

THE MILL

January 2021
Vol 5 Num 1

Frank Frost
HO scale Phoenix Steel
Layout



Lineside Reprints

Model a Union Railroad
Shorty Caboose

Around the Mill:
By Bill Parkinson

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The Mill

The Mill is a publication of the Steel Mill Modeling and Steel Mill Pictorial groups and is available to readers quarterly. The Mill is only available in PDF format and is a free download for anyone interested.

History

The Steel Mill Modeling group was founded on October 21, 2014,
January 1st, 2021: 2,242 members
<https://www.facebook.com/groups/708840849171343/>

The Steel Mill Pictorial group was founded on July 14, 2017,
January 1st, 2021: 5,160 members
<https://www.facebook.com/groups/1561038727264008/>

Download

To download past newsletters follow the provided link.
<https://steelindustryay.blogspot.com/2018/11/the-mill-newsletters-available-for.html>

The Purpose

This newsletter is to recognize the members of the steel mill community that would like to share their modeling ideas, on how-to builds of steel mills and equipment and the members who like to share their knowledge of the steel industry in general. This also includes industries that support the steel industry including coal, lime store, slag, coke, etc.

Thank You

I like to thank the members of the Steel Mill Modeling Group, Steel Mill Pictorial Group and the Yahoo Steel Mill Group for what you all have done to make this newsletter possible. Thank you all who have contributed to passed and future issues of The Mill Newsletter.

As Always Take Care, Stay Safe, Happy Modeling and May God Bless you all.

Editor, Don Dunn
Assistant Editor, Brady McClelland

Members of the steel mill community that we have lost.



Bill Wolfe

Born: March 24, 1948

Passed: July 27, 2020

Bill was at one time the President of the Steel Mill Modeling Sig and an avid steel mill modeler.

John Glaab

Born: June 5, 1940

Passed: November 25, 2020

John was known for his great knowledge on steel mills and his steel mill shop "Peach Creek Hobbies"

Correction

The bottle car at the top of page 8 of The Mill Volume 4 Issue 4, was taken by John Teichmoeller in Cleveland, at the Newburgh & South Shore's Seneca yard on the west bank of the Cuyahoga, ca. 1983

Cover

PH-210 under the stripper crane on Frank Forsten's Phoenix Steel layout.

In this issue

PG 4. Modeler's Corner: Phoenix Steel by Frank Forsten

PG 7. What's on the Bench: Building a Union Railroad Shorty caboose, by Janis Roguskie

PG 14. What's on the Bench: Steel Mill Modeling, 3D Printing, and you! by Benjamin Bair

PG 19. Lineside Article Reprints: The Iron and Steel Industry part 3

PG 24. A Steel Mill Holiday Story

PG 28. Around the Mill: By Bill Parkinson

PG 38. Resources

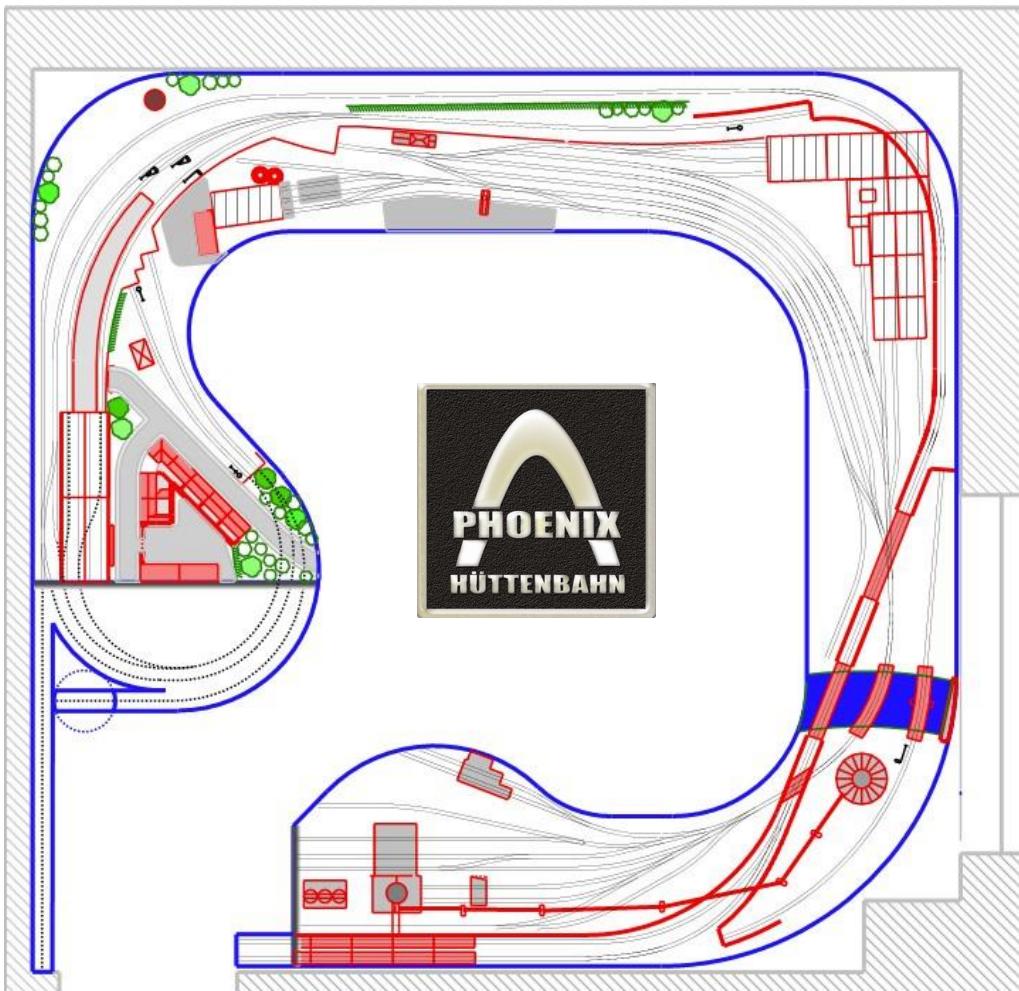
Submission information

Anyone who would like to submit pictures, articles, club news, upcoming shows or events to be placed in future issues of The Mill, please send an email to don_csx@hotmail.com. Pictures used have to be of your own collection or used with permission. When submitting pictures the bigger the better for detail purposes.

All pictures in The Mill are used with permission. If there are any questions concerning pictures or articles used please send them to don_csx@hotmail.com and the question will be forwarded to the contributor of the photo or article.

Phoenix Steel by Frank Forsten

Phoenix Steel is the creation of Frank Forsten. The layout measures 4.5 x 4.4 meters. Along with a steel mill operation the layout includes a electrified DB route with passenger operations. More information about Frank's layout can be found at his website. <https://www.stahlbahn.de/index.php>



Phoenix Steel Track Plan



Hot transport of glowing slabs on special wagons



Open pig iron wagons in use



PH 490 with new locomotive lettering



PH-210 with the new brake truck



PH-410 with ladle cars # 42, # 45 and # 47 in front of the steelworks



PH-412 and PH-424 in operation



PH-424 has fetched a ladle car division from the blast furnace



PH-424 pushes a ladle trolley department into the converter hall



PH-434 and PH-488 in use in front of coke trains, which are now driven to the bunker



The pipeline crosses the elevated railway and disappears behind the steel mill



The steel billets are ready at the dispatch hall



Two converted Henschel locomotives from Märklin, now for 2-rail operation



The train with the thermal hoods is ready to depart from the work station



Two scrap trains from converted wagons

What's on the Bench

Union Railroad shorty caboose made from a Lionel caboose, by Janis Roguskie

Janis, models the Union Railroad on her 16 ½ feet by 6 ½ O scale layout. The layout was features in the Volume 4 Issue 3 of The Mills Newsletter. Union RR shorty cabooses are not available in O scale. Janis shows how she made a representation of the Union RR shorty caboose using a Lionel bay-window caboose as a starting point.



The end result.



Pic 1

(Pic 1) We begin with one Lionel bay window caboose.



Pic 2

(Pic 2) Lines are scribed across the frame where the cuts will be made.



Pic 3

(Pic 3) Frame from a previous project in the rear.



Pic 4

(Pic 4) The frame after the extraneous pieces (crop) are cut out.



Pic 5

(Pic 5) The roof is cut off the body.





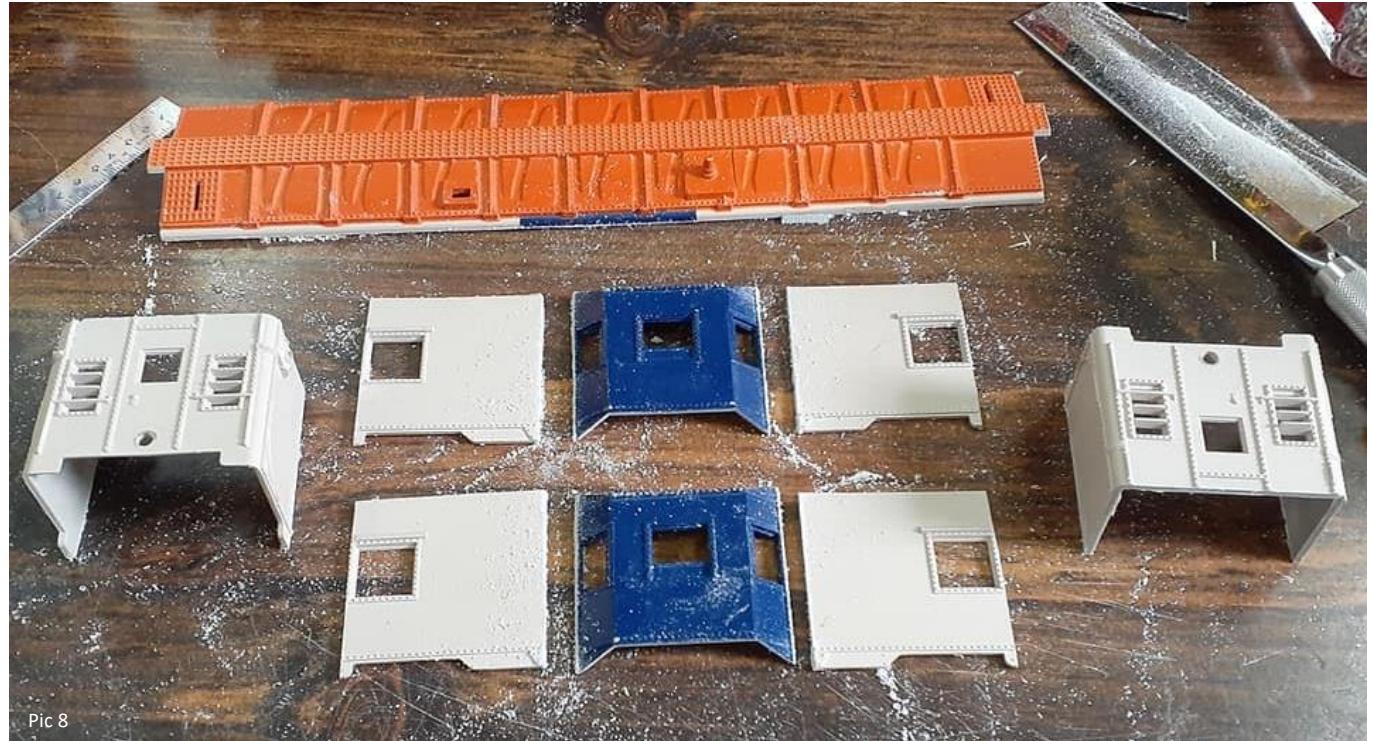
Pic 6

(Pic 6) The ends of the body are cut off.



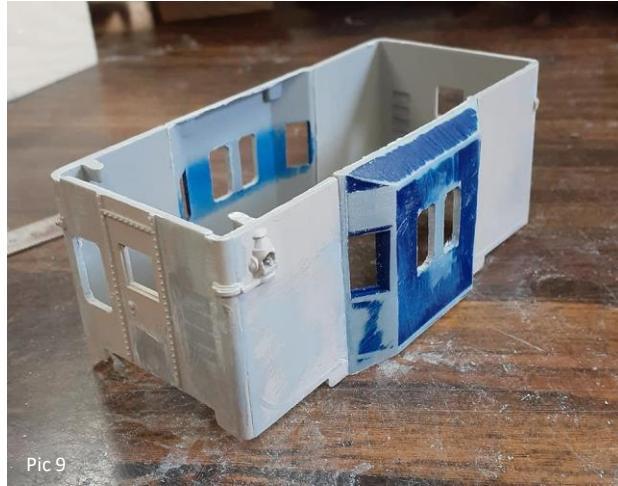
Pic 7

(Pic 7) In this photo you can see how pieces of crop material are used to join the frame sections together. At this point, everything is secured with Crazy Glue. After I was sure that the frame was in alignment, I coated the frame joints with JB Weld.



Pic 8

(Pic 8) The remainder of extraneous material is cut off the body.



Pic 9

(Pic 9) The ends of the body are joined to the bay window sections using Crazy Glue.



Pic 10

(Pic 10) Broadside view of the modified body. The center window of the bay was filed larger and a piece of Plastruct sheeting was added to the center of the window to make the dual windows.



Pic 11

(Pic 11) Body is test fit to the frame.



Pic 12

(Pic 12) The original step ends are used. A piece of Plastruct sheet is used to join the step ends to the body. After that process is complete, Plastruct angle iron is used to construct the "porch" railings. Plastruct channel is used to construct the bracing around the brake wheel. Take note that the body is notched out to allow it to fit over the upright leg of the frame. The window on the left side of the body was filed out larger while the window on the right side was puttied over.



Pic 13

(Pic 13) Flat Plastruct was used for the "X" bracing on the porch railing. Next the roof was cut from Plastruct styrene sheeting.



Pic 14



Pic 15

(Pic 14) Plastruct angle iron used for the supports on the four corners of the roof.

(Pic 15) I Crazy Glued floral wire to both ends of the roof for the rail gutters. The air reservoir was purchased on eBay .



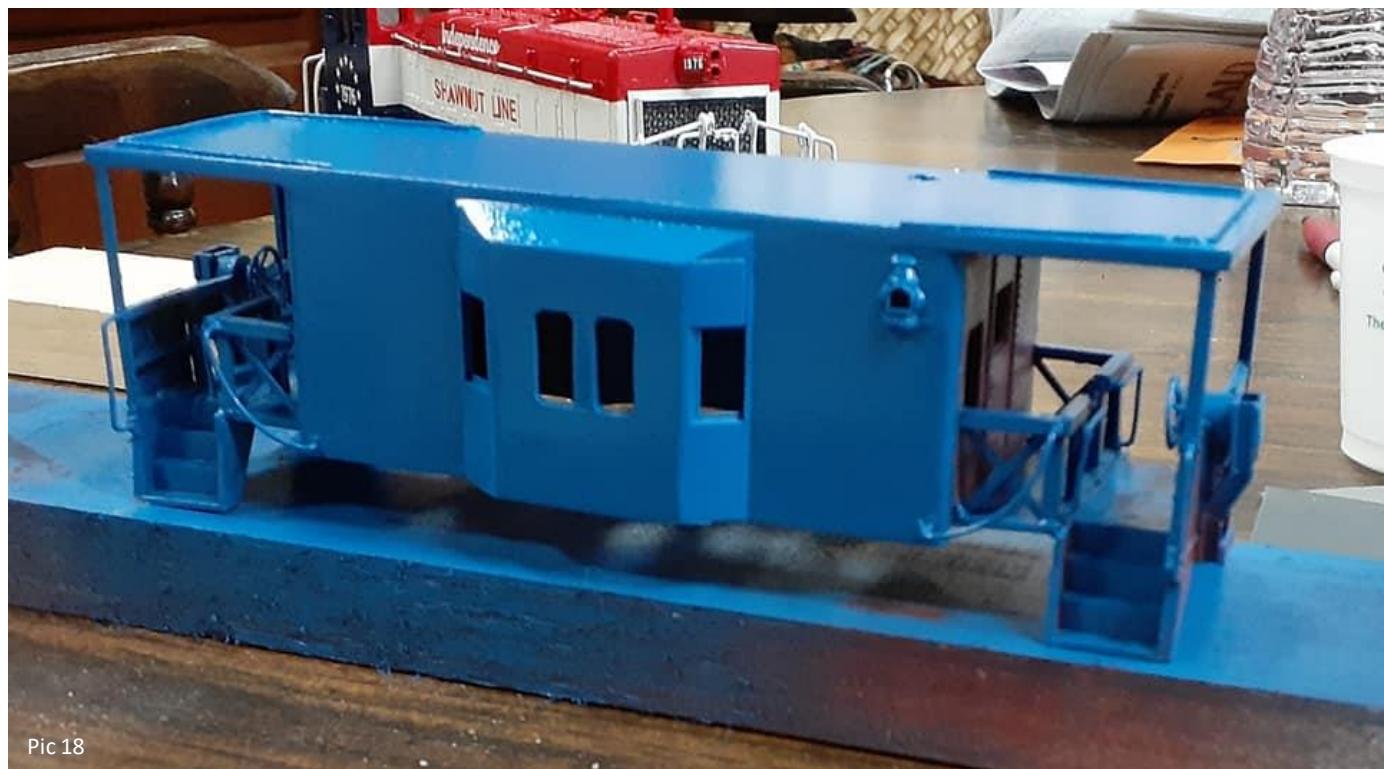
Pic 16

(Pic 16) Plastruct sheeting was used for the solid sections of the railing ends. The disc was cut from the same material. Quarter inch Plastruct angle iron is glued to the underside of the caboose frame, both for additional strength and appearance. The molded on railings were all filed off and I made new railings out of floral wire.



(Pic 17) A coat of red oxide surfacer was used to prime the piece.

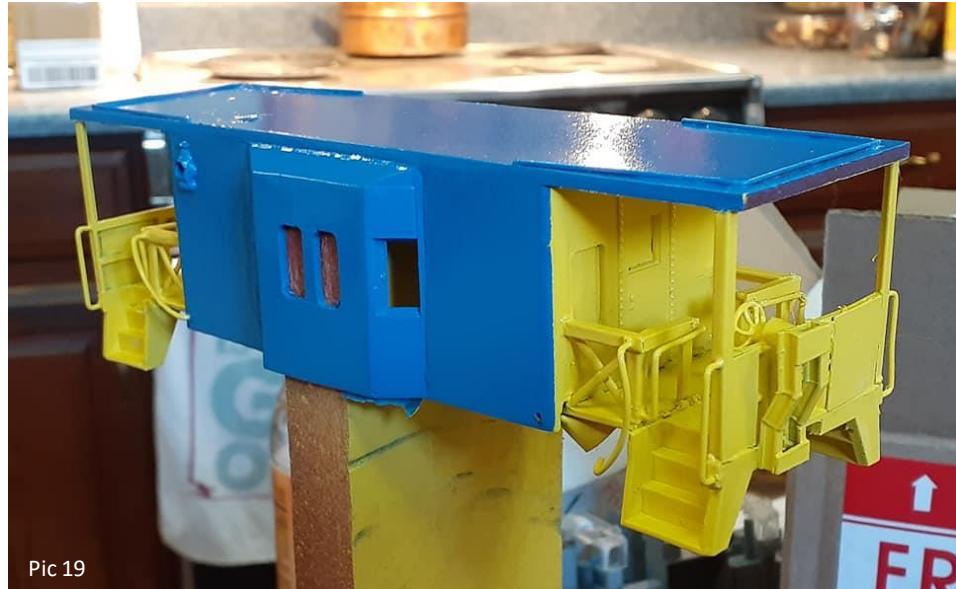
Pic 17



Pic 18

(Pic 18) Scalecoat Conrail Blue was the first color to go on.

(Pic 19) After three day of drying time, the blue was masked off with painter's tape and then the yellow (Rust-Oleum Painter's Touch Sun Yellow) was applied.



Pic 19



Pic 20

(Pic 20) Next, the decals.

(Pic 21) The finished product. I should also mention that I painted fine blue lines across the white decals to give them the stenciled look.

Pic 21



What's on the Bench

Steel Mill Modeling, 3D Printing, and you! by Benjamin Bair

Steel mill modeling is unique. It is just popular enough that some models exist of rolling stock and buildings, but each steel company and mill have specific equipment, facilities, and details that are too numerous for any company to mass produce (in addition to the price tag most models carry). Scratch building is one answer to this, but there are still some limitations for all but the most experienced modelers. 3D printing adds a new tool to the workbench, allowing for quick, repeatable production of models -- whether it is a yard office, railcar, detail parts, your childhood home, or a prop from your favorite movie to add a fun 'easter egg' to your layout. Hopefully this article will provide a decent primer if you're considering getting a printer or know someone who can print things for you and give your mill an extra layer of detail.



Hot metal cars. The black and red car is based off of an Edgar Thomson Works prototype

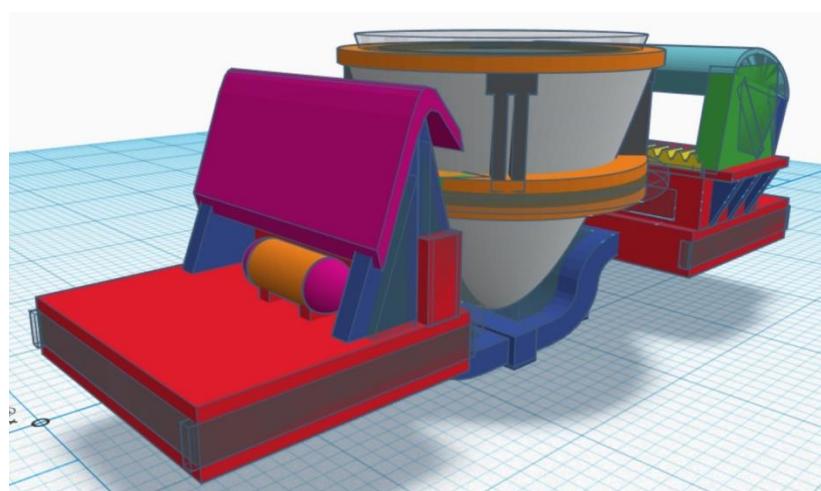
My interest in 3D printing started when I realized how just how few N scale steel mill cars are on the market. There are a few metal ones for sale, which is far better than nothing, but the Pittsburgh area equipment I wanted to see on my Union Railroad layout is not represented specifically. They also tend to be relatively expensive. 3D printing has allowed me to create just about any mill railcar I can think of, as well as specific structures and details that are otherwise obscure or non-existent. All I need is a reference photo, and in a couple of days I have it running on the rails. After the initial investment for the printer (about the same as a new DCC/sound equipped locomotive), most of the cost of printing railcars comes from the wheels, trucks, couplers. The amount of printed material is less than a dollar per car.

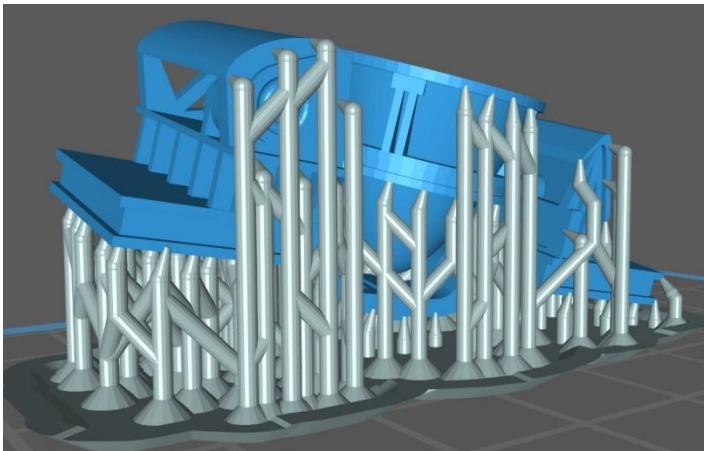
So how exactly does 3D printing work?

Step 1: Digital blueprint

First, you must have a 3D digital file shaped exactly like the object to be printed. This is the 'blueprint' for the object and can be downloaded from the internet or designed specifically for your project. Many user friendly and free design tools exist.

(Right) 3D digital model, 'blue print' of the model





Step 2: Prepare to print

Once the 3D digital file is designed or downloaded into an .STL file type, it must be prepared for printing in a software program. This is done by orienting the model, adding supports to make sure printing goes smoothly, and then saving that newly supported 3D digital file in a format the printer can read and print.

3D digital model prepared for printing. This is what physically printed, the supports are removed after. The model must be angled to minimize deformation during printing.



The progression of slag cars from fresh off of the printer to painted and weathered

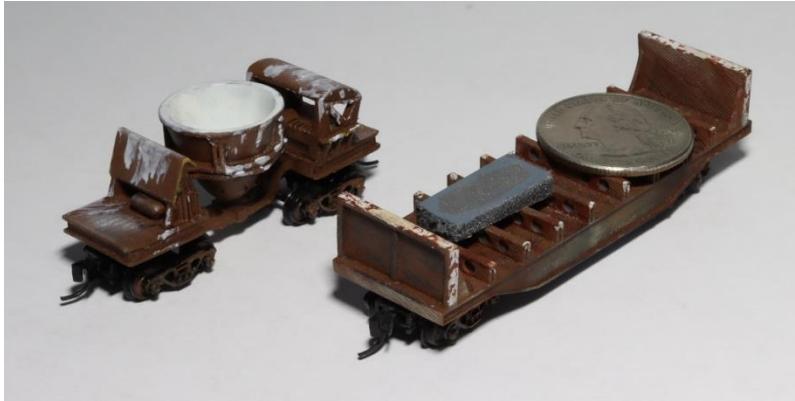
Step 3: Print and process

The file is given to the printer; if all goes well, within a few hours the 3D digital file that was on your computer will now be on your workbench. Once the supports are removed and cleaned up, the model can be painted and weathered like any other.

Now that we know the overall workflow process, there are two different types of printer available. Both kinds perform the same process listed above in their own way, and an entry level printer costs about the same as a new locomotive with DCC and sound installed.

The more common type of printer is called Filament, also referred to as FDM. It feeds a spool of plastic filament and melts it just enough to lay a bead which quickly solidifies. Unfortunately, this process also leaves an almost corrugated texture which may or may not bother some modelers. It has many practical applications outside of modeling as well, such as small household items, due to the large build volume and strong parts it produces (I have an FDM printed air intake on my car). For modeling it is great for making large buildings, especially blast furnaces and other large mill structures that may have tricky geometry. It may not replace scratch building entirely, but it can still make scratch building go a lot smoother. It is good for large N scale structures, and any kind of model in HO scale and up.

The other kind, which I am experienced with, is called Resin, also referred to as SLA. It is more complicated than Filament, but it basically works by solidifying liquid resin with a UV light screen. The parts have a smooth finish, which makes even the smallest detail parts possible; and multiple parts can be printed all at once, saving time. Currently the build volume available on most Resin printers is small and limited to about two N scale freight cars at a time, although it is possible to split a larger model into a kit with multiple prints. The technology has only been around about 5 years, so there will be major improvements sooner than later. It is good for any kind of model in N scale and up but limited to printing smaller items or pieces.

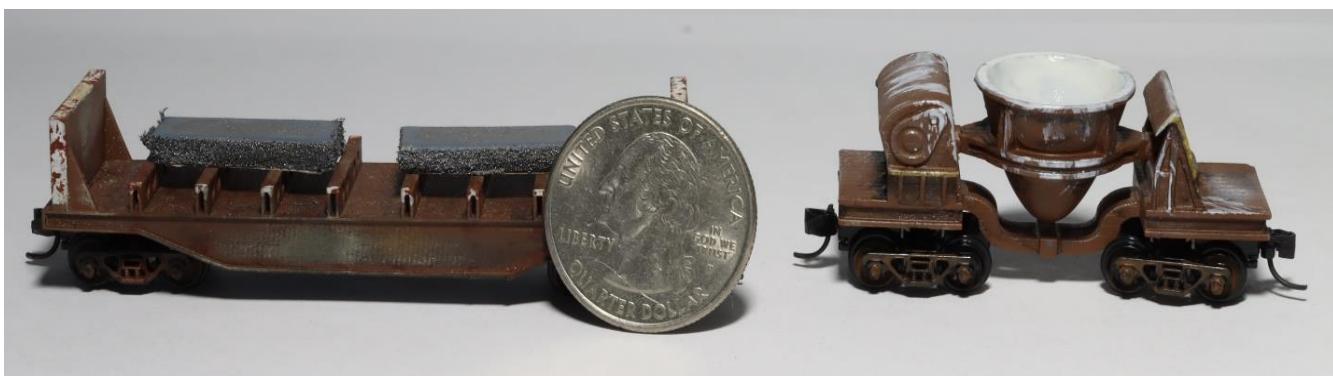


Slag car and Slab car. Metal slab is a pinewood derby car weight.

As with any modeling method, there are some modeling considerations to 3D printing in addition to the texture of Filament and small build volume of Resin. A lot of specific steel mill models will likely have to be custom designed, and not everyone has the time or interest to learn how to use a design program. Very fine details, such as grab irons, horns, and similar pieces typically do not print well, it is still best to get metal ones and apply those separately. Although, for Resin printing at least, I have been able to achieve N scale bricks, doorknobs, and even the reptile texture of an alligator!

The printers may also have gremlins appear out of nowhere, ruining a print and wasting hours and material. Additionally, Resin is considered hazardous and requires additional washing and curing equipment and processes. This curing also results in warping, which can be unsightly and best and cause dimensional tolerance issues at worst. It is also a very light material so most cars will have to be weighted after the fact.

There is a large 3D printing community online to help troubleshoot issues, but it may not be worth the effort for some modelers to have to maintain the printer at random intervals. Going all in and purchasing a printer, material, and learning how to do it all and do it well can be daunting. However, for those with the ability to get invested in it, it is totally worth it to add that extra layer of detail and signature look to your mill or layout. And for those who don't get one for themselves, there is a growing number of fellow modelers who can always print it for you!



Slag car and slab car. Metal slab is a pinewood derby car weight.



Slag cars. One benefit of 3D printing is repeatable production. Metal slab is a pinewood derby car weight.



The hole in the Slab car is sized to fit an assembled pin of a Micro Trains truck. Braced to minimize warping and give space for adding weights if desired.



I couldn't find a caboose for my US Steel engine, so I made my own



3D printed caboose and a Bluford Shops caboose.



(Above) Some scrap ladies and their transfer car. Ladle based on a Chicago area prototype; transfer car is freelanced. Painted and weathered by Scott Wahl on his N scale Bethlehem Steel layout. Photo courtesy of Scott.



(Left) Some non-steel mill 3D prints. Gators were sourced from the internet. Pardon my amateur painting skills.

Lineside was a quarterly newsletter focused on many different industries not just steel mills. The articles that were about steel mills helped many modelers and help people to understand how the steel making process worked.

After receiving permission from Stan Knotts and John Teichmoeller, a few of these steel mill related article will be featured in issues of The Mill. Some of these articles maybe obsolete from the technology that we have today but there are great article none the less. These articles are photo copied from past issues. Thanks John and Stan for allowing these to be shared. Original article by Phil Baggley.

Lineside

The Iron and Steel Industry. Part 3

By Phil Baggley.

(Editors note: Figure 4 from the previous article appears at the end of this article). Having discussed typical arrangements of blast furnace plant, it is time to make a more detailed examination of the equipment which constitutes the blast furnace. A study of what might be called the ancillary equipment. Stoves, gas washers/dust catchers, stock bins, etc. will follow later. For the moment, the structure which constitutes the blast furnace in its basic form will be the focus of attention.

Figure 1 is the arrangement of "A" furnace, Republic Steel Company, Wharton, NJ. A small section of the site plan has been reproduced to illustrate the local area. Refer to page 9 of "Lineside" Vol. 1 No. 4 for a more complete overview of the site. Try to match the equipment marked in the arrangement with its outline on the plan. Try to imagine the flow of materials through the usual production cycle.

Limestone, iron ore, and coke stored in the stock bins, discharged through bottom doors into the self propelled scale car in measured amounts. Note the grizzly screens drawn to the left of the scale car. These screen coke to remove smaller particles (coke breeze) which may be recycled later at the sinter plant. The raw materials drop into one of two waiting skips, below. The laden skip is rope hauled to the top of the furnace while the empty skip is lowered. The configuration of the skip tracks at the top of the furnace automatically causes the skip to tip and empty the load on to the small bell via the distributor. As its name implies, the distributor spreads the materials in regular fashion around the small bell; of vital importance for satisfactory furnace operation. The sequential lowering of the small bell and large bell to ensure gas tight charging of the materials into the furnace is self evident.

From hereon, furnace operation is of little consequence to those planning to build a model. It may be useful to observe however that molten iron and the slag which floats upon it are drawn off at regular intervals. They exit the furnace through separate holes and flow through separate channels to the respective iron and slag cars

positioned beside and below the level of the cast house floor.

Notice how rail borne traffic of raw materials and molten iron and slag is designed to be handled on different sides of the furnace.

Quite apart from the fact that I had little choice but to base this study around the Republic Steel Co. furnace, it suits our purposes remarkably well. In comparison with other furnaces, it exhibits modest proportions. The overall height is about 148 ft above the (hot metal car) tracks; equivalent to about 20 1/2" in HO scale. For some models, therefore, a scale model is a realistic proposition. One must not overlook the area that a scale sized model would consume when ancillary equipment is taken into account.

The Furnace Structure

The Stack Casing. The general practice was to encase the furnace stack in a mild steel shell securely fastened to the lintel plate. The lintel was fixed to the upper ends of very robust cast iron columns firmly entrenched in a substantial concrete foundation. The structure had to be strong enough to carry the weight of the charging gear and upper structure. It had to support the skip hoist framework and withstand wind forces. The mild steel bosh casing was suspended from the lintel plate and is water cooled. In some parts of the USA, water spraying on the outside of the bosh casing is used. This has been found insufficient in furnaces making a large tonnage and the general practice is to use copper cooling plates.

The method of construction of the stack casing at Republic Steel is not known. It is likely to have been similar to that shown in Fig. 2 showing details from the Park Gate Works in England. Horizontal seams were lap jointed with the upper ring slipping in to that below it to protect the joints from the effects of internal acidic moisture. It was found by experience that the joints immediately above the lintel had a tendency to burst open so the lap joint construction was replaced by strong butt straps forming a continuous belt around the furnace. The vertical straps are butt jointed covered with butt straps.

Lineside

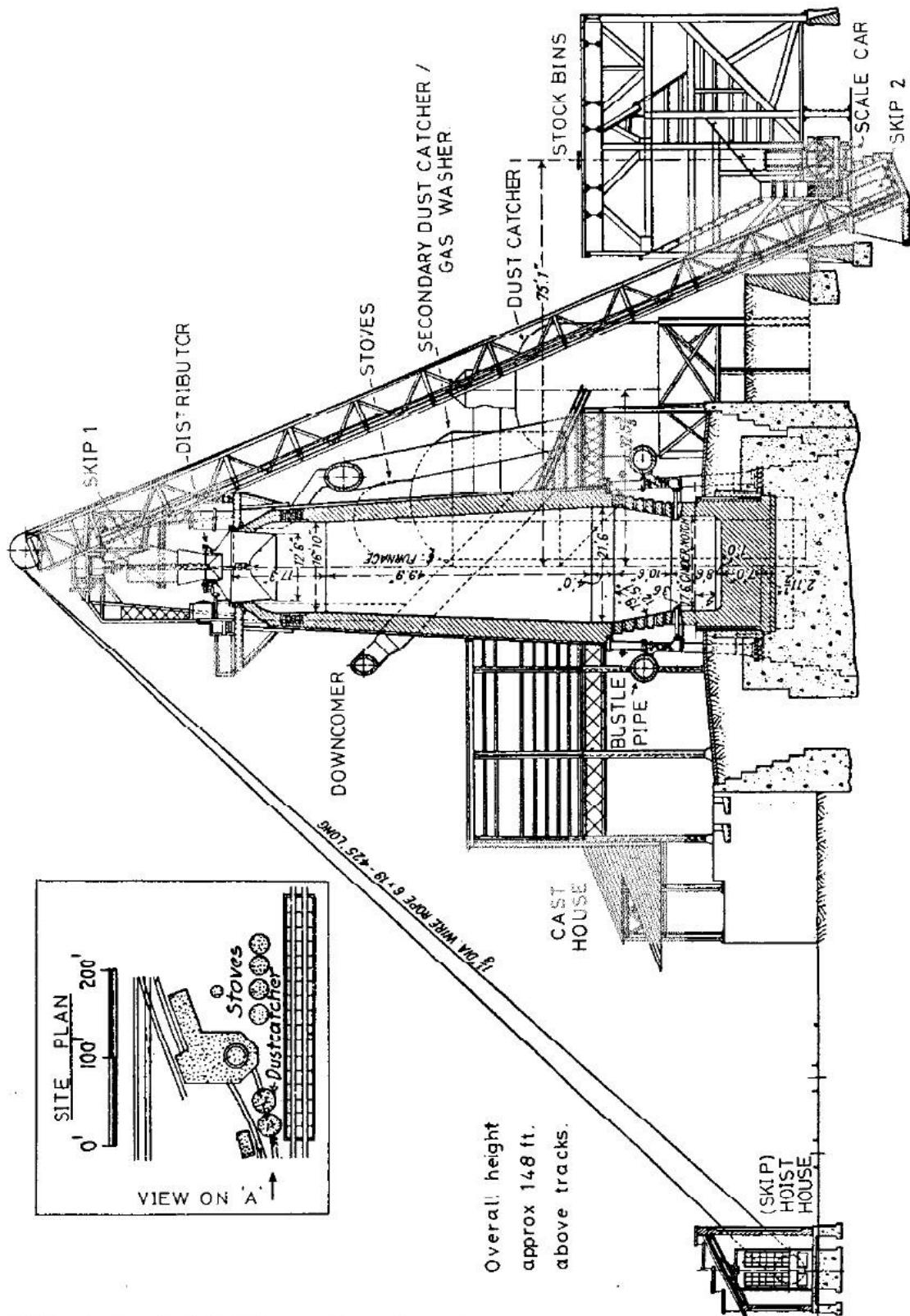


Fig. 1 ARRANGEMENT OF "A" FURNACE, RELOGLE STEEL CO., WHARTON, N.J., U.S.A.

Lineside

Styrene sheet would be a good choice for modeling the stack casing. Rivet impressions are fairly straightforward. It wouldn't be necessary to cut and fit each individual plate - joints could be scribed. An old modeling trick for indenting rows of rivets is to use a small metal gear wheel from a clock mechanism mounted on a slotted plastic rod - bicycle wheel fashion. With a straightedge as a guide, run the wheel back and forth along the styrene punching the raised rivet heads through to the reverse side; instant rivets.

The Bosh and Hearth. Fig. 3 illustrates the construction at Replogle Steel. Drawings of a bosh cooler and a hearth cooler from the Algoma Works in Canada have been included. Replogle's would have been very similar. Study the two sections to see how the coolers were built into the bosh. From the outside the appearance of the bosh was a series of stepped mild steel rings accommodating a pattern of coolers, all linked by pipes as in Fig. 4. This is enough detail and complexity to tax all but the diehards amongst us. Fig. 4 shows the water cooled tuyeres piping through which the hot blast was directed into the hearth. Each of the 12 tuyeres was connected to the annular bustle pipe via couplings which could be dismantled to allow tuyere maintenance.

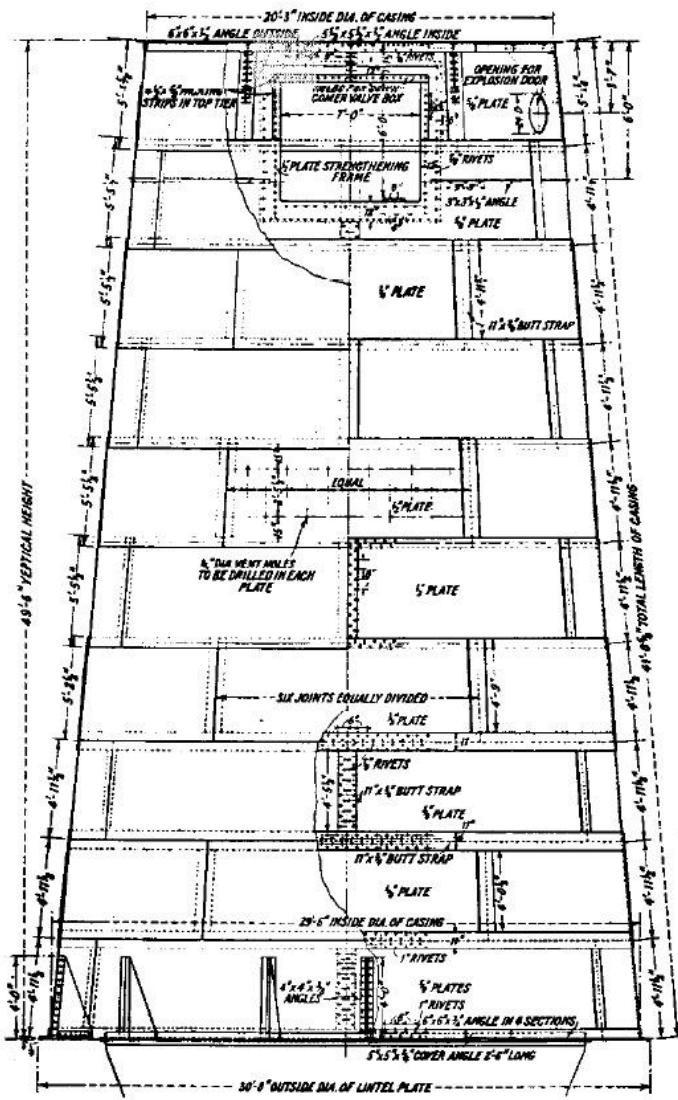


FIG. 2.—NO. 3 FURNACE CASING DETAILS AT PARK GATE WORKS.

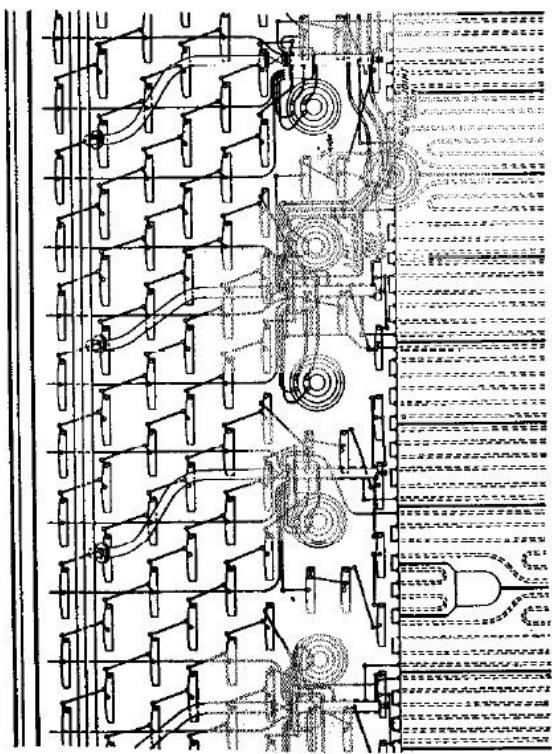


FIG. 4.—COOLING PIPE ARRANGEMENT AT REPROGLE STEEL CO.

Lineside

Note in Fig. 3 that the stack casing is riveted to, and rests on the lintel plate, a pair of substantial annular steel rings firmly fixed to the eight cast iron columns. The columns are tapered and tubular but very heavy H section columns were commonplace.

Well maintained furnace base areas might receive an overall wash of aluminum reflective paint, but the rigors of operating in such a volatile, dirty environment meant that a liberal coating of grime, dirt and rust would be appropriate. A well

detailed model furnace will require a lot of time spent in this area. Modelers wishing to take a short cut would be advised to make as much use of corrugated siding or similar materials to enclose and shield from view the cast house floor and base of the furnace. There are no equivalent short cuts available when the furnace top and attendant skip hoist structure has to be modeled. That is the subject of the next part.

Phil Bagley.

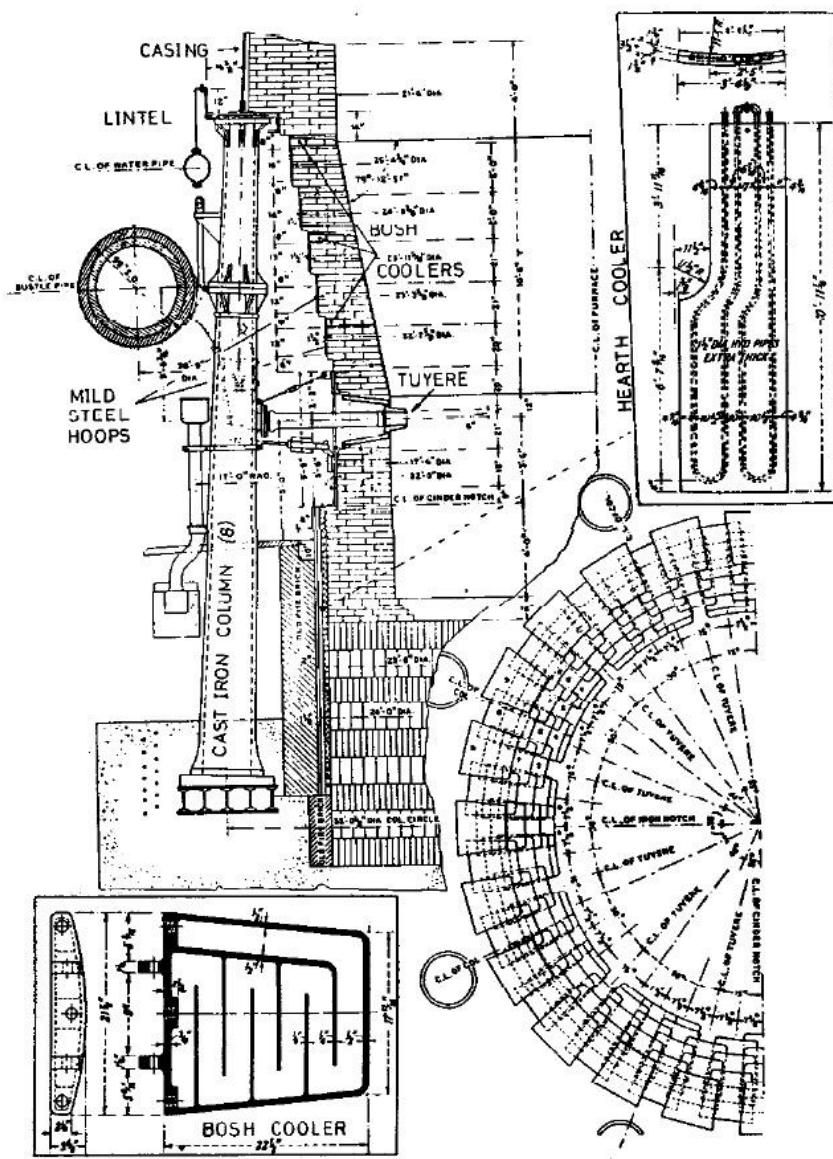


FIG. 3 —HEARTH AND BOSH OF FURNACES AT REPLOGLE STEEL CO.

Lineside

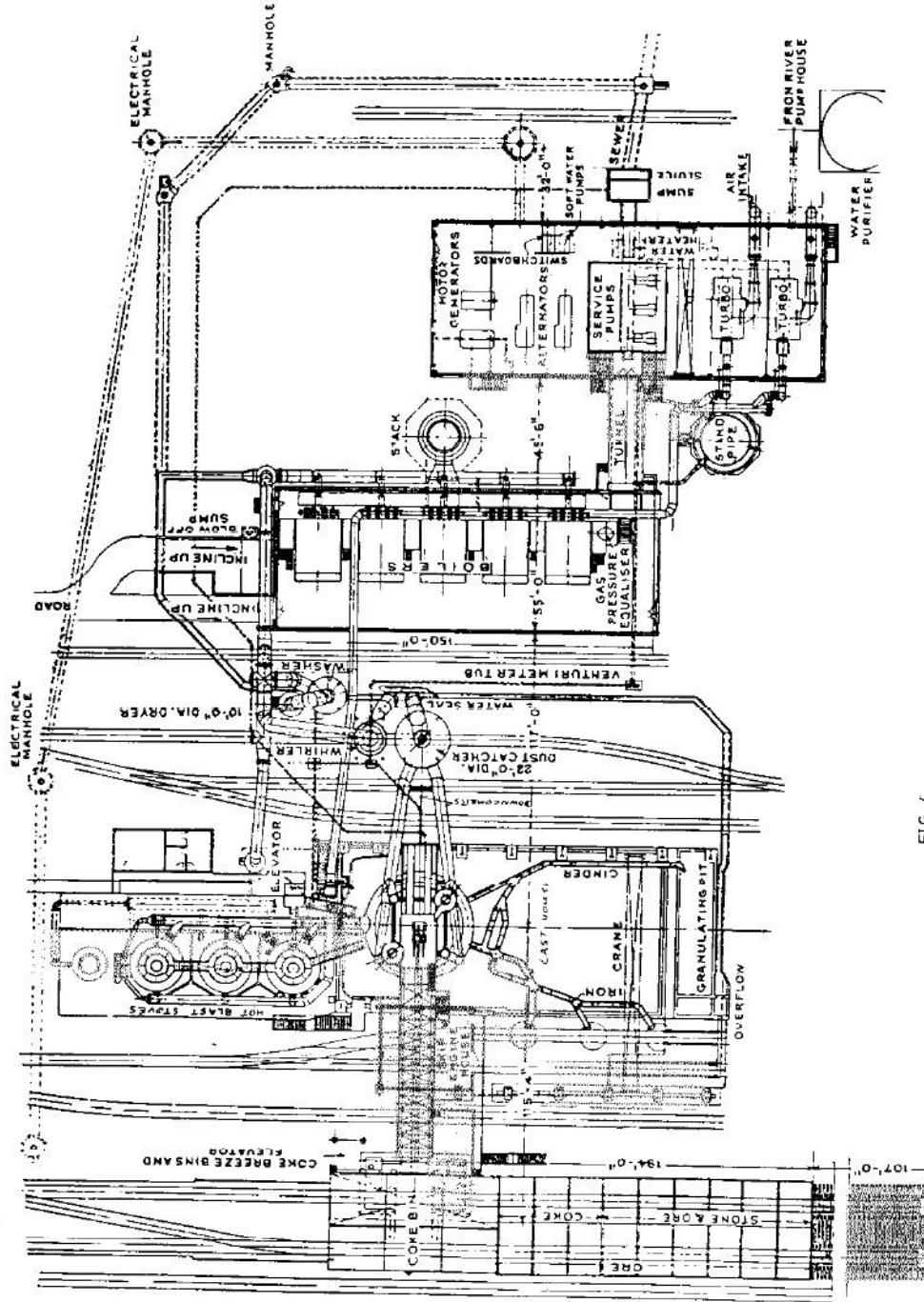


FIG. 4
PLAN OF TRUMBULL CLIFFS FURNACE CO. PLANT.

Figure 4 from Part II, previous issue

A Steel Mill Holiday Story

Article by Franklin Forge and Gear

Pictures and Models by Tom Stewart

It was this past holiday when visiting a close family friend (possibly his last holiday season with us due to his advanced age) and observing all the COVID-19 guidelines, I was told a tale of incredible proportions that would be the envy of any science fiction writer. This gentleman had been a photographer for a rather large steel mill corporation located in Buffalo NY. As a corporate photographer, with a lot of experience and "stripes", he had special access to some of the more classified projects being produced for the military and the different branches of government. He knew I was a steel mill modeler and would understand the terminology in his story. He also knew I like the study of history and the details that are associated with preserving it and doing so accurately. The story that he relayed to me that afternoon was hard to believe and made me extremely skeptical of its truth. He was difficult to understand since his voice was diminished due to his various ailments and age.

He was also on oxygen and with all the beeping and humming of the life support equipment I was only able to understand bits and pieces. I felt, at the time, the conveyance of this information was the mere rambling of a person that was losing his mental faculties. I asked him why he told me this incredible story and he replied that he knew he was fading fast and would soon be released of his oath of secrecy after he had passed on to the "Next Great Adventure". But in the end, he gave me a set of numbers. He made me write them down and read them back to him. It was only later when I was musing about what he told me that I remembered the slip of paper. The numbers he had given me looked to be actual modern-day GPS coordinates.

1/87 Turbo Encabulator by Multiscale Corporation

After he was "gone" I punched in the coordinates into my phone and followed them to a deep and lonely forest in upstate New York. I also located the landmarks that he had described in detail. After a little digging I recovered a medium sized metal box. The metal it was made of had strange properties. For its size it was light as a feather and exhibited no signs of rust at all. It was perfectly sealed and showed no signs of a seam or lid. It was a perfect cube with no imperfections. I waited until I got back to my hotel room to open it. I applied pressure to the location on the case, where he had directed me. It opened slowly and I realized it was vacuum sealed. A weird green light came on when the lid was opened. Inside there were a large number of documents and pictures. How they all were contained within such a small box like this, was amazing. The documents were composed of weird symbols and appeared to be some sort of code. I showed a close friend of mine, John Stamper, who said they were written in PigPen, a Masonic Language, which he knew because he was a recording scribe for his lodge.

What follows is a synopsis of one of the most obscure steel mill stories ever. A story that would have been lost to history if it had not been preserved and spoken about by one of the last known survivors of an incredible saga in American history.

In 1947 a few things happened that would leave an indelible mark on history. A "supposed" UFO crashed in Roswell New Mexico. Coincidentally, it was also known as the very start of Cold War. The news media and conspiracy theorists have had a field day through the years, discounting the militaries account of the events. As one knows; nothing has ever been proven of this accident. However, what was never released, was that the alien pilots survived and them and their craft were transported to Wright Patterson AFB near Dayton OH. The aliens were on a scientific expedition, from what we know as the Pegasus Galaxy. But the damage was such that it could not readily be repaired. The aliens had a directive that they were



not to interfere with the normal evolution of any life-forms that they came in contact. They were unable to contact their home world due to the damage and they never could pass as humans due to their exceptionally large heads and big eyes and gray skins. Their handlers nicknamed them "Grays". Their individual names were un-pronounceable, their handlers lovingly called them Click and Clack the alien bothers. Just two wild and crazy guys. The prospects of living in an airplane hangar the rest of their long lives did not enthuse them. So, they came to an agreement with the government that they would work with the scientist freely under the one condition that they would help build the equipment necessary to repair their ship; provided it was never used directly for military purposes against other Tau'ri on the planet. They were a peaceful race that had visited earth in ancient times and had kept close tabs on earth.



The "Grays" met with General Electric in early 1955 and started drafting plans for the type of material that would be needed to repair the hull of their ship. But the electronics needed to run and control the equipment was not available. They showed the scientists how to make a thing called a "chip". It could do the work of a thousand computers and tape machines. It could take the place of vacuum tubes. This could also help eventually get the Tau'ri civilization into space. After the electronics and this new thing call "polymers" were created, they started on the alloy steel for their spacecraft. This would take a special machine, everyone decided would be called a Turbo Encabulator". TE for short.

Traditional steel mill methods would not work with refining the ores and alloys needed to make the material for the craft. This metal was super lightweight and had to be formed with calculations of intense mathematical equations that even gave Albert Einstein fits. He was one of the guys that worked so closely with the aliens thatin fact.... they often referred to him as a relative.



Higgins Riggers in action Loading the Turbo Encabulator. Notice: Binocs every watchful eye in the background.

The mill chosen was located in Buffalo due to its expanse and its skilled craftsmen and rolling capabilities. The government also figured that anything going in or out would get "lost" in all the normal mill traffic. However, GE was unable to make the TE there. It had to be assembled at another plant and shipped to the un-named steel mill in Buffalo. GE had recently purchased an old factory complex in Elmira NY, The Hungerford Rocket Car Factory. They then turned it into a "Skunk Works" of sorts. They clandestinely dug out the clay dirt under the earth approximately 40 ft below the ground and had an extensive 24" gauge railroad connecting the various laboratories. They passed it off to the local as an experimental freight tunnel system. Final assembly would take place above the ground. But what was the Turbo Encabulator and why was it so crucial?



Decoy Equipment that made up part of the special move to throw off any un-authorized eyes.

It took a newly discovered element from ore only available to be mined in the South Pole on a small island called Elephant Island. The ore is called Unobtanium. Extremely rare. After it was refined in a furnace that looked like a traditional Bessemer Furnace. It had an object that looked like a "lance" where oxygen and argon were forced into the mix. Once done, it was poured directly into a special thing called a "Tundish" and then into a machine with a false bottom that created continuous slabs of metal, cut off with a thing that used a flame device called a Plasma Torch. The slab could then be rolled into the metal needed to repair the alien spacecraft. This is where the TE comes in. The rolling equipment needed, had to have a "Warp Drive" attached to it. The actual rolling engine was a huge Twin Tandem Compound Corliss Steam Engine type. The spacecraft needed a highly specialized warp for tensile strength to be driven into the alloy steel in order for the molecules to bond correctly. The documents referenced things called Quarks and something called "Dark Matter" A special "driver" was developed to put this warp into the alloys. The TE powered this driver by taking the by-product gas left over from the smelting of the Unobtanium and injecting it into the warp driver. This would "excite" the dilithium crystal screen located in the Venturi of the Warp Drive thus, creating the extreme pressure needed on the alloy to bond the Quarks and something called "Neutrinos" together.



This bond was tested by a piece of equipment called a "Tricorder" and was ran by a mill helper named Gene Roddenberry, who was absolutely fascinated by this equipment and the stories that the aliens would tell him during the maintenance times and coffee breaks. The stories would be about other cultures where people had pointy ears and believed logic ruled everything. They also talked about an animal called a "Tribble" and the trouble it could cause.

It took until 1965 to get the alloy rolled and the spacecraft repaired. But it was successful, and the aliens promised that they would be back. They enjoyed their time with the Tau'ri but were sad the City of Atlantis had

(Left) Heavy Guard for the delivery of the delivery of the Unobtanium at the processing site.

disappeared, and no one knew where it was. They said good times were to be "had" there. They were certain that Earth would eventually be admitted into the Federation of Planets and would explore the stars.

As mentioned at the beginning of this document there were a set of pictures. These were of the movement of the Turbo Encabulator from the Skunk Works to the mill in Buffalo. The TE had to be trucked to a secretive railroad siding due to the local railroad bridges not being able to take the weight. So, the new interstate (I86) was closed off and the TE was delivered to the siding via truck under a heavy escort. All the work was done in absolute secrecy and was done under pitch black conditions. The loading coincided with the dark of the moon on the 6th of June. The military unit protecting the TE was from just south of town and called themselves the FOO (Forward Operations Observers) Fighters. The civilian riggers were from Higgins Rigging out of Buffalo and the chief foreman was Carl Douglas. But for the work that took place that night:

Everybody was a Higgins Rigger. Those cats were fast as lightning, infact it was a little bit frightening. But they rigged it with expert timing. There was a chunky maintenance man, from just below Watertown. They were lifting things up; they were putting things down. It's an ancient rigging art where everybody knew their part, from a feint into a slip (knot) to a tie off of a clip. Everybody was from Higgins Rigging.

High security was the order of the night. Not seen in the pictures are the tanks, jeeps and various Men in Black that were on site to keep the prying eyes of the locals out and the spy's that might be concealed as well as any commie Pinkos that might want to interfere. There was a government man known only as Binoc due to the specially created eye pieces that he looked through in the dark to see objects as bright as daylight (**B**inary **I**onic **N**itrogenous **O**cular **C**omposites). He was always scanning the immediate area looking for heat signatures of other life signs, be it human or aliens that were trying to "derail" humanity advances into space. Fortunately, he did not see anything. Sometimes.... as the old saying goes.... Scanners Live in Vain.

The photographer was allowed to use BINOC technology to shoot in the dark. He had several special cameras and just happened to keep a couple rolls of film to be processed privately. I would not care to speculate on where he hid them when everyone involved was stripped searched when the job was done. No trace was to be left behind.

Alas, this was a story about a special black-ops deep in the Cold War that involved Aliens, G-Men, Military men, and an un-named steel mill, the South Buffalo RR, and lots of things that eventually came true. It is my sincerest hope that everyone that reads this had as much fun reading it as we did making the models and creating the story to go along with them. Sometimes we try to be so "prototypical" and trying to be the best at everything that we forget that steel mill modeling is fun and so should the stories that go with our models. Almost all of us played with Matchboxes and Hot Wheels as kids, and sometimes we should give ourselves a break and bring some of that innocence and magic back to our steel mills.

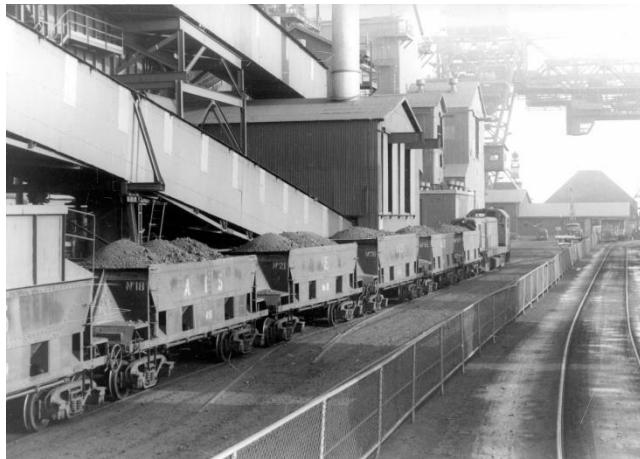


Final Assembly Building of the old Hungerford Rocket Car Complex



Around the Mill

By Bill Parkinson



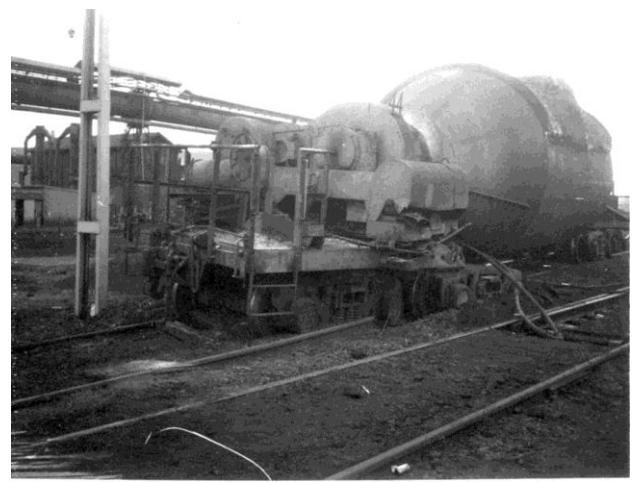
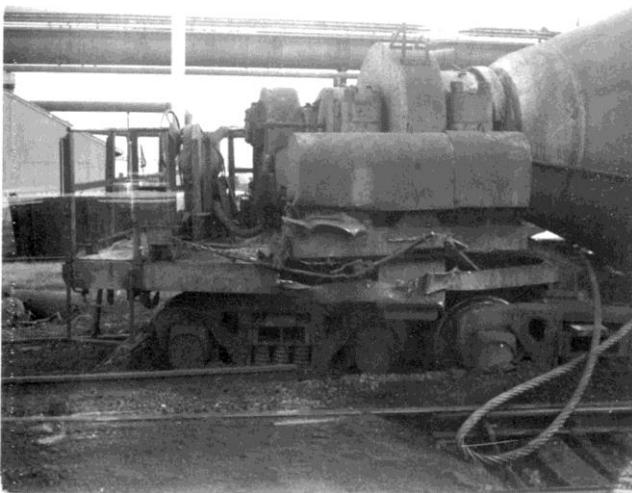
Port Kembla works of AIS. One of the company's locos loading sinter at the bins near the company's ore berth in the 1970's



Photo taken about 1960, D12 shunts two Treadwells at near new No.4 blast furnace. AIS works Port Kembla.



A recently assembled Pollock ladle is getting its refractory lining installed at the ladle shop back in the 1980's.



When loaded metal ladles derail they don't just derail, they tend to imitate gophers & dig themselves into the ground. This gives the rerailing crew a bit more stress as there is a time limit on their task due to the vehicle being full of molten iron. Here are a couple of shots of a Pollock ladle in distress. AIS works Port Kembla.



A bit more Pilbara history, the first loco to arrive for construction of the Hamersley line was this Alco S1. Affectionately called "Mabel". The Alco RSC3 was the second main line diesel loco on the NSW Government Railways, road No. 4002 & was purchased along with 4006 to construct the Cliffs Robe River iron ore line.

Both these locos are in operational condition at the Pilbara railway museum near Karartha on the Hamersley line.



The wagon shop boys attending to an errant diff dump car in the field with 30 crane lending a hand back in the 1980's.



Two of the company's coal locos loading out from one of two 2,000 ton bins at this location on the NSW South coast about 3 miles from the steelworks. D34 is wearing it's 3rd colour scheme & D51 is in the new blue colours after being purchased second hand from a Western Australian iron ore mining company.



D40 was normally used on coal haulage but one weekend was used on ingot transfer. Our valiant drivers somehow set it up so that when pushing an ingot rake into the stripper building they ran into the stripper tongs which must have been set just right to miss the engine canopy & exhaust but not the cab with the result shown. The cab was rebuilt but was never quite straight after the rebuild.



Back in the late 1980's a railfan tour was organised using AIS coal loco D34. The destination was the town of Kiama on the South coast of NSW, a well known tourist destination. Kiama is about 20 miles South of the steelworks. It is very rare to be able to photograph industrial locos heading a passenger train in a tourist area. here the train is leaving Bombo, the closest station to the sea in NSW on its return run.



A freshly painted AIS / BHP D19 shunts a pollock ladle near No.5 blast furnace back in the late 1990's.



The vessel is charged & the lance is in & blowing. AIS Port Kembla.



A look down shot of D19 back in the 1970's on a short rake of ingot buggies at the No.2 open hearth stripper building. No.2 open hearth building is the red one in the background & was one of the largest industrial buildings in Australia at the time. Now totally gone & is the site of No.6 blast furnace.



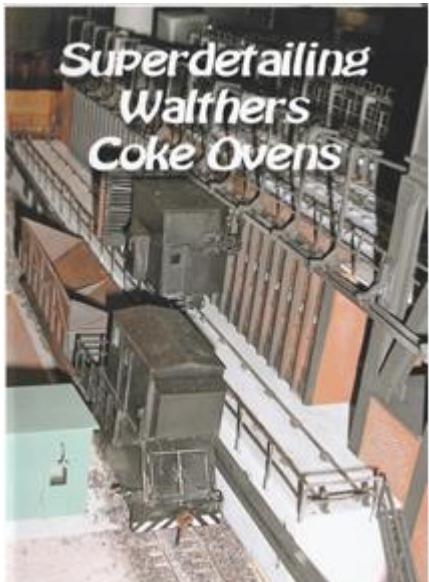
JL3 Helen Mary in the steelworks with 2 gondolas of coil scrap returning for recycling & a train of coils for processing. The Lysaghts plant is in the background.

Happy New Year

We at The Mill wish each and everyone to have a great and safe New Year with family and friends. We hope 2021 will be a great year for everyone.

Take Care, Stay Safe, Happy Modeling and God Bless each and everyone.

Jeff Borne's Super Detailing Walthers Coke Oven.



SUPERDETAILING WALTHERS COKE OVENS: The Walthers Coke Ovens is a great kit and the only one of its kind, but it is somewhat thin on some details, lacks some key components and is too small.

This video shows how to transform two Walthers kits into something approaching museum-quality. Tons of detail are added to the kits that includes lengthening them, walkways, handrails, trolley lines, ammonia liquor spray pipes, modified quench tower, quench locomotive, coke guide, door extractor, oven pusher, coal dumphouse, coke load-out, coke wharf and new smokestack. Finally the finished model is painted, weathered and mounted to the base with trackage.

The presenter is Jeff Borne, known for his heavy industry HO-scale layout "Columbia River Steel Corp."

Includes a self-starting CD-ROM "book" with 314 photos and a list of parts used in the project and a 100-page construction instructions (in PDF format). CD contents can be printed out. The video is two hours. \$24.95 + free shipping (in the United States only)

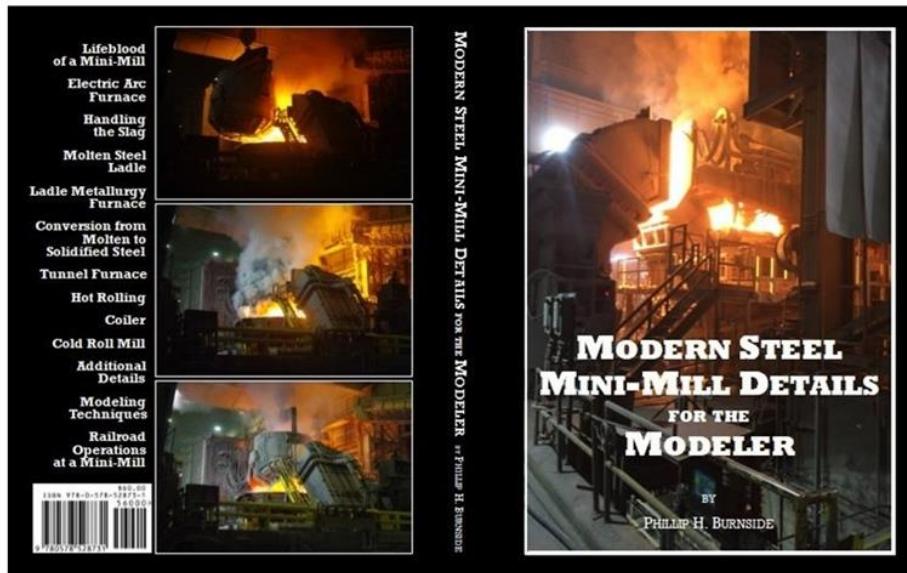
<http://www.prairie-works.com/steel-mill-modeling.html>

Concept Models Contemporary Models



Scale Kits for Modelers
<http://www.con-sys.com>





Modern Steel Mini-Mill Details for the Modeler

by
Phillip H. Burnside
phillipsfoundry@yahoo.com

What started as a chance encounter with a Nucor company executive led to an incredible opportunity for private tours to photograph the interior of a modern steel mill. Knowing that most visitors are not allowed to take photographs inside these mills, and with the assistance of Nucor, the author is sharing his experiences and newly-found knowledge by writing this book. With over 300 photographs, drawings and diagrams, this book explains the various steps and describes the equipment used in a modern steel mini-mill. It also illustrates the techniques used to build a model of the Nucor facility in Crawfordsville, Indiana.

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Ghost Rails XVII Steel Graveyards



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Ghost Rails XVII Steel Graveyards

United States Steel Ohio Works

Youngstown & Northern Railroad

North and South of the Mahoning River, The Railroad Complex

Youngstown, McDonald, Girard, Niles, DeForest Junction

Old Main Line B&O, Erie Canal Branch, PRR, P&Y, T&M, Touch of LE&E

Wayne A. Cole



Above: 1972 USS Open Hearth, the Teeming Platform, "Whiter" Cicatello First Steel Pourer, adjusting the Stopper, Joseph Cicatello
Left: Y&N AlCo 221, 1975 with Caboose 108 returns Extra from working USS McDonald to Ohio Works. Bud Puskarich

Volume 17 Steel Graveyards is an intense United States Steel Ohio Works history and its railroad the Youngstown and Northern. About 200 pages of the 292 page, 44 color pages, hardback, details the massive plant and its entire history. Emphasis is on the open hearth, Bessemer converter, and blast furnaces. The open hearth in particular is manifested with unique 1970 employee photos. Numerous maps and charts manifest layouts and production flow. The 5 mile Y&N linked the USS Ohio Works and the USS finishing mill at McDonald. Volume 17 has well over 500 first time photos and outstanding timelines!

About 1/3rd of the book covers the very complex railroad layout on the north and south side of the Mahoning River. I did not intend to cover in Volume 17, but the Y&N was built upon the Painesville and Youngstown narrow gauge; thus, one history led to another and I had to have a good geographical end and beginning. I could not have **ghost rail loose ends** so to speak. Consequently, old main line B&O is detailed, P&Y (the unknown T&M) from Youngstown to DeForest, Erie Railroad from near Girard to DeForest, the Canal Branch, connection to Ohio Works, PY&A near Niles, Mineral Ridge RR, Ohio Central, LE&E, streetcar lines in Niles area. All this lead me to cover briefly AM Byers, Republic Niles, and a handful of smaller blast furnaces in Girard Niles area. Volume 17 is complex and an exceptional first time history. DeForest operation OML B&O, P&Y and Erie covered in depth.

There are a handful of other Ghost Rails 9, 12, 13, 15, 16 plus some coil bounds as Y&A or Y&S Special Edition available; email if interested. Prefer: **Books can be paid via PayPal Family and Friend to wacole@hotmail.com. Or send a \$65 check for Volume 17 to: Colebooks, 1402 Seminole Circle, Beaver Falls, Pa. 15010 Add \$10 for priority. Price listed includes shipping**

Because of the virus only a small number were printed, and I may be a little slower on shipping.

Name _____

Brief note:

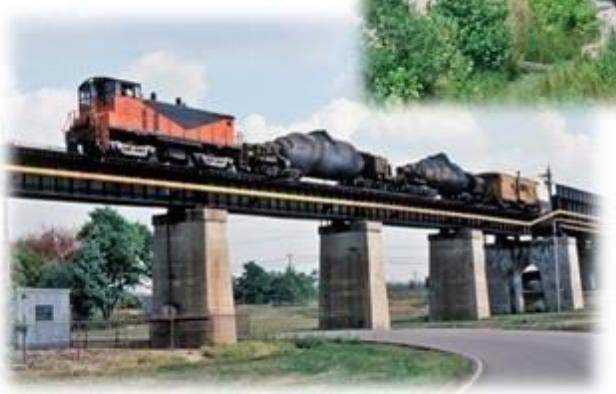
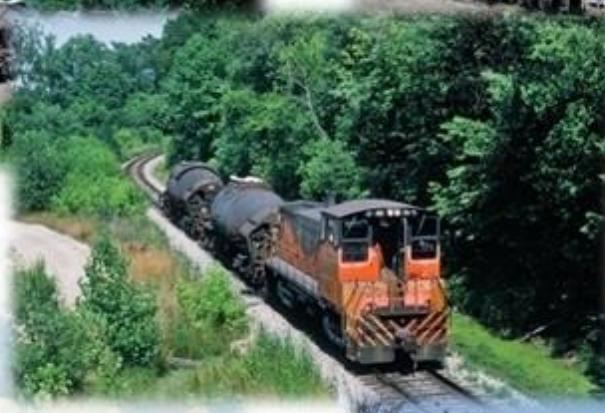
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Armco book in the works



Frank Sabo is currently writing a book on Armco Steel -AK Steel. He is looking for images of Armco locomotives both roster and action, rolling stock, and also photos of any of Armco's structures. These photos can be from any year or any plant. If you would like to make a photo contribution, please contact Frank by email. The book will be published by Morning Sun Books with a release date sometime in 2020. Frank Sabo can be contacted through his email SP_Lives@rocketmail.com or Facebook page. <https://www.facebook.com/frankie.sabo>





STEEL MILL MODELERS

A SPECIAL INTEREST GROUP (SIG) OF THE NATIONAL MODEL RAILROAD ASSOCIATION

MEMBER BENEFITS

- Priority registration for events.
- Annual Steel Mill Modelers Meet – The annual meet is held some time from mid-August through Labor Day weekend from Thursday evening through Sunday morning and features steel mill modeling clinics, layout tours and where possible prototype tours.
- Quarterly “Steel Mill Modelers Journal” – The journal serves as the official newsletter to members and contains articles and data that pertains’ to steel mill design, operations and modeling. Also featured are product releases and how to find information.
- Clinic Slides and Presentation Material – Presentations from the annual meet are available.
- Plant Directory – Have your layout listed in the steel mill plant directory. Use this directory to contact other modelers who have steel mill operations on their layout.
- Reference Exchange – Share blue prints, photos, reference materials, member designed and constructed unique steel mill features and details.
- Dean Freytag award – Be judged by your peers and earn this prestigious award at the annual meet for excellence in steel mill modeling.

DUES

- \$60.00 per year for US members
- \$75.00 per year for International members (the additional dues for international members barely covers the cost of postage to send out the Journal).

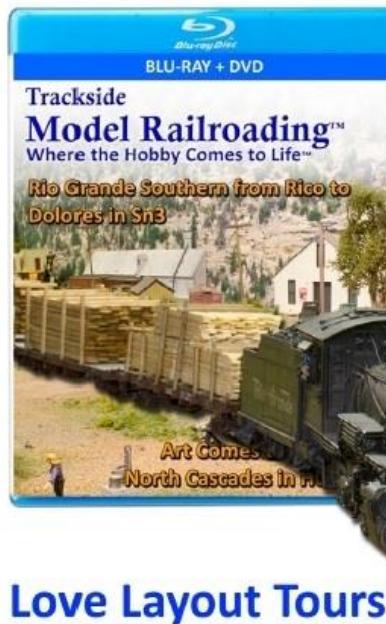
For more information on dues, member benefits, membership, and the annual meet please contact the [SMMSIG](#)

Trackside Model Railroading™

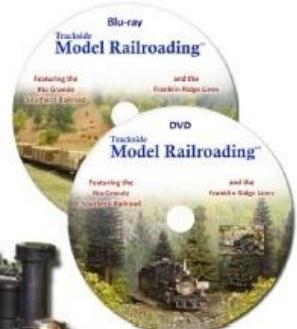
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From Woodinville, one leg of the wye headed west to Bothell, Kenmore, and Seattle, the second ran north to Snohomish, and the third

CB&Q formed the Burlington Northern, the route known locally as the "Eastside Beltline" was owned by the BN. As a concession of the Milwaukee Road was granted

ights over the former Northern line and used it to access its remote Bellingham, and Sumas operations to

the north. Unlike the BN, which operated mostly shorter locals on the line, Milwaukee ran long trains with six-axle GE's on a line that was never intended for such heavy service. Brian shared, "There are many reports that BN operators were shocked when they first learned that Milwaukee was running 80-plus car trains over the line. After Milwaukee abandoned its 'Lines West' in 1980, the line reverted to its branch line status." The Woodinville Subdivision passed to the BNSF after the BN/AT&SF merger in 1996.

Trackside Model Railroading™

Volume 7, Number 9

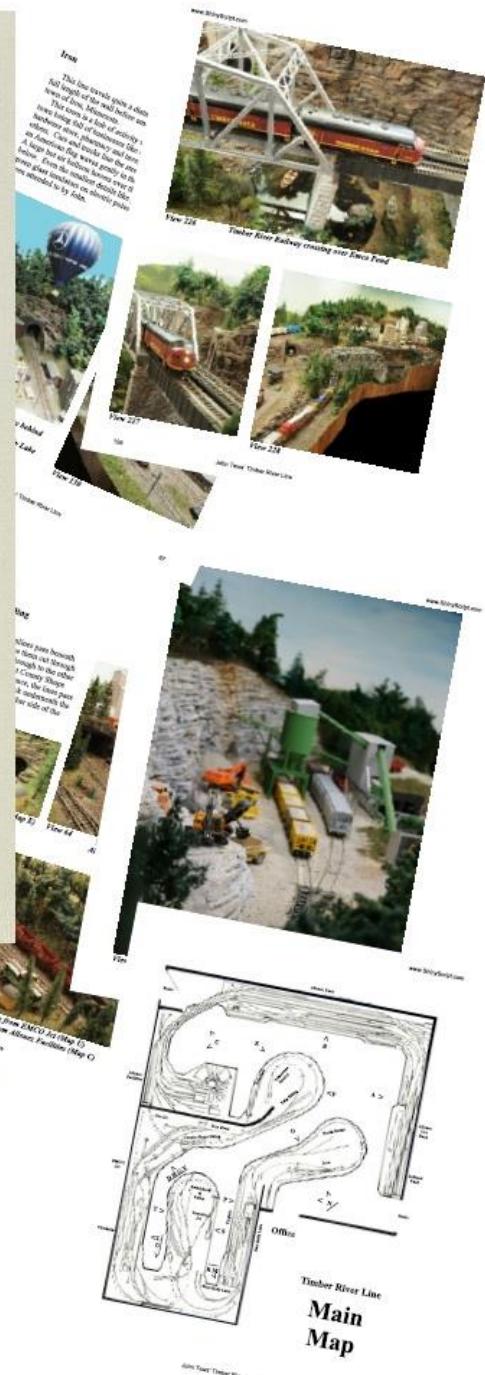
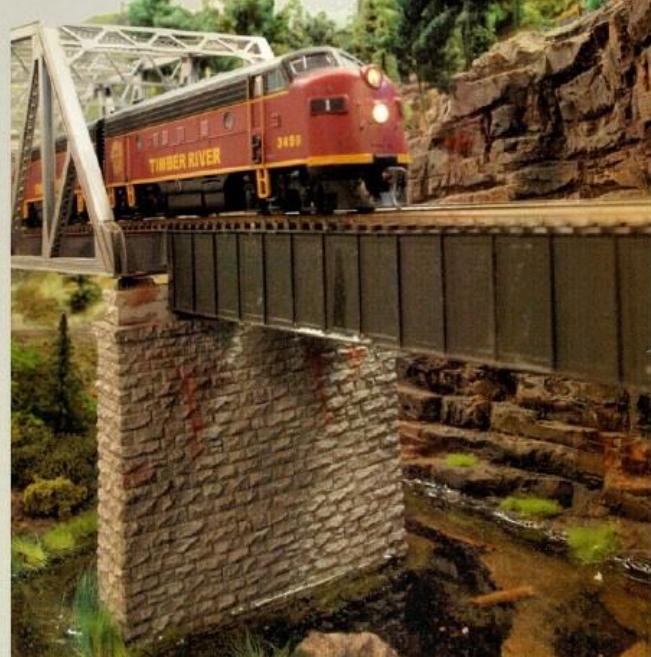
The image shows the front cover of the September 2019 issue of Trackside Model Railroading. The cover features a photograph of a green locomotive (number 1741) and grain cars on a track, with a small white car on a road nearby. The title "Trackside Model Railroading" is at the top, followed by "September 2019 Premium Edition". Below the title, there are several headlines: "Modeling the BN's Woodinville Sub in a Small Room in HO", "Roof Hatch Modifications for Grain Cars", and "HO Scale Shortline Works Through the Oil Crisis".



All Scale Rails

John Tews' Timber River Line

By Bonnie Domrois
Photos by Kevin Domrois & Bonnie Domrois



Take a trip on the Timber River Line and experience a visual tour of legendary Master Modeler John Tews' Timber River Line. 245 color photos show multiple industries including mines and logging and interchanges as the railroad moves the products back and forth. This being a fully operational railroad, every detail and movement is taken into account, mimicking full size railroads, along with innovations like John Tews' automatic model train hopper car unloader. This book also includes a biography on John Tews himself; both personal and his achievements within the industry, including Trainfest and how he grew it to one of the largest model railroad shows in the country. This book is destined to be a favorite and hold a permanent place in your collection.

Available:
Both in E-Book and Print
On our website in the Store

<http://allscalerails.com/>

Resources

Steel Mill Related Videos

Green Frog Productions

*Styrene The Ideals, Tips and Techniques of Dean Freytag.

PCN Tours

*Joy Mining Machinery

*ArcelorMittal Steel

Pentrex

*Eastern Kentucky Coal

Pelts Express

*C&NWs Iron Ore Route

*Duluth, Missabe & Iron Range Vol 1

*Duluth, Missabe & Iron Range Vol 2

*Lake Superior & Ishpeming Vol 1

*Lake Superior & Ishpeming Vol 2

*Bessemer & Lake Erie

*LTV Ore Lines

*Missabe T-Birds

*Missabe Rails

*Missabe Winter Vol 1

*Missabe Winter Vol 2

*North Shore Mining Railroad

*Ohio Rails and the Wheeling & Lake Erie

*Railroads & Ships of U.S. Steel

*Taconite Trains of Minnesota Vol 1

*Taconite Trains of Minnesota Vol 2

*Birmingham Southern

*Elgin Joliet & Eastern

*Tribute to the Erie Mining Ore Lines

*Twin Ports Trackside Vol 1 Duluth Minnesota

*Twin Ports Trackside Vol 2 Superior Wisconsin

Prairie Works

*Hot Metal

* Union Railroad

* On the Great Lakes

* Lake Superior Iron

* Missabe Retrospective

* Duluth, Missabe & Iron Range Steam Power

* Duluth, Missabe & Iron Range Depots & Structures

* Taconite Haulers

*USS Duluth Works - Photo Video

*Super detailing a Walthers Blast Furnace Part 1

*Super detailing a Walthers Blast Furnace Part 2

Model Railroader's Dream - Plan - Build

* Railroads and Steel

Videotrain

*The Union Railroad

Steel Mill Related Books

*Morning Sun Books

By Stephen Timko

Steel Mill Railroads in Color Vol #1

Steel Mill Railroads in Color Vol #2

Steel Mill Railroads in Color Vol #3

Steel Mill Railroads in Color Vol #4

Steel Mill Railroads in Color Vol #5

Steel Mill Railroads in Color Vol #6

Steel Mill Railroads in Color Vol #7

Appalachian Coal Mines and Railroad Vol#1

Appalachian Coal Mines and Railroad Vol#2

Appalachian Coal Mines and Railroad Vol#3

Industrial Railroading Vol#1

Industrial Railroading Vol#1

Union Railroad Power In Color

Steel Mill Railroad Facilities and Equipment (eBook)

By Robert Wilt

Bethlehem Steel Company Vol #1, Obtaining – Transporting Raw Material, and Making Iron

Bethlehem Steel Company Vol #2 Making Steel, Finished Product Handling, and the Final Years

By David C. Schauer

LS&I Vol #1

LS&I Vol #2

By Richard C. Borkowski Jr.

Union Railroad In Color

By Kurt Reisweber & Brad Esposito

Pittsburg & Shawmut

*Model Railroader

By Bernard Kempinski

The Model Railroader's Guild to Steel Mill

*The Railroad Press

By Nevin Sterling Yeakel

Bethlehem Steel

*Plastruct

By Dean Freytag

The Cyclopedia of Industrial Modeling

*Walthers

By Dean Freytag

The History of Making and Modeling of Steel

Phillip H. Burnside

Modeler Steel Mini-Mill Details for the Modeler

All Scale Rails

John Tews Timber River Railway

*Wayne Cole

Rails of Dream

Y&S New Galilee to Youngstown Lisbon and Ohio River at Smith Ferry, steam, electric, diesel,

Beaver Valley RR coil company

5th Street RR in Beaver

Ghost Rails I

10 RR local histories Ellwood City, New Castle, Leetonia, Sharon, Erie Niles Lisbon RR, E&P RR

Ghost Rails II Western Allegheny RR,

Rt 422 Lake Arthur to Bradys Bend popular bk Lots of West Pittsburgh, Cascade Park, Kaylor, Queen Junction, Route 422 to East Brady

Ghost Rails III Electrics

East Liverpool, Calcutta, Beaver, Salem, Rock Springs Park Chester, Steubenville, Leetonia

Ghost Rails IV Industrial Short Lines

5 local rr histories, Wampum, Koppel, Beaver Falls, New Castle, Sandy Lake Note This book has the Beaver Valley RR from steel mill perspective quite different from the other Beaver Valley RR book listed above. Covers early German Koppel Car Company.

Ghost Rails V PRR Butler,

Allegheny River to Butler USS Sintering Plant and steel mill sintering process

Ghost Rails VI Harmony Route

(Beaver Valley Traction included) Tons of very local history, popular bk Lots of Ellwood, New Castle, Koppel, Beaver Falls, Butler, Pittsburgh

Ghost Rails VII Short Line

Pittsburgh to Butler, other half of Harmony line history.

Ghost Rails VIII B&O Northern Sub

Butler, Foxburg, Marienville , Mt Jewett, K&K RR, Kinzua Bridge, a little Tionesta Valley, Kane

Ghost Rails IX State Line Legend

New Castle dynamite. Bessemer, P&LE Gateway yards, Sharon Steel Lowellville plant, critters, Narrow gauge, industrial limestone operations, Mt Jackson, Lowellville,

Ghost Rails X Iron Phantoms

Aliquippa and Southern J&L Very popular steel mill book. Just had a very limited reprint March 2018

Ghost Rails XI Shenango Valley Steel

New Castle to Sharon Sharon— tons of New Castle, history of Sharon Steel, Youngstown, Center Street, NS to Hubbard and Sharon. Good complex history!!

Ghost Rails XII Seamless B&W History

Beaver Falls, Ambridge, Koppel touch of National Electric, Armco, AM Byers, PRR Economy Branch. Good steel mill history Beaver Valley

Ghost Rails XIII Hilliards Branch

Butler County, and North Bessemer, Unity RR, Pa. Turnpike, PRR Plum Creek in Verona

Ghost Rails XIV Hallowed Ground

Conneaut Lake, Linesville, Meadville, Mercer, Cheswick and Harmar RR, B&LE history, Harwick Coal Mine and Pa. greatest coal mining disaster

Ghost Rails XV Monongahela

Connection RR, Pittsburgh J&L, extensive Pittsburgh history, Allegheny and South Side, PRR Whitehall Branch, B&O in Glenwood, sister book of Volume 10

Ghost Rails XVI Republic Steel Youngstown

Detailed history of Republics Steel Youngstown from 1850 to its demise in 1980s and the aftermath.

Keystone Driller history

industry in Beaver Falls, early well drilling, steam, diesel, electric

Youngstown and Southern / Pittsburgh Lisbon and Western

Special Edition to Dick Mumma last Y&S Superintendent, Coil bound, 75 pages / 26 color, new photo collection covers Ohio Central Y&S operation and Y&SE to 2018

Steel Mill Related Websites

Groups

*Steel Mill Modelers Special Interest Group

<http://www.smmsig.org/>

Facebook:

*Bessemer Subdivision

<https://www.facebook.com/groups/787429424621662/?fref=nt>

*Bessemer and Lake Erie Railroad Sightings Page

<https://www.facebook.com/groups/1029716723816394/>

*Birmingham Southern-Fairfield Southern

<https://www.facebook.com/groups/337021349697833/>

*BSRR/FSRR

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*Harrisburg Terminal Railroad

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*J&L Narrow Gauge Railroad

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*Munhall, Bessemer and Port Perry

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*New Boston Steel Mill and Coke Plant

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*Timber River Railway

<https://www.facebook.com/groups/1591376621172524/>

*The Splitrock Mining Company layout

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*U.S. Steel Duluth Works

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*Youngstown Steel Heritage

<https://www.facebook.com/SteelHeritage/>

Photographs

*2007 Steel Mill Modelers meet

http://www.pbase.com/jtunnel/2007_steele_modelers_meet&page=1

*Arthur's Albums and Images

<http://www.rmweb.co.uk/community/index.php?/gallery/member/6861-arthur/>

*Birmingham Rails

<http://www.bhamrails.info/>

*Rick Rowlands

<https://www.flickr.com/photos/33523379@N03/sets/>

*The Rust Jungle

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

Layouts:

*Acme Steel Riverdale BOF & Chicago BF Modeled in HO scale(1/87)

<http://www.trainweb.org/chicagosteel/index.htm>

*Bethlehem Steel Layout

<http://www.brokenbushandroundtop.com/bethlehemsteel/>

*Columbia River Steel Corporation

<http://www.prairie-works.com/crsc.html>

*Dave Scale Modeling

<http://daveayers.com/Modeling/Steel.htm>

*DK Recycling

<http://www.frankshuette.de/>

*Forsten Online

<http://www.stahlbahn.de/index.php>

*Harrisburg Terminal Railroad

<https://www.facebook.com/Harrisburg-Terminal-Railroad-271356453384157/>

*Pittsburgh and Western Railroad - Paul Lapointe

http://www.coaldivision.org/pittsburgh_and_western.html

*Pittsburgh, Youngstown & Ashtabula RR

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

*Stahlbahn

<http://www.stahlbahn.de/index.php>

*Republic of Train World

<http://trainworldcity.webs.com/apps/blog/show/43914314-the-trainworld-city-steel-works-and-duluth-works->

Blogs

*KV&O and D&D Mining & Steel

<http://doncsx.blogspot.com/>

*Musser Steel Mill

<http://mussersteelmill.blogspot.com/>

*The Mill

<https://steelindustray.blogspot.com/>

Hobby Shops

*Industrial Model Shop

<http://industrialmodelshop.com/>

*Joswood

<http://lasercut-shop.de/Joswood-Ltd>

*KenRay Models

<https://kenraymodels.com/>

*State Tool & Die

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

Yahoo Groups

*Harrisburg Terminal Railroad

<https://groups.yahoo.com/neo/groups/htrco/info>

*Steel

<https://groups.yahoo.com/neo/groups/steel/info>

Podcast

*A Modelers Life

<https://www.amodelerslife.com/>

*Model Railroad Hobbyist podcast

<http://model-railroad-hobbyist.com/podcast/episodes>

*The Roundhouse

<http://theroundhousepodcast.com/>

Manufactures

*Adair Shops

<http://adairshops.net/index.php>

*FireCat Designs

<http://www.firecatdesigns.com/home.html>

*Plastruct

<https://plastruct.com/>

*State Tool & Die

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

*Steel Mill Modelers Supply

<https://www.facebook.com/steelmodelerssupply/>

Museums

*Youngstown Steel Heritage

<http://www.todengine.org/>

Steel Mill Related Picture CDs

Prairie Works

<http://www.prairie-works.com/>

* Minnesota Iron & Steel

* Heavy Industry Postcards

* Coper & Nickel

* Tod Engine Project