug. 2020, pp. 32-37.)

Automated Car Identification (ACI) Use:

- All photos post-2000 shows no ACI label.
- Even the RPAW photo of BN 621827, 30 October 1983, Oneonta, New York, shows no ACI label in the expected location.
- Technically, ACI labels were required at the time these flatcars were built (i.e., before 1 Jan. 1977). Conceivably, the labels were never applied.

Automatic Equipment Identification (AEI) Locations:

- Placement varies, as these were retrofits done a decade after initial delivery: photos show AEI to right of, left of, and (when there was room) below the Consolidated Stencil, which is always in the general vicinity of the third stake pocket from the right.
- AEI tags are applied to both sides of the car, towards the right end. (See MRDFC, p. 90.)

Consolidated Stencil ("FRA Lube Plates") Locations:

- Placement is typically in the general vicinity of the third stake pocket from the right. Occasionally, just right of second stake pocket from the right (between stake pocket and jacking pad).

Reinforcing Plate on Bottom of Sill:

- On new cars, stops short of stirrup step.
- On older cars (i.e., in later years, especially after 2000), the plate usually runs to the car end, forcing stirrup step to either (a) arc out around the plate (BN) or (b) be welded to the bottom of the plate (SSW).

- This pattern with time is true whether or not the bulkhead sides have been reinforced (with the reinforcing plate having the characteristic rosette welding holes).

Systematic Comparisons Among Athearn Factory (As-Shipped) Model and Prototypes

This section systematically compares the stock Athearn model, BN prototype, and SSW prototype.

Feature: Reinforcing Plate on Bottom of Sill

Factory Model: Not present

BN Prototype: Runs from end to about $\frac{3}{4}$ of the way from the first to the second stake pocket (nearly universal modification – as-delivered, the plate stopped short of the stirrup step)

SSW Prototype: Runs from end to fourth stake pocket (i.e., 5 feet longer than BN)

Feature: Bulkhead Side Configuration

Factory Model: Outer side has straight diagonal slope; 4 horizontal straight, one vertical straight, and one near-vertical straight grab irons on both ends; horizontal grab irons are vertically aligned; large *angled* extension of bulkhead flange below the deck

BN Prototype: Outer side has bottom third straight, rest diagonal; 4 horizontal drop grab irons on both ends, one near-vertical straight grab iron on right end only; horizontal grab irons are offset to accommodate the slant of the bulkhead (from bottom: 1, 2 directly in line, 3 offset inboard, 4 offset further inboard); *no* extension of bulkhead flange below the deck

SSW Prototype: Straight diagonal slope; 4 horizontal grab irons on both ends (top 3 straight, bottom drop), one near-vertical straight grab iron on right end only; horizontal grab irons are vertically aligned; large *tapered* extension of bulkhead flange below the deck

Feature: Bulkhead End Configuration

Factory Model: Two large center vertical T members close together sharing common T cross; *two* vertical ribs on each side of center members; one horizontal rib 55% of the way down from the top; top horizontal channel NOT running all the way out to the edge of the bulkhead, instead of stopping at outer sides of side posts; top bulkhead corners *round*; no strap on the bottom half of either main vertical member

BN Prototype: Two large center vertical T members close together with separate T cross elements; *no* other vertical ribs; four horizontal ribs on each side; top horizontal channel running all the way out to the edge of bulkhead top *square* corners; no strap on the bottom half of either main vertical member

SSW Prototype: Two large center vertical T members well separated with separate T cross elements; *one* vertical rib on each side of center members; one horizontal rib 45% of the way down from the top; top horizontal channel (wider than factory model's) running all the way out to the edge of bulkhead top *square* corners; strap on each main vertical member running down from just above the horizontal member to the bottom of the end sill

Feature: Car Length (interior = between bulkheads, exterior = between coupler pulling faces)

Factory Model: Interior 56' Exterior 66'

BN Prototype: Interior 60' 8" Exterior 69'

SSW Prototype: Interior 60' 7" Exterior 70' 2"

Feature: Stake Pockets

Factory Model: 13

BN Prototype: 15

SSW Prototype: 18

Feature: Pulling Loops

Factory Model: None

BN Prototype: Horizontal roping staple

SSW Prototype: Vertical plate below side sill

Feature: Manufacturer

Factory Model: Thrall

BN Prototype: General Steel Castings (GSC)

SSW Prototype: Thrall

Feature: Stirrup Steps

Factory Model: Standard stirrup step mounted to the bottom of the side sill

BN Prototype: Home-made stirrup step bends out around the reinforcing plate, which protrudes outboard of the main sill member

SSW Prototype: Crude home-made stirrup step is welded to the bottom of reinforcing plate

Feature: Truck Centers

Factory Model: As close to ends as practical

BN Prototype: As close to ends as practical

SSW Prototype: Two feet inboard of closest practical location

Feature: Bad-Order Tube

Factory Model: Not present

BN Prototype: Present, left side near B-end

SSW Prototype: Not present

Feature: End Number Boards

Factory Model: Mounted directly to the back face of the bulkhead

BN Prototype: None – the end numbers are applied directly to the bulkhead

SSW Prototype: Mounted between right main vertical rib and bulkhead right side

Feature: Short End Ladder Inside Stile Top Support

Factory Model: Free-floating

BN Prototype: Strap brace to second horizontal rib from the bottom

SSW Prototype: Angle-iron brace to the back of the bulkhead and/or rightmost vertical rib

Feature: Brake Chain

Factory Model: Not present

BN Prototype: Through crossover platform; fulcrum visible

SSW Prototype: Through floor next to left main vertical rib; fulcrum not visible

Feature: Exterior Bolster Supports

Factory Model: Four vertical braces, tops well below deck

BN Prototype: Three vertical braces, tops at bottom of the deck

SSW Prototype: Four vertical braces, tops near the bottom of the deck

Feature: Vertical Center Stripe on Bulkhead

Factory Model: Not present

BN Prototype: Present as-delivered; sometimes present (e.g., BN 621685 in 2013), sometimes not (perhaps worn away)

SSW Prototype: Present

Modifications to The Original Model

This section lists modifications made to the stock models to better match the prototypes.

Generic Considerations

ACI (if present), AEI (if present) and Consolidated Stencil locations tend to vary on prototype cars, so absent photo of the same road number, location is only roughly specified.

Interior and exterior length differences and stake pocket count differences (model vs. both prototypes) require appropriate changes in placements of some details.

The Rationale for Choices of Modifications

Prototype Weight Issues: For detailing decisions concerning post-build modifications that would have significantly increased the lightweight, do NOT modify, since the extremely low lightweight is what causes the BN car to be an F343 rather than an F243 as late as the 1992 ORER. Minor increase modifications are allowed for their distinctive visual effects. Thus:

- Heavy reinforcement plates on the sides of the bulkheads are not to be added.
- Bottoms of sill reinforcing plates are to extend to the ends of the car (so BN stirrup steps' distinctive arcing around the plates can be shown). [SSW will have home-made stirrup step welded to the bottom of plate]
- Wide external strap across 3rd horizontal rib from the top is NOT to be added to the BN model.

Major Structural Issues: Major structural modification of the stock model body is not being attempted. The project is an extensive super detailing effort. Thus:

- BN and SSW: Overall car length will not be corrected – adding 4 feet to length would leave the car too fragile for routine layout and TECO train show use.
- BN and SSW: Stake pocket counts and locations will not be corrected – this could not be done consistently given the decision (explained above) not to change the overall length.
- BN: The bulkhead side profile of the BN model (uniform taper down to deck height) will not be changed to try to match the prototype (broader overall, with taper ending about 18" above the deck). [SSW already has a correct profile, uniform taper down to deck height]
- SSW: The SSW bolsters need to be relocated 2 feet inboard and the exterior bolster braces moved accordingly.

Specific Modifications

Interior bolster location:

- BN: No change. [N/A]
- SSW: Relocate 2 feet inboard. [DONE.]

Exterior bolster supports:

- BN: Replace 4 vertical braces with 3 and extend all to the bottom of the deck. [DONE.]
- SSW: Relocate 2 feet inboard and extend all vertical braces to near bottom of deck except where blocked by stake pocket. [DONE.]

Bulkhead flanges:

- BN: Bulkhead flanges extending below deck need to be removed. [DONE.]
- SSW: Bulkhead flanges extending below deck need to be given a straight taper (vs. factory dog-leg). [DONE.]

Trucks and wheelsets:

- BN and SSW: 33-inch ("70 ton") wheelsets need to be replaced with 36-inch ("100 ton"). [DONE.]
- BN and SSW: Trucks and wheelsets need to be weathered. [DONE.]

Coupler height and wheels clearance (after replacing 33" with 36" wheelsets):

- BN: Body height OK but remove under-deck materials to clear wheels. [DONE.]
- SSW: Body needs to be lowered to get correct coupler height (lower bolster and remove under-deck materials to clear wheels). [DONE.]

Horizontal grab irons under end ladders:

- BN: Replace cast-on grab irons with formed wire straight grab irons. [DONE.]
- SSW: Replace cast-on right-side grab irons with formed wire drop grab irons. [DONE.]
- SSW: Replace cast-on left side grab irons with formed wire straight grab irons. [DONE.]

Horizontal rungs of end ladders:

- BN: Replace crude cast-on rungs with formed wire straight grab irons. [DONE.]
- SSW: Replace crude cast-on rungs with formed wire straight grab irons. (Note: This is tricky as the stiles are quite brittle, making drilling holes for the formed wire grabs a delicate operation. In retrospect, the BN model approach of replacing the brittle stiles with styrene angle was better.) [DONE.]

Horizontal grab irons on bulkhead sides:

- BN: Replace cast-on grab irons with 4 formed wire drop grab irons. [DONE.]
- SSW: Replace cast-on grab irons with top 3 straight, bottom drop grab irons of formed wire. [DONE.]

Vertical grab irons on bulkhead sides:

- BN: Vertical grabs on all bulkhead sides need to be removed. [DONE.]
- SSW: Vertical grabs on right-end bulkhead sides need to be removed. [DONE.]

Slant (near-vertical) grab irons on bulkhead sides:

- BN: Molded-on slant grabs on right-end bulkhead sides need to be replaced by wire. [DONE.]
- SSW: Molded-on slant grabs on right-end bulkhead sides need to be replaced by wire. [DONE.]
- Molded-on slant grabs on left-end bulkhead sides need to be removed. [DONE.]

Pulling loops:

- BN: Horizontal roping staples need to be added to the sides of the side sill. [DONE.]
- SSW: Vertical pulling loops need to be added to the bottom of the side sill reinforcing plates. [DONE.]

Bad-order tube:

- BN: Need to add bad-order tube, left side near B-end. [DONE.]
- SSW: No bad-order tube present, so the factory model is correct. [N/A.]

Bottom sill reinforcing plates:

- BN: Reinforcing plates (of BN prototypical length) need to be added to bottoms of side sills near car ends. [DONE.]
- SSW: Reinforcing plates (of SSW prototypical length, notably longer than BN prototypes) need to be added to the bottoms of the side sills near car ends. [DONE.]

Data Stencils:

- BN and SSW: Light Weight (LT WT) and Load Limit/Capacity stencils OK as-is. [N/A.]

Consolidated Stencils:

- BN: Already present as a single panel. [N/A.]
- SSW: Already present as two horizontally separated panels but the right-hand panel needs to be relocated to accommodate relocated external bolster support. [DONE.]

AEI transponders:

- NOTES:
 - AEI tags (transponders) were mandatory by 31 Dec 1994. See MR, July 1999, p. 35.
 - AEI tags are applied to both sides of the car, towards the right end. (See MRDFC, p. 90.)
- BN: AEI transponder needs to be added near the bottom of the side sill, near the 3rd stake pocket from the right. [DONE.]

- SSW: AEI transponder needs to be added just below the deck, between 2nd and 3rd stake pockets from right. [DONE.]

Bulkhead end main central vertical braces:

- BN: Center single vertical bulkhead brace needs to become closely-spaced pair. [DONE.]
- SSW: Center single vertical bulkhead brace needs to become widely-spaced pair. Need to add a strap on each main vertical member running down from just above the horizontal member to the bottom of the end sill. [DONE.]

Vertical bulkhead braces (between main central vertical braces and bulkhead sides):

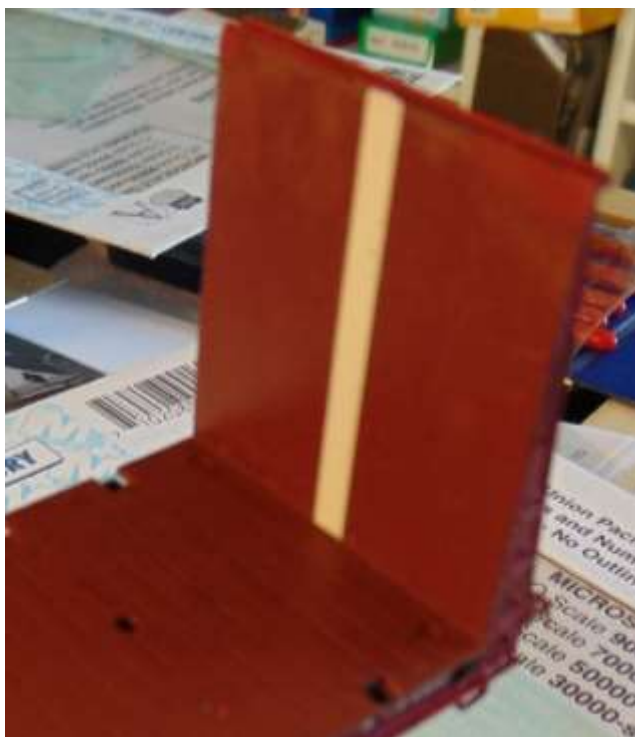
- BN: Thin vertical bulkhead braces (2 per side) need to be removed. [DONE.]
- SSW: Thin vertical bulkhead braces (2 per side) need to be removed and replaced with one stout one per side. [DONE.]

Bulkhead end horizontal braces:

- BN: Single horizontal brace needs to be removed and replaced with 4 evenly-vertically-spaced horizontal braces. [DONE.]
- SSW: Single horizontal brace 55% of the way down from top needs to be removed and replaced with single horizontal brace 45% of the way down from the top. [DONE.]

Bulkhead top channel and top corners:

- BN: Channel needs to run to the ends of the bulkhead. Bulkhead round top corners need to be replaced with square corners. [DONE.]
- SSW: Channel needs to be wider than factory model and run to the ends of the bulkhead. Bulkhead round top corners need to be replaced with square corners (photo SSW Striped Bulkhead). [DONE.]



SSW Striped Bulkhead

End number boards:

- BN: End number boards need to be removed (numbers go directly onto bulkhead back faces) [DONE.]
- SSW: End number boards need to be relocated. [DONE.]

Side numbers:

- BN: Side numbers need to be changed from 621734 to 621743. [DONE.]
- SSW: OK as-is. [N/A.]

End numbers:

- BN: End numbers need to be added to bulkhead back faces. [DONE.]
- BN: End numbers need to be changed from 621734 to 621743. [DONE.]
- SSW: End numbers need to be added to end number boards. [IN PROGRESS.]

Crossover platforms:

- BN: Cast-on crossover platforms need to be replaced, using etched metal. [DONE.]
- SSW: Cast-on crossover platforms need to be replaced, using etched metal. [DONE.]

Short end ladder top inside stile:

- BN: Short end ladder needs to have strap support from the top of the inside stile to the top of the third horizontal rib from the top (rather than stile being free-floating). [DONE.]
- SSW: Short end ladder needs to have angle iron support from the top inside stile to the back of bulkhead and/or right vertical rib (rather than stile being free-floating and extending well above top rung). [DONE.]

Cut lever brackets:

- BN: Add cut lever brackets (per RPAW photo of BN 621846). [DONE.]
- SSW: Add cut lever brackets (per detail of RCP photo of SSW 88001; quite different from BN). [DONE.]

Cut lever:

- BN: Add cut lever (per RPAW photo of BN 621658). [DONE.]
- SSW: Add cut lever (RCP photo of SSW 88001, 21 May 2019); Plano Model Products #12009 Stanray-style cut lever is a good match. [DONE.]

Brake chain and fulcrum:

- BN: Add brake chain and fulcrum (per RPAW photo of BN 621666). [DONE.]
- SSW: Add brake chain (per FFRPW photo of SSW 88303) – no visible fulcrum; chain drops through a hole in the deck. [DONE.]

Vertical Center Stripe on Bulkhead:

- BN: Not present (assumed worn away – was present at delivery). [N/A]
- SSW: Add narrow stripe (with 1/8" chart tape) (photo SSW Striped Bulkhead). [DONE.]

Model Train Bargains

By Wade Mountz

This is for those people who didn't take time to attend our last TECO train show/swap meet. Model train bargains are always available to those who bother to look around the vendors. I paid \$1.00 for Waycar with one truck missing plus \$1.00 for a used truck with metal wheels for a grand total of \$2.00. Minimal weathering. NOTE that all white plastic grab handles are missing (nothing in life is perfect).

Santa Fe Waycar #999539 CE-6 (Main Line Service), 1 of 5 purchased in 1974 (999538 - 999542) from Inter. Car Co. Kenton, Ohio





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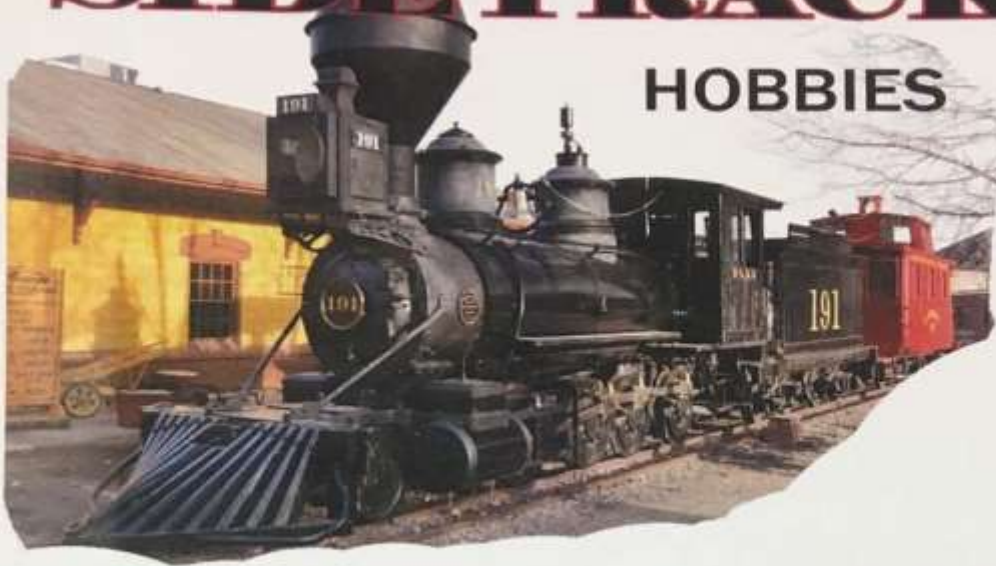
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