THE BRASS POUNDER

Newsletter of the Carolina Southern Division 12, Mid-Eastern Region, National Model Railroad Association

Volume 20 Number 11 **November 2020**

Division Coming Events
(See CSD Website for further details)

To avoid conflict with the Hickory Train Show on November 21st at the Hickory Metro Center, the Division will not hold a meeting in November.

Superintendent's Corner

By Alan Hardee

GREAT NEWS!!! Carolina Southern Division 12 had a meeting on October 17th. We had 14 members present at the Southeastern Narrow Gauge & Shortline Museum in Newton Depot for our visit. If you missed this event and want to visit later, the Newton Depot is located at 1123 North Main Avenue in Newton, NC. We met at the depot at 10:00 AM to start the tour of the Model Railroad building next door, restored depot, numerus prototype equipment under the covered pavilion.

We plan to open Brookford on November 21st to show during the Hickory Train Show on that same day. YES, you read that right. Matt Bumgarner has scheduled another show in Hickory for the 21st at the Hickory Metro Center just off I-40. We will be seeking volunteers to man the layout at Brookford and to work the show handing out flyers with directions. Gil normally handles Brookford, but he will be at the show with the N Scale modules. Please contact me at superintendent@carolinasouthern.org AND copy Gil at webmaster@carolinasouthern.org if you can help with the Brookford layout.
I hope Everyone stays safe and healthy as we slowly get back to a somewhat normal routine. Wear a mask, practice social distant guidelines and have some FUN!!!

<u>UPCOMING</u>
<u>AREA TRAIN EVENTS</u>

Hickory Train Show
Hickory Metro Center
Saturday, November 21st
9:00am – 4:00pm

Other events will be announced when scheduled

STAY SAFE AND HEALTHY.

Editor's Notes

By Ed Gumphrey

Needless to say, I'm happy that CSD had a meeting in October, even though I couldn't be there. Now we're into November with a Train Show on the calendar and re-opening Brookford. It's also the Month of Thanksgiving. So, here's my thanks to….

- Gil Brauch, MMR, for providing a synopsis and photos from the October meeting.
- Joe Skorch, for volunteering to assume webmaster duties in the coming year.
- Keith Iritski for braving the challenge to become a new author with his in-depth discussion of a complex bridge project.
- Ed Smith and Tim Rumph for their many articles. They're taking a well-deserved break this month.
- Michele Chance for alerting me to the MER Convention plans

<u>SUBMISSION GUIDELINES</u>
I target the 1st of each month for publication. Please submit articles for publication by the 27th of each month.
The preferred format is MS Word, but I can convert most other formats.
For questions and help, email me at editor@carolinasouthern.org

DIVISION AND REGIONAL NEWS

By Gil Brauch, MMR

The Carolina Southern Division held its first monthly meeting since March on October 17th at the Newton, NC Depot – home of the Southeastern Short Line and Narrow Gauge Museum. About 12 of our members gathered in the Museum's Model Railroading Center to view their four layouts: one in O Scale, two HO Scale, and one N Scale. We also discussed a few items of business to give a quick update of the last few months.

Neal Anderson, MMR presented Ed Smith with his Achievement Certificate for Author. Gil Brauch announced that Joe Skorch has volunteered to be the Webmaster beginning in the new year. Alan Hardee announced that there will be no meeting in November because it would conflict with the Hickory Train Show, but that Brookford would be open so that train show visitors would have the opportunity to drop by the layout there.

Ed Smith received a Certificate of Achievement for Model Railroad Author, presented by Division AP Chairman Neal Anderson, MMR

We then moved to the Depot where James Glenn conducted us on a tour of the exhibits there. Many items are from short lines that have existed in the general area as well as some more contemporary items from various collections. Our last stop was at the outdoor pavilion where Matt Bumgarner showed us the various items in their 1:1 collection and explained the history behind some of the older pieces. Of particular interest were two wood cupola cabooses – one Southern and the other Clinchfield, two vintage narrow gauge boxcars, and the crown jewel of their collection – Alexander RR #6 – a fully operational Alco switcher.

This was a very nice outing for all of us and we thank the staff and volunteers of the SESLNG Museum for their hospitality. Enjoy a few pictures from the outing on the next page.

CSD Members in the model railroad room at Southeastern Short Line and Narrow Gauge Museum on October 17th for our first meeting since March

CSD Members look at museum displays and listed to tour guide James Glenn

CSD Members in the model railroad room at Southeastern Short Line and Narrow Gauge Museum on October 17th for our first meeting since March

Mogul #50 – an early photo from SESLNG Website.

UPCOMING CONVENTION NEWS

By Ed Gumphrey

There are two relatively nearby NMRA Regional Conventions on the calendar for next year.

- The first is our neighboring Southeast Region (SER) Convention in Greenville, SC. Make your plans for June 10-13 and get more details at www.swamprabbitexpress.org
- The second is our own Mideast Region (MER) Convention in Baltimore, MD. Make your plans for next October 21-24 and get more details at https://mtclarejct.com/

FIRST UP:

Swamp Rabbit Express
Greenville, South Carolina 2021

Greenville, SC
June 10-13, 2021

Information at:
www.swamprabbitexpress.org

Palmetto Division
Upstate South Carolina
Southeastern Region SER NMRA

FOLLOWED BY:

MOUNT CLARE JUNCTION
MER 2021 - BALTIMORE, MD

OCTOBER 21-24, 2021

Information at:
https://mtclarejct.com/

New York New Haven & Hartford Scherzer Rollling Lift Bridges Project

Or: TWO STEPS FORWARD, ONE STEP BACK

By Keith Iritski

I'm modelling the NYNH&H Railroad's Old Colony Division, from South Station in Boston Mass, to Plymouth Mass, In the fall of 1920. Why 1920? It was the year of the highest ridership coming out of South Station on the New Haven. And fall, during cranberry harvesting season, which generated a large amount of freight traffic out of the south shore of Massachusetts where I grew up. To a lesser degree there were excursions from Boston to Plymouth for the Thanksgiving season.

As far as iconic structures along the New Haven line go, the 3 Scherzer rolling lift bridges that the New Haven used, along with the Boston and Albany, to cross Fort Point Channel just south of the South Station terminal, was something I felt I had to model to help identify this severely compressed section of my layout as South Station. The bridges were completed in 1900, and were opened and closed an average of 24 times a day, with 200-400 trains a day crossing them. (Photo 1)

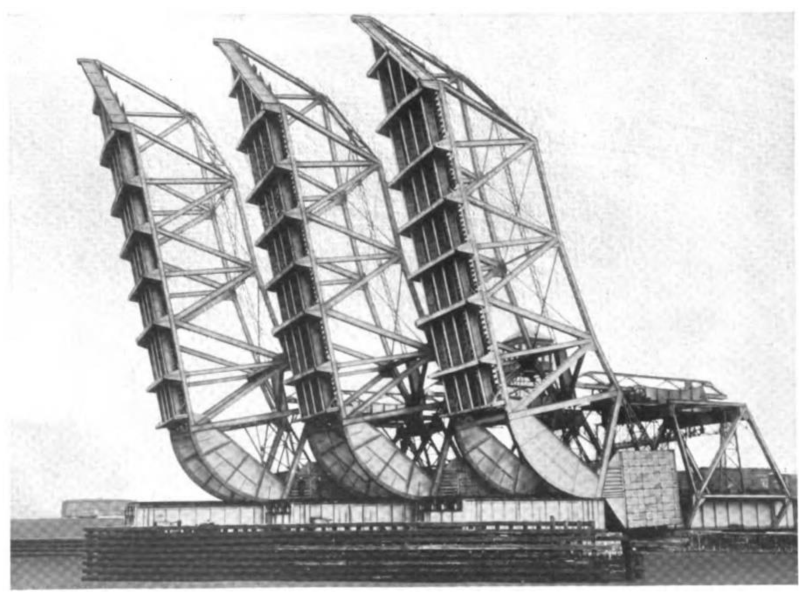
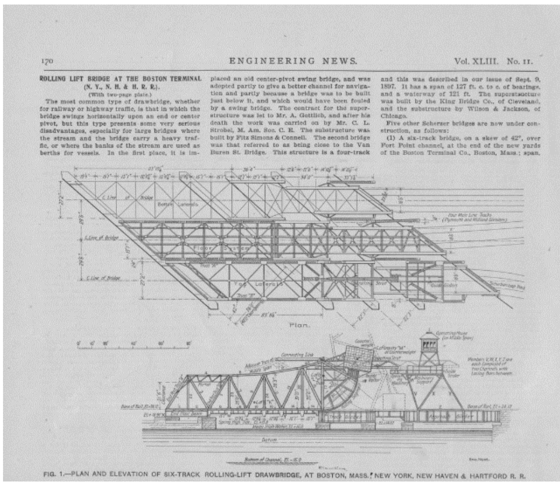


Photo 1: The 3 bridges spanning Fort Point Channel

The prototype bridges were all double track, but with space limitations, I'm modelling them as single track. Also, I'm modelling them as non-operating. I need to retain some of my sanity after this endeavor. Perhaps in the future I can con Fred Miller into designing an Arduino program and circuit to lift the bridges with creaking, squealing, and startled seagull sounds. Could I have modelled just one of the bridges and call it good enough? Sure, but I like to punish myself for past indiscretions and do things the hard way, like handlaying 90% of my track.

Since no commercial kits exist of these particular bridges, I have to kitbash/scratchbuild them. YAY. I was able to find a few photos and some actual drawings that appeared in the March 15th 1900 issue of Engineering News. (Photos 2 & 3) Additional information is available at http://southstation.blogspot.com/.



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ROLLING LIFT BRIDGE AT THE BOSTON TERMINAL (N. Y., N. H. & H. R. R.).

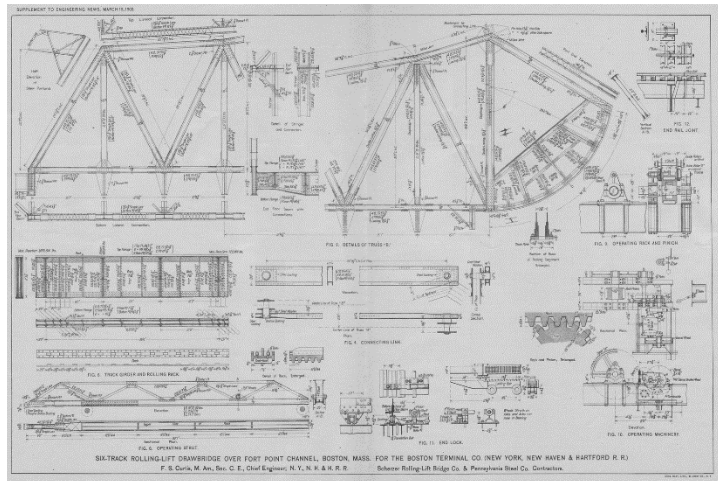
(With two-page plate.)

The most common type of drawbridge, whether for railway or highway traffic, is that in which the bridge swings horizontally upon an end or center pivot, but this type presents some very serious disadvantages, especially for large bridges where the stream and the bridge carry a heavy traffic, or where the banks of the stream are used as berths for vessels. In the first place, it is im- placed an old center-pivot swing bridge, and was adopted partly to give a better channel for navigation and partly because a bridge was to be built just below it, and which would have been fouled by a swing bridge. The contract for the superstructure was let to Mr. A. Gottlieb, and after his death the work was carried on by Mr. C. L. Strobel, M. Am. Soc. C. E. The substructure was built by Fitz Simons & Connell. The second bridge was that referred to as being close to the Van Buren St. Bridge. This structure is a four-track and this was described in our issue of Sept. 9, 1897. It has a span of 127 ft. c. to c. of bearings, and a waterway of 121 ft. The superstructure was built by the King Bridge Co., of Cleveland, and the substructure by Wilson & Jackson, of Chicago.

Five other Scherzer bridges are now under construction, as follows:

(1) A six-track bridge, on a skew of 42°, over Fort Point channel, at the end of the new yards of the Boston Terminal Co., Boston, Mass.; span,

FIG. 1.—PLAN AND ELEVATION OF SIX-TRACK ROLLING-LIFT DRAWBRIDGE, AT BOSTON, MASS. NEW YORK, NEW HAVEN & HARTFORD R. R.



Photos 2 & 3: Elevation and plan views of the bridges, as well as detailed drawings of various components of the bridges were found during research. To view full size images and others, see http://southstation.blogspot.com/

For the main lifting part of the bridge, I used a Central Valley Pratt 150' 1902 kit heavily kitbashed. Basically, I just used the parts cut to what I needed, mostly the truss beams. I wasable to construct the floor system for the bridge by matching up the sections of Central valley floor girders to the plans of the prototype and cutting them to length with a razor saw and miter box. Notches had to be cut in some of these to allow for the crosspieces to fit the shortened sections. I had to fabricate an end plate girder section for the skewed end of the lifting section of the bridge as the end of the CV bridge is not skewed (Photo 4). The same had to be done later with the portal bracing on the skewed end. The Kalmbach books; Bridges and Trestles vol. 1 and 2 were a great help in understanding bridge construction, and how to design and build your own. Using the tables in the books, I was

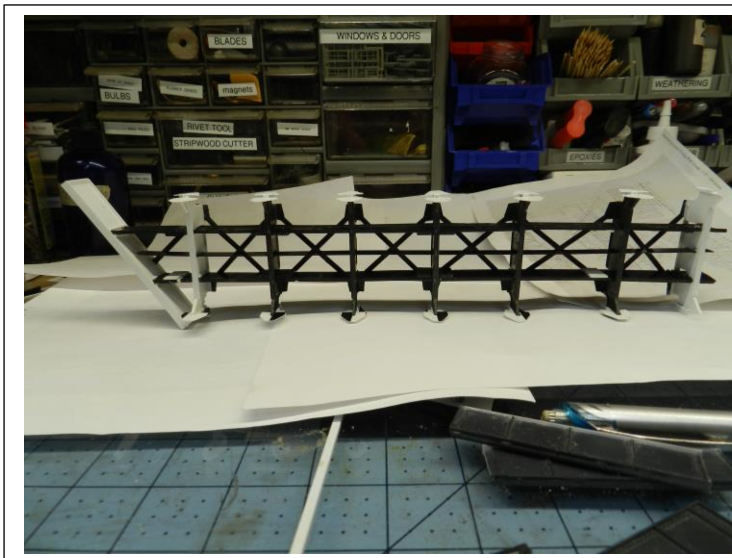


Photo 4: The completed bridge floor assembly, kitbashed for single track and a skewed end.

able to size and fashion an end girder with filler plates, and styrene angle stiffeners, spacing them out using a calculator to divide the length of the plate girder by the number of stiffeners needed. (looks left and right. Whispers, "I use metric measurements most of the time." Yeah, yeah I know, this is 'Murica, but dividing 20mm in half is easier to me than dividing 3-11/32 in half - well at least to my addled brain.)

Let me digress. Whenever I build anything, I build it, discover something wrong, usually because of a miscalculation in the planning or just having a brain fart when measuring or cutting, and have to take it apart, change something, and put it back together. Two steps forward, one step back. This happens to me from small models, to benchwork, to building a goat barn. So, after spending all this time constructing the end girder, I placed it on the layout, and discovered it won't even be seen except the top plate. Detailing was a waste of time. From this point on I vowed that if it won't be seen, I'm not spending the time or the money to model it.

The truss structure was constructed by fiddling with the drawings I downloaded. Resizing, printing, resizing, printing etc. until I had them HO sized. I then secured them to a thick section of tempered glass and covered the drawing with Waxed Paper to help with sticking issues with the styrene glue. This setup allowed me to build the truss girders on top of the drawing, just like in my balsa airplane building days. A miter box and razor saw come in really handy for this, as did my newly purchased "Sand-It" from Micro-Mark to make sure the ends of the girders were square. Once one side of the truss superstructure was complete, it was rinse and repeat for the other side. But wait - the bridge is skewed, and I am screwed. The prototype bridge was double track and with that geometry they simply added one more bay to the truss on the longer side of the bridge. The fact that I changed to a single- track bridge now reared its ugly and asymmetrical head. Cue the wringing of hands, pacing, crying, and reading about skewed bridge geometry. I tried a few design ideas from the overly simple to the absurdly overly complicated. I settled on something close to the geometry of the bridge bay that didn't look too out of place. (Photo 5)


Photo 5: An asymmetrical panel was added to one side of the bridge to create the skew for the modified single-track bridge.

Now to join the two truss sides together. Due to the spacing of the prototype uprights and truss bays, it wasn't all unicorns and rainbows. I couldn't just use the Central Valley upper crossmembers, and had to kitbash the web truss sections to fit my bridge. Cutting some shorter (easy), and elongating some others (harder). You have to strategically cut the web truss, so that the web sections line up with no odd spacing, before gluing them perfectly flat and aligned.

Now for the rolling quadrants. The giant "cams" that the rolling lift bridge rolls with and the quadrant track - the heavy-duty plate girders that the rolling lift bridge rolls ON. I cut the large side pieces from .040 sheet styrene, with .10 X .06 styrene strip stock as spacers and stiffeners between to get the proper thickness of the quadrant. The sides of the quadrants had stiffener angles radiating from the center outward. It basically has the same construction as a plate girder section. I used 3/32 angle stock around the outside edges with 1/16 angle stock as the stiffener angles in the middle of the side plate. The holes to receive the fulcrum blocks or teeth on the quadrant track were made by cutting .10 X.06 strip pieces on a NWSL chopper with a stop set to get uniform pieces. You can save some time by cutting a length of stock in say, thirds, and stack these on the deck of the chopper, and cutting several with one stroke. I then placed the cut pieces between the quadrant plates on the rolling edge with spaces between them corresponding with the dimensions and spacing of the teeth on the quadrant track (Photo 6).

The quadrant track bridge section was next. I constructed the deck girders following the drawings and in the same manner as previous plate girders with cover plates on the bottom of the plate girders made of .030 strip stock ,with two additional cover plates of a length of 102mm long, and on top of that one, one at 52mm long, centered on the bottom of the girder to reinforce the girder. Bear in mind that this plate girder bears the weight of the whole lifting section of the bridge when the bridge is raised. The teeth locations were taken from the drawing to correspond with the receiving holes in the rolling quadrant. The teeth were cut on the NWSL chopper, and glued in place. I then constructed the floor system bracing with .030 sheet styrene for the crossbeams (webs) with .010X.128 thin strips for the top and bottom edges of the web. the X-bracing was installed top and bottom and this section is done. I didn't bother with the side stiffener angles on the backside of the deck plate girders as they will not be seen (Photo 7).

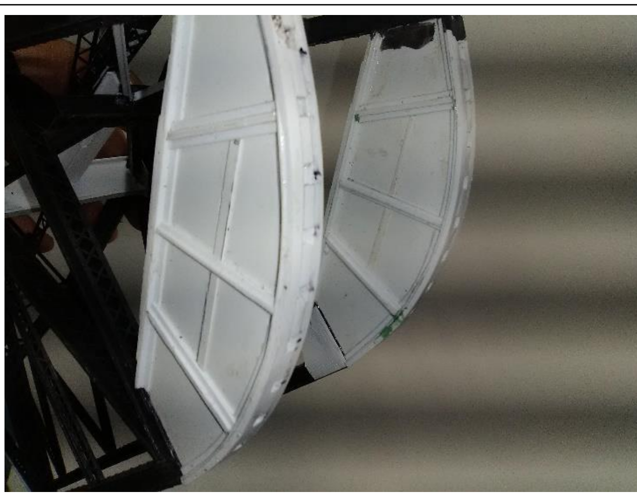


Photo 6: The quadrant sections. Note the spaces to receive the quadrant track teeth

Photo 7: The quadrant track bridge section. The interior detail of this section will be not seen due to track and wooden walkways covering it.

The small deck plate girder bridge section was on the prototype to allow space for the large counterweights to be able to swing down when the bridge was in the raised position. This was constructed from a kitbashed section of an 85 foot Micro Engineering open deck plate girder bridge. The original deck girder was too deep for my application so I had to cut it down lengthwise with a razor saw, and then across the piece to the proper length. To repair the cut ends and bottom I constructed the stiffener angles and cover plates as with the previous builds using 3/64 styrene angles, and it looked as if it was manufactured for this application, which I guess it was. To add the X- bracing in the interior of the span, I had to cut down the existing cross frames to fit the shorter girder depth. I cut the lateral struts off the flanges and carefully separated the two struts with a new X-ACTO blade where they crossed each other (Photo 8). The flanges have to be sanded to remove the bits of lateral struts left. I had to ensure that the crossframes remained the same width and height when I glued them back together, so I constructed a wood frame glued to a piece of paper, in which to rebuild the crossframe section in (Photo 9). The crossframes that were removed were trimmed to fit, and glued to the flanges at the top and bottom of the unit. I discovered that I had to thin the ends of the removed lateral struts before gluing them to the

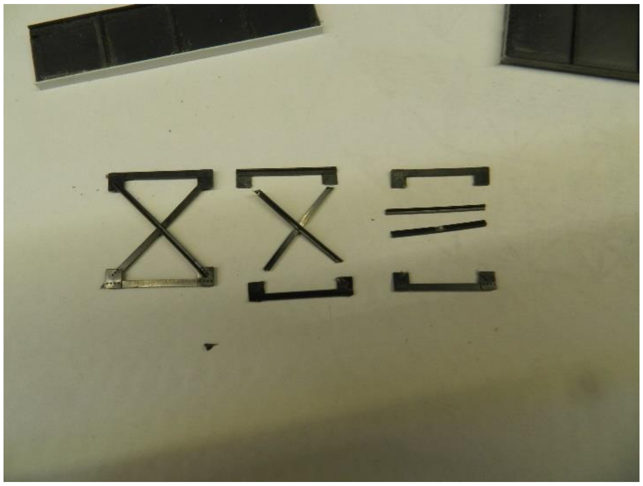


Photo 8: All the bits separated.

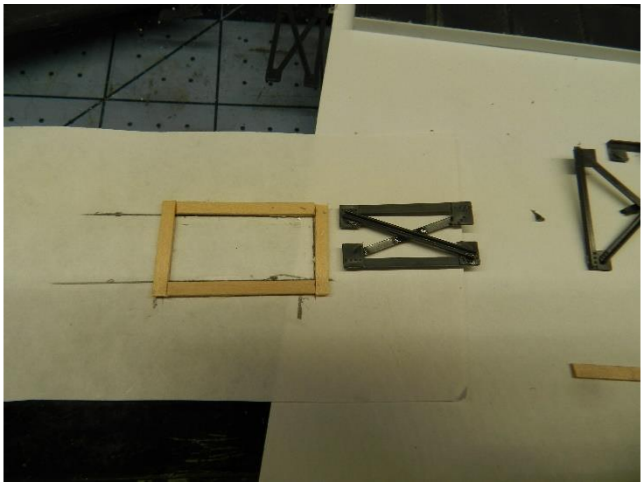


Photo 9: the box jig to ensure consistent reconstruction dimensions.

flanges or else it left a big gap where they crossed, and the whole cross frame unit was twisted. Two steps forward, one step back. Could I have just constructed new cross frames by scratch? Yes, but that would have used a few dollars in materials, and the 20% of Scottish Genes in my DNA profile wouldn't let me. Besides there were only three of them to kitbash (Photo 10 on next page).

One can only decipher so much from an elevation and a plan view with no profile or end view. I had to interpret how things were put together and placed. the main structure of truss girders was settled, along with the floor system. Now for the nitty gritty. The attachment point for the operating strut was pretty ambiguous in the drawings and more so in the photos I had on hand. So, I tried to build something that looked beefy enough. After thinking about it, and trying to line up how an operating strut would attach I fitted a chisel blade to the Xacto handle, and removed the attachment beam. After going back to the photos on my PC I reworked something closer to what, as far as I could tell, was how it was built (Photo 11 on next page).

Photo 10: The small bridge section reassembled.

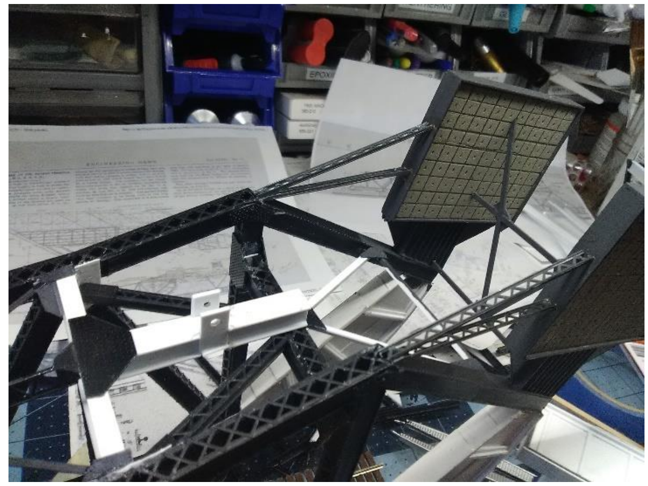


Photo 11: The attachment point of the operating strut.

I wish I could see the strut better. What is that in the way? Oh nuts, I forgot the counterweights. I knew they were constructed of Individual concrete blocks held in with a bolt, removable to balance the bridge if any changes to the weight of the bridge happened. All the photos and drawings showed the counterweights to be rectangular, with 10 blocks along the top and 9 blocks high. I've etched blocks in foam before, but I wanted something sturdier. I used balsa sheet stock cut to the dimensions of the counterwieght units, and glued in stiffener/spacers in between the two thin sheets to give the proper thickness. I then plotted out the blocks with dividers marking where the lines have to be etched by dividing the top dimension by ten, and the side dimension by nine. I then etched the lines into the balsa with a mechanical pencil, pressing enough to get an indented line to represent the spaces in between the individual blocks. To represent the recessed bolt head, I pressed the point of the pencil into the center of each block. I then painted the balsa sheets with Floquil concrete which raised the wood grain where I had etched the lines and “bolts". I had to etch the lines again lightly to reestablish them. Two steps forward, one step back. Lesson learned; paint first, etch later. Of course, I learned this after building six of the counterweights, two for each of the three bridges, and painting them. Now to wrap the balsa with strips of .020 styrene to represent the steel encasing the concrete blocks as one unit. to mount the counterweights to the rolling quadrants I used .040 styrene girder webs framed with 1/16 styrene angles. The center web had, what I could tell from the photos, a series of stiffner angles riveted close together. 3/64 angles were used to accomplish this. very tedious but very noticeable in the photos. The completed counterweights were mounted to the quadrants and the bridge is starting to look like the prototype (Photo 12). Lesson learned;

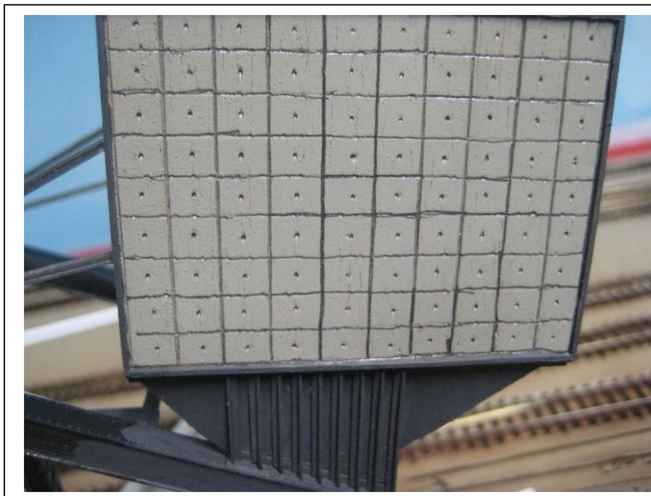


Photo 12: The large counterweights with etched blocks in balsa sheet.

Next came some bracing that stabilized the counterweights that I was able to see in a photo. I tend to construct bracing and a lot of steelwork freehand to fit a structure that has been already built, so that it will fit tightly, rather than building a unit and finding that a lot of cutting and fitting has to be done later, or it has to be scrapped altogether. I pieced the bracing together with styrene strips, and glued it together. It fit well. To save frustration later I knew I had two more of these to build so a quick template was needed. Then lightning struck my brain. I sprayed the white styrene black and set it on the glass of my copier/printer, and made a copy of it. Perfect. Now I had something to build the other braces right on top of (Photos 13 & 14).

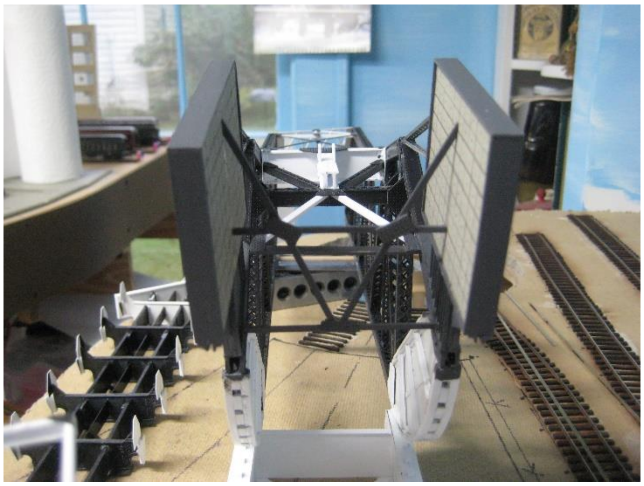


Photo 13: The bracing in place between the counterweights.

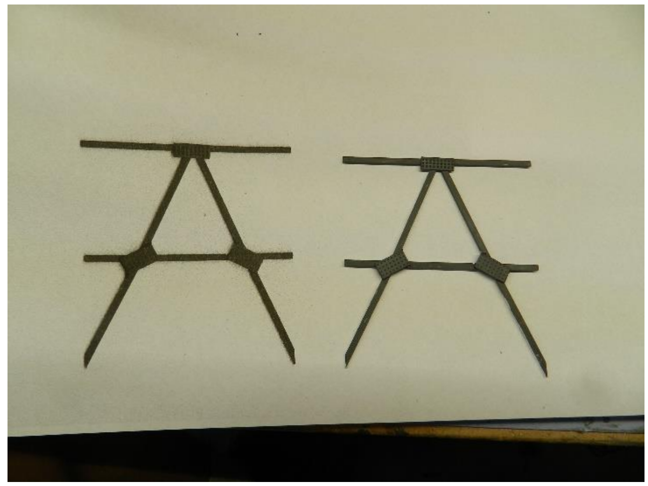


Photo 14: The template made by copying the brace structure. The actual brace is on the right.

The next big chunk of the bridge to do is the superstructure that held the operating strut guide girders and machinery to lift the bridges. The center span of the three also held an operating house. The three bridges could be lowered and raised independently, and each had its own 50 HP motor and machinery. All uprights were the C-C girders from the Central Valley kit. I ended up having to order two more of the Central Valley 1902-5 girder kits to finish the bridges. A shame since I just needed the C-C girders. Well, I do have some gantry cranes to build, and a tall building under construction in Boston would be neat. Oh, to have a 3D printer to print just what I need. More on that note later. Out comes the graph paper and a reawakening of my High School drafting class. I took the dimensions of the section from the drawing I had and laid out the top chord end posts and bottom chord.

I used the wax paper over the drawing trick and constructed one side of the section. A moment of panic set in. "Is it the right height compared to what I had built?" I mocked up the sections of bridge that I had constructed with sticks and bubblegum, to the proper height, and NO NO NO, it's too short by almost 3/4 of an inch. That's what comes from trying to scale a drawing and not measuring the actual object. Two steps forward, one step back. Back to the drawing board, literally. I had to cut apart the three uprights, and revise my drawing (Photo 15) Lesson learned but most likely forgotten. (I went to High School in the seventies if you get my drift.) After reconstructing the section and making a duplicate for the back truss section, I joined them together at the top chords forming two portals. This support structure was then mounted to a 50 foot section of Micro Engineering 85' open deck plate girder bridge I had left over from the previously kitbashed small girder bridge section. After adding cross bracing to the top of the support structure, I added two Tichy 40' plate girder bridge sections to represent the guide girders that the wheels on the operating strut rode on. As far as I could tell they were straight across in the drawings I had. I then made two girder pieces that the machinery sat on to move the operating strut. I was looking at the details of all the gears, brake wheels, and shafts that were in the drawings, and getting more nauseous by the minute. Um, I know, they boxed everything up with sheet metal and enclosed it to keep snow and umm, SEAGULLS, out of the gears, Yeah, that's it. (In my best Jon Lovett voice.)

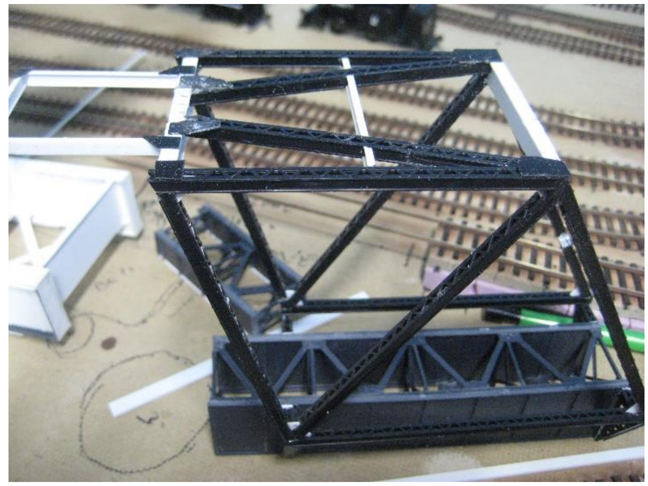


Photo 15: After raising the section by 3/4 of an inch. And before the girders are placed.

At his point I was poking around on the ol' internet. I had done countless searches for the "South Station" lift bridges, with limited success. This time I searched for "Fort Point Channel Bridges" and got whisked off to the Library of Congress that had; 47, FORTY SEVEN, SIEBENUNDVIERZIG photographs, DETAILED photographs, real research stuff, of what I was desperately trying to recreate. These photos showed what I had luckily got right, and what I had gotten horribly WRONG. For instance, the guide girders that were laughably easy to place, not having to kitbash, from Tichy were, in fact, curved on the top, rather dramatically three quarters the way down the girder to allow the operating strut to angle down when the bridge was almost totally open (Photo16 on next page). I then learned that the end support gusset for the guide girders wasn't dumb little triangles of .010 thick styrene that I glued at the bottom of either girder, but a big beefy thing that could support say, an operating strut lifting 100s of tons of bridge. And now look at all the other stuff I neglected to model. Out came the chisel blade and the tears as I cut away a week's worth of work. Two steps forward ***three*** steps back. I made the guide girders using the previous techniques, with the challenge of cutting the curved top of the girder. That $400.00 ultra-mega-sonic atomic vibrating knife would come in handy from Micro-Mark, as would a $189.00 3D printer. (I have to order one of those someday).

After cutting the girder plate out I attached the 3/32 angle stock to the upper curve and held it in place with magnets and the steel tray that I got from Micro Mark in the 90s. I've been getting a ton of use out of it with this project, as well as two sets of 3-2-1 blocks I ordered from Amazon. $16.00 for two blocks. I placed a bead of model master glue along the top and clamped the angle with small round magnets from Harbor Freight. The rear girder just has edge detail as it won't be seen (Photo17).

Photo 16: Photo of the operating structure and machinery.

Photo 17: Guide girder glue up.

Now for the dreaded machinery. I was having a hard time finding gears to use. The main gear that turns the pinion gear pulling the operating strut back is five scale feet in diameter. I was able to order a 150g bag of various "Assorted Steampunk Gears" from Amazon. Of these, I found three appropriate ones for the main gear, and three for the brake wheel. The brake wheel had no teeth on the prototype, so I had to grind them off with a dremel. The brake wheel had a metal band over it running to a tensioning arm that when moved, would tighten the band, thus slowing the wheel, and the bridge's descent for the last few feet. If it closed too fast, it could jam the locking mechanism, making it impossible to raise the bridge. So now for more fiddly bits as our British modelling brethren and sistren would say. I made pillow blocks for the shafts out of bits of styrene filed down, shafts were cut from my bin of assorted metal tubes and bits and bobs of brass, copper, and aluminum again From Micro-Mark. One bag will last you a lifetime. The metal to styrene connections were glued with CA glue. I made the 50 HP motor out of a piece of styrene sprue (never throw anything away) filed to look like a motor. The brake wheel was fitted with a .005 x 1/32 piece of styrene super glued to the top and pulled down to a piece of .030 stock glued to the underside of a crossbeam to form the tensioning arm. A couple more gears from an assortment of watch gears, and some "Phantom" shafts and I'm calling it done. This the furthest back of the three bridges and some of this will be hard to see so it will have the least amount of detail I can get away with. (Photos 18 & 19 on next page).

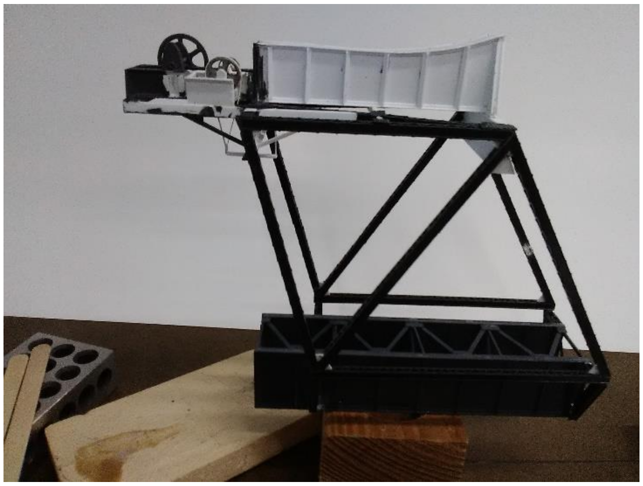


Photo 18: The operating platform in all its glory.

Photo 19: The machinery, close up.

The Operating strut... WAKE UP! We're almost done. The drawings I had of the operating strut were very detailed. I had to decipher the internal bracing though as that was not too clear. I used an A-B girder from the Central Valley kit for the bottom chord/rack of the strut that is pulled along by the operating pinion gear. The top chord and internal bracing were web truss sections from the above kit. The phosphor-bronze tube that the pin that connected the strut to the bridge went through, was a piece of aluminum tube from the bits and bobs bag super glued to the end of the strut. Various riveted gusset plates from the CV kit were trimmed and glued over the joints that the web trusses formed, reinforcing the joints while conveniently hiding any shoddy workmanship. The wheel that rides on the guide girder was made by punching out a 1/8 inch piece with a leather punch from my leatherworking days. This "wheel" was glued to another piece of copper tube inserted through a gusset and the wheel on the other side glued to the other end of the shaft (Photo17).

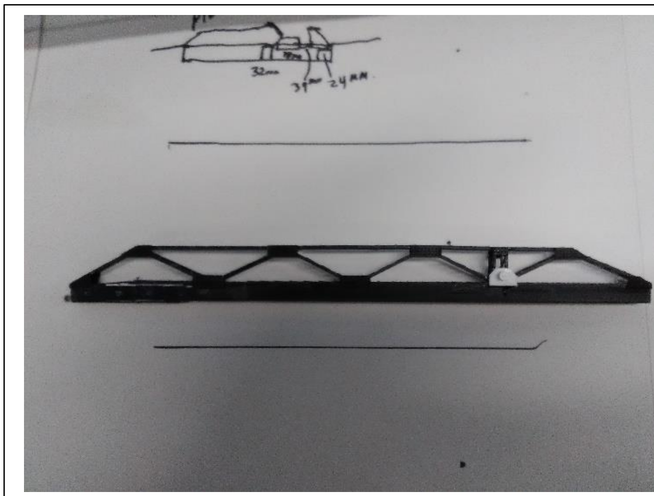


Photo 20: The operating strut, the workhorse of the lifting bridge.

Now all that is left is to paint the sucker, and setup all the support piers. Not sure If I'm going to use XPS foam, cast them in Hydrocal, or perhaps 3D print them with my NEW TOYS. “No honey we can't get a new floor and vanity for the bathroom, I spent the money on a 3D Resin Printer and a FDM 3D printer.” Don't tell her I'm eyeing up a laser engraver/cutter. I hope she doesn't read this.   In the meantime, I set the bridge sections on mocked up piers to get a sense of its appearance over the river bed (Photo 21)

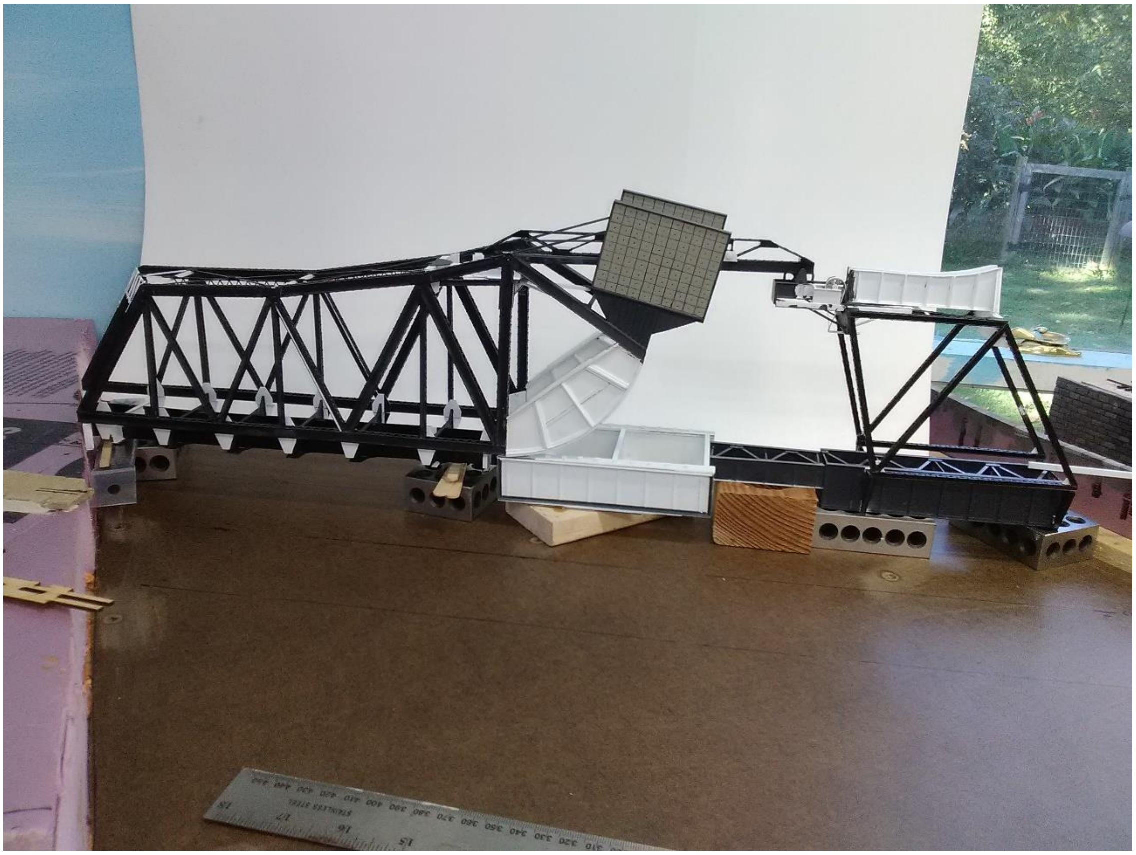


Photo 21: The bridge sections sitting on mock up piers

I also have to mount the Micro Engineering bridge track, and put in the wooden walkways on either side of the track. Oh yes, and I have to do all that I've spoken about in this article two more times for the other bridges. So far, I've been working on this bridge for four months or so, in between killing zombies and making post apocalyptic America safe for humanity on the Playstation.   Hopefully the other two will go a bit faster. The research is all done , the construction kinks are worked out, and the materials are on hand. I'll submit another article when the other bridges are done, and I'm modelling the channel and the numerous wood pilings protecting the stone piers.

Bye for now, stay safe, and happy modelling.

Keith Iritsky

The Smart Industry X-Change System (SIXS) - Concept and Theory

The Next Stage Prototypical Operations

By Scott G. Perry

For those that don't know me, my profession is that of a Supply Chain Specialist. When big corporation design a new widget for sale to the public, they call me. I help figure out how to make it, where to make it, and then I set up the factory. Next I figure out how to get it to the warehouse so it can be shipped. Supply Chain. You have a product in your home that I have worked on at some time in my career. Moving freight from one point to the other is part of the supply chain. Railroads move goods from here to there, and they also are part of the supply chain.

So that got me thinking about how our model railroads function. Often, we stage a train either in a yard, or better yet in an offsite staging area, thanks to Frank Ellison and the legendary Delta Lines. From off-site staging the train comes on to the layout and we deliver empty or full rolling stock to industries across the layout. We pretend that the cars we set out, often with a car card/way bill system, is now the opposite (full or empty) of what we pretended it to be and we take it off the layout by train and run it to offsite storage which we pretend is a town further up the line. Lots of pretending. Lots of fun.

When analyzing what we do on our model railroad, we should first look at the real railroad shouldn't we? So, the Union Pacific has a pile of cars in a big yard in Salt Lake City. They pick a bunch of cars they feel like shipping and take them to industries everywhere, and just drop them off. Then they pretend a car card is flipped over, go pick it up, and bring it back to the empty yard. Oh, and they get money for it. Well, that's not how that really happens.

What really happens is United Grain needs 20 hoppers full of grain to sell to their customers. Their buyer purchases it from Heartland Grain, and Heartland loads the hoppers. They call Union Pacific who arranges for a train to go by Heartland and pick up the cars. By way of interconnected tracks, they bring them to the customer United Grain and they drop them off. The customer unloads the hoppers, sells the grain and pays the railroad for their trouble.

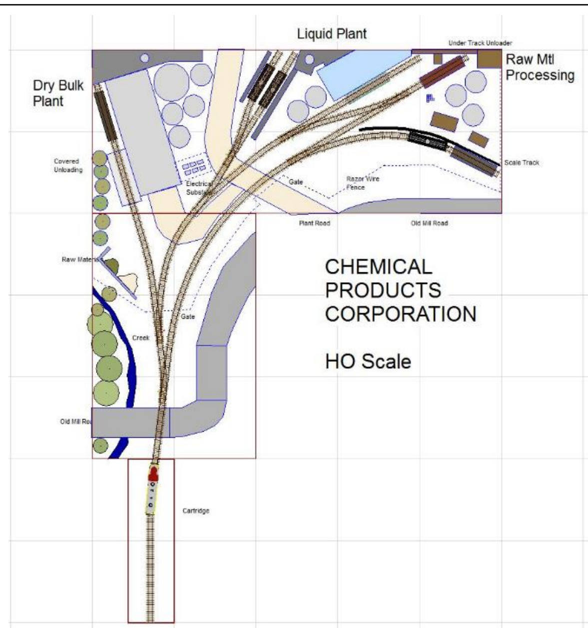
Our model railroads, if you use Supply Chain terminology, are using Demand Push Logistics. We "push" cars to the industry, whether they need them or not. This is often used by retail companies like Walmart who send tons of Christmas items to every store, whether they want them or not, and make them sell them for the season. Therefore, you get cheap wrapping paper the first week of January. It's not very efficient.

Real railroads work on a Demand-Pull Logistics system. The industry determines what it needs and its requirements for the railroad. It takes no more cars than it needs and ships no more cars than it can fill. Very reasonable and effective.

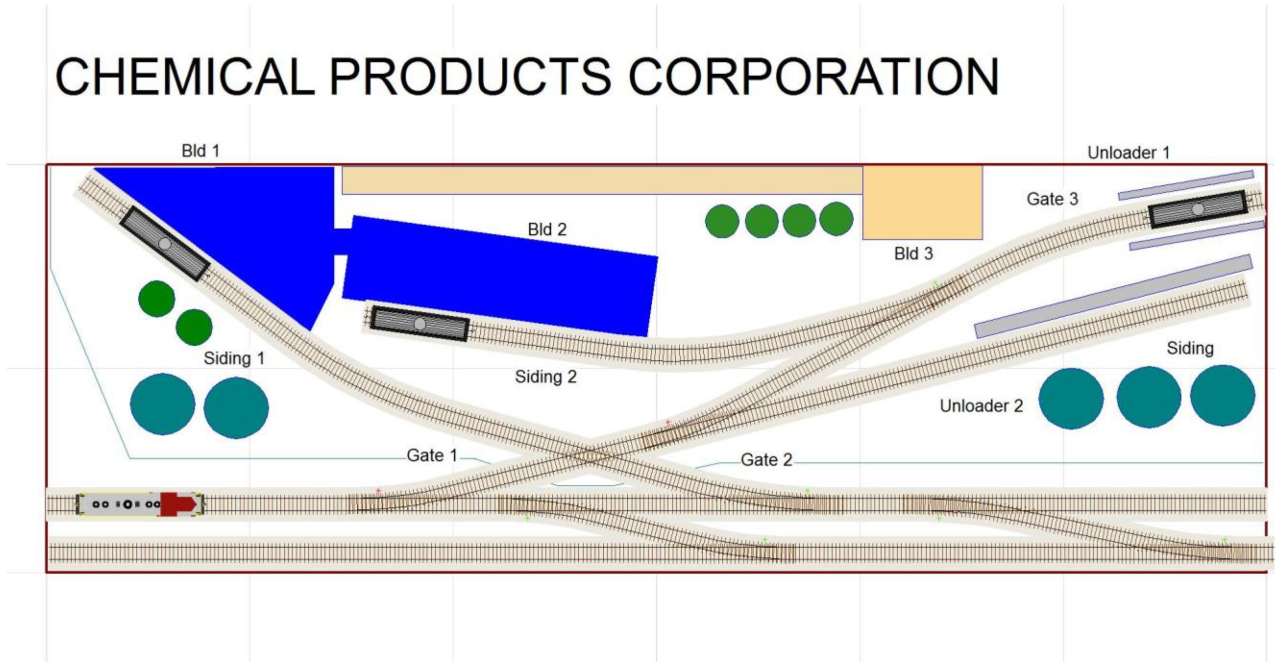
So, how do we get our "customers" to request rolling stock instead of just shipping it to them? Let me introduce you to the Smart Industry X-Change System or SIXS concept. Using modern and inexpensive technology we can make our industries on the layout "smart" and let them generate their requirements. This is VERY backward from our current thinking, but I see huge opportunities here.

Pic 1: The chemical plant prototype for Chemical Products Corporation

As an example, let's meet our newest layout industry Chemical Product Solutions (pic 1)! Chemical Product Solutions or CPS is a sprawling chemical plant complex with three significant production areas and several spurs. A plant complex like this would be larger than your house in HO, so naturally we must scale it down to a size (Pic 2) we can fit in the basement or on to a module (Pic 3 on next page).



Pic 2 The Smart Industry Chemical Plant selectively compressed



Pic 3: An even more compressed SIXS industry

Here we have reduced the size to something that is still very large on a modest basement layout. We should selectively compress the plant to three main areas; the powder products plant, the liquids plant and the raw materials plant. So now we have constructed plastic and wood structures, added plastic tanks, lights and track. It is a static model.

Ok, Igor...go get me a brain! How does our empty plastic factory with no insides, no machines, and no real people going to go to work? Ah, with a computer. We can make a simple program or even a macro-driven spreadsheet to calculate the inputs and outputs of our plant. We know, for instance, that our factory takes in certain chemicals by the train load. It takes tankers, covered hoppers and box cars. Then it takes these chemical "inputs" of raw materials and uses plant processes to turn them into specialty chemicals for its customers. By setting parameters such as how much material it demands, how long it would take to make chemicals, and what products in what form it would ship, the smart industry can generate materials (in a database) and request the railroad provide rolling stock. Then it ships tankers, hoppers and box cars out. Because it is a large industry it will draw and ship a lot of cars.

Ok, we have a "business" and its brain calculates what it needs and what it ships. Now we need to make it part of the environment. Let's look at the micro-controller. A micro-controller is a small circuit board with a sophisticated and programmable controller that manages inputs and outputs in its environment. Your brain is wonderful, but if you don't have the ability to touch, taste, smell, see or hear, your brain can't really do anything. Thus, the micro-controller is the senses for the brain.

Currently I'm playing with an Arduino board (Pic 4). It is a development platform that has an array of digital and analog configurable inputs and outputs. We can take the Arduino board and program it to read and respond to the environment. Let's look at an example.

Pic 4: Arduino circuit board system

On Thursday at 7:35 am Chemical Products calls the Dispatcher and tells him that they have freight to ship and what empty cars they need. The Dispatcher issues train orders to the CSX Conductor who instructs the engineer to remove a cut of cars and head to the switching lead toward Chemical Products Solutions. As the cars get close to the gate, a sensor picks up the moving cars using a light sensor. It sends a signal to the Arduino and all of a sudden, the Conductor hears a phone dial, and the shipping and receiving manager from CPS answers the phone! He hears him tell the Conductor that a person is coming to unlock Gate A for him to allow the train to pass. Car 11072 is to go to the Powder Plant. Tank car 3387 is to be put at position B at the storage track. Hopper car 99331 must be taken to Plant 1, but you need to blow your horn three times so the crew unlocks the car that is unloading so you can move it out of the way. Tanker 656690 is to be picked up and taken to Atlanta. Oh, you forgot what the customer asked you to do? Say "head's up" and a pop-up visual projection has your instructions up on the backdrop!

Wait, what? Was that just a recording? Yes and no. Here is what is going on in the background. The smart industry is calculating the use of raw materials and the production of finished goods. The Arduino board read the tracks by use of a sensor. It knows there is a hopper car at Plant 1 and its record shows that it has been there since the last session. It calculated how fast the chemical might be unloaded and consumed and it calculates that it is half full. The tank cars at Plant 2 are sensed and timed as well, so one is empty and needs to go back to be cleaned and refilled. The storage tracks are also monitored and may tell the Conductor to move one into a new location. The Arduino can grab different audio signals and chain them together to make it seem like a conversation.

After the right amount of time has passed, the Arduino sends a signal to two servo motors and the gates magically swing open for the train. We move the hopper car over to Plant 1 and blow the horn three times. The Arduino picks up the audible signal and rolls up the freight door by use of a servo. A red light near the track turns green indicating we can pull the car. Moving the cars sends more signals back to the computer that we have more input raw materials.

The Conductor moves the tank car, but we accidentally drop it off at the wrong siding. The Arduino detects the car in the spot, but when it checks its transponder signal it reads the car is incorrect. A phone rings and the receiving manager yells at the both of you for putting the car in the wrong spot. He politely tells you just where you can put it!

Once we are done with our moves the board detects our locomotive leaving the facility (pic 5). Again, the gates move and the security lights go off. The job is done, but the plant is still thinking. How much did I receive? How fast am I producing? When do I need to ship more goods? All of this is independent of the layout. When the factory gets hungry, it calls for more cars!

Pic 5 The smart industry can turn lights on and off, startup equipment sounds and open gates for the crew. Chemical plants are busy places!

"Ok, Scott, why is this a good thing? I spend a ton of money on electronics and lots of time designing the Smart Industry. What's in it for me? I'm glad you asked!

Now we have a layout with a true purpose. We have a customer-driven, demand pull system that generates traffic for the railroad. No more staging. No more car cards. No more REAL work at pre-staging that is not fun and not value added. No having to plan to have an operating session! Now the layout is doing the work and we are reacting just like a real railroad. You just come downstairs and run the trains.

Twenty industries from small to large are thinking, making calculations, and telling the railroad what to do. When a few guys want to run trains, you just turn the power on. We start where we left off. Each industry reads its zone and any cars that were pulled out, moved or added are put into the calculation within seconds. We no longer have staging so instead of pulling and flipping car cards the computer sends a screen to the engineer to pick up the cars he needs in a yard and get them moving on the railroad's schedule. The computer routes the train over the road, still using Dispatching if you like. The engineer's smart phone will have the list of rolling stock for easy reference. Each industry will call the shots, whether is a coal mine, a small warehouse, or the locomotive shop at the railroad. The SIXS can even figure out when there are too many or not enough cars in a zone and request a solution.

Ok, a bit backwards from our normal way of thinking. My thought is that this gets us closer to prototype railroads and removes some of the burdensome work we have to do to run trains. SIXS mean more prototypical running and less work.

What do you think about this concept?

CLOSING PAGE BONUS

HAPPY THANKSGIVING

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