Build a liquid-asphalt transfer terminal

This small-yet-busy HO scale industry will fit almost any modern layout

BY CLYDE B. MAYBEE JR.
PHOTOS BY THE AUTHOR

During a recent vacation I discovered a compact, modern trackside facility which makes an excellent, attention-getting railroad display model. On a roadside siding I saw a row of modern 54-foot insulated tank cars engulfed in steam, a lot of piping, and several tank trucks being loaded. This turned out to be a Total Distribution Services Inc. (TDSI) asphalt bulk-loading terminal in Apex, N. C. Within a fenced-in area, liquid asphalt was being heated in the rail tank cars and pumped directly into waiting tank trucks. Since the tank cars themselves are used for storage, space-consuming storage tanks aren't necessary.

A facility like this one will fit logically on almost any modern layout, as there are a number of industries and products that use liquid asphalt, including paving and roofing.

The asphalt business

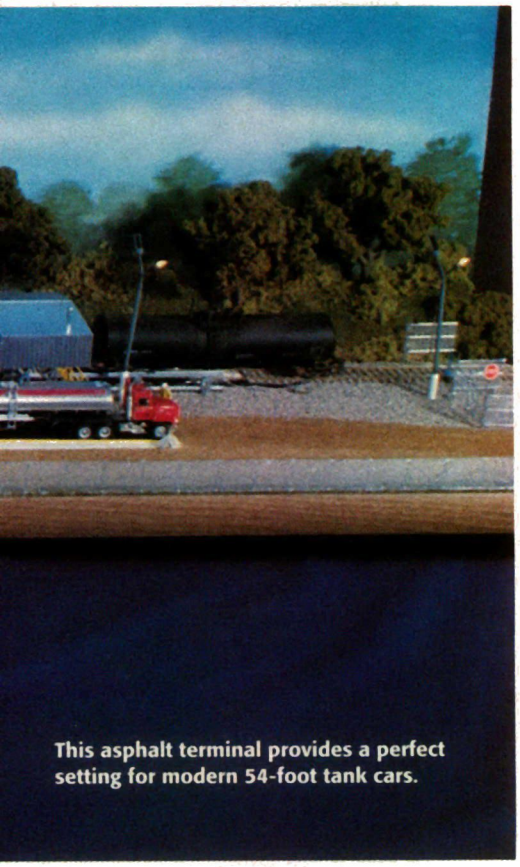
The operation begins when a train spots 54-foot tank cars filled with liquid asphalt at one of the loading stations. For efficiency the terminal is divided into two sections, each serving eight tank cars. The siding, with a switch at each end, has unloading stations for 16 tank cars. This operation can easily be modeled as a double-ended siding or a dead-end spur with room for any number of cars. The double-ended arrangement allows flexibility in switching cars from either end.

The insulated tank cars are equipped with external heating coils (external to the tank, but enclosed in the car's insulation), and as soon as they're spotted, workers connect the cars to the terminal's steam lines. The steam, which is generated by one of two boilers in the main building, travels through insulated pipes to connections on the bottom of each car.

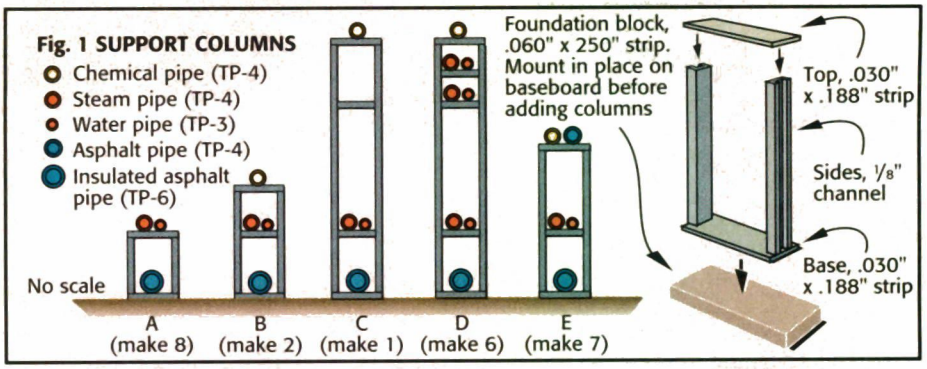
The steam heats the liquid asphalt enough to allow it to flow freely through insulated pipes, which are also connected to the bottom of each car. Employees may select any car and open its valve. This allows the asphalt to be pumped into a heat exchanger, which raises the temperature of the liquid to about 320 degrees. From there it flows to the loading dock and into a waiting asphalt tank truck. These 25-ton capacity trucks are weighed as they're loaded. Although liquid asphalt is a potentially dangerous, hot, gooey liquid, it is handled safely, efficiently, and cleanly. I marvel at the way the staff manages to keep the terminal so neat and clean. Employees wear protective clothing, helmets with face visors, and have water showers available for emergencies. The asphalt fumes are filtered both at the tank car top hatches and at the truck loading dock. The result is a very clean, neat facility, and a model should reflect that look.

These new transfer terminals represent the culmination of a 3-year effort between TDSI and an asphalt supplier. The company has designed and built asphalt terminals in Atlanta, and in Charlotte and Winston-Salem, N. C. In fact, this new asphalt transfer concept was so innovative that it won the 1990 Golden Freight Car Award from *Modern Railroads* magazine.

The Apex terminal is a busy place. During the summer months the terminal is open from 3 a.m. to 11 p.m. 5 days a week, and in the winter it operates from 5 a.m. to 5 p.m. 5 days a week.



This asphalt terminal provides a perfect setting for modern 54-foot tank cars.



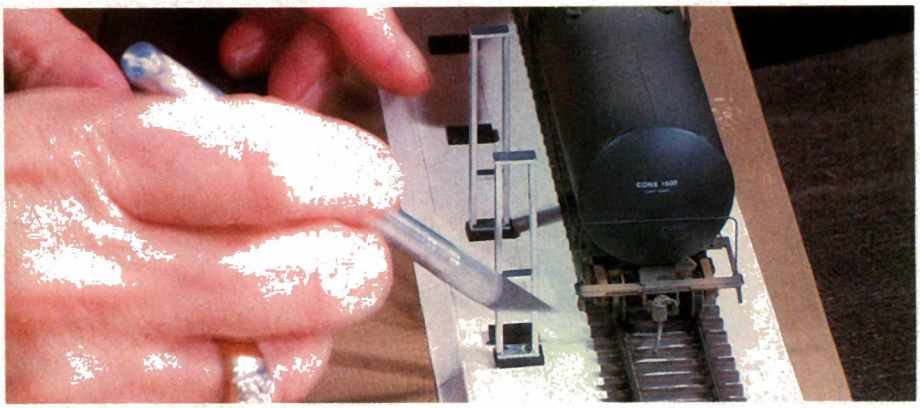
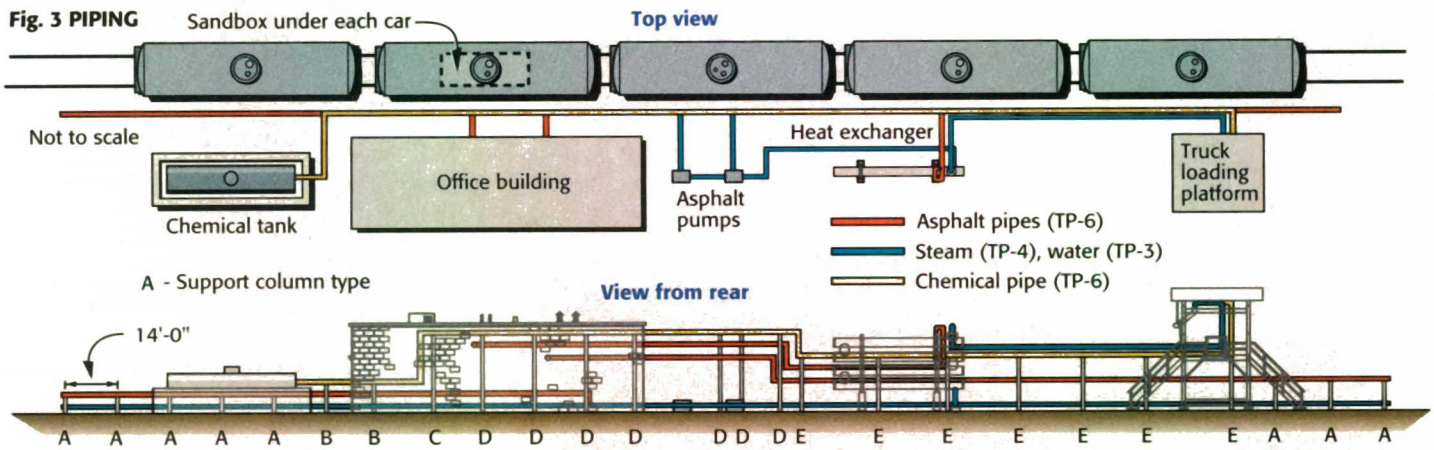


Fig. 2. SUPPORT-COLUMN FOUNDATIONS. Glue the foundation blocks to the foam core base before adding the support columns.



Designing the model

Although the Apex terminal has space for 16 tank cars, to conserve space I designed a 6-car facility for my display model. My model is five feet long and 10 inches wide. I decided not to include the passing track at this time so the model will be easier to install on a future layout. I cut a piece of seasoned 3/4" plywood for the base dimensions, then used 3/16" foam core as a roadbed and pipeline base. I put a piece of Atlas code 83 flextrack in place and sprayed it with Floquil Rail Brown.

Support columns and piping

The various pipes and lines are held in place by support columns. I used

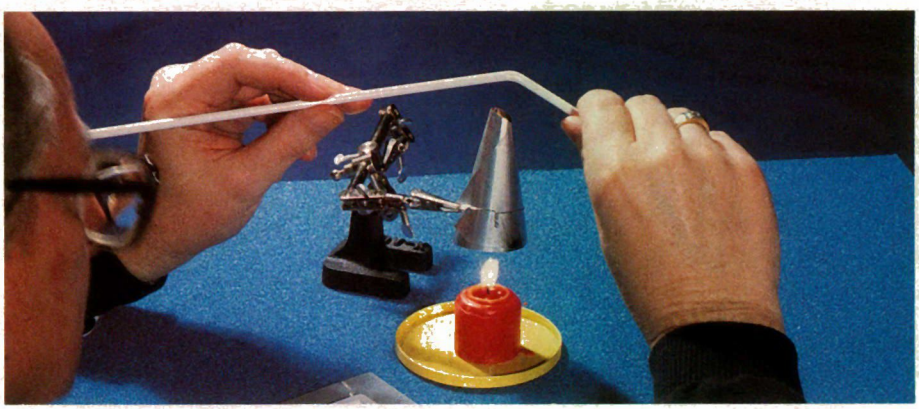


Fig. 4. BENDING THE TUBING. Concentrating the heat from a candle with material from an aluminum can makes it easy to bend the Plastruct tubing.

Fig. 5 CEMENT-BLOCK BUILDING

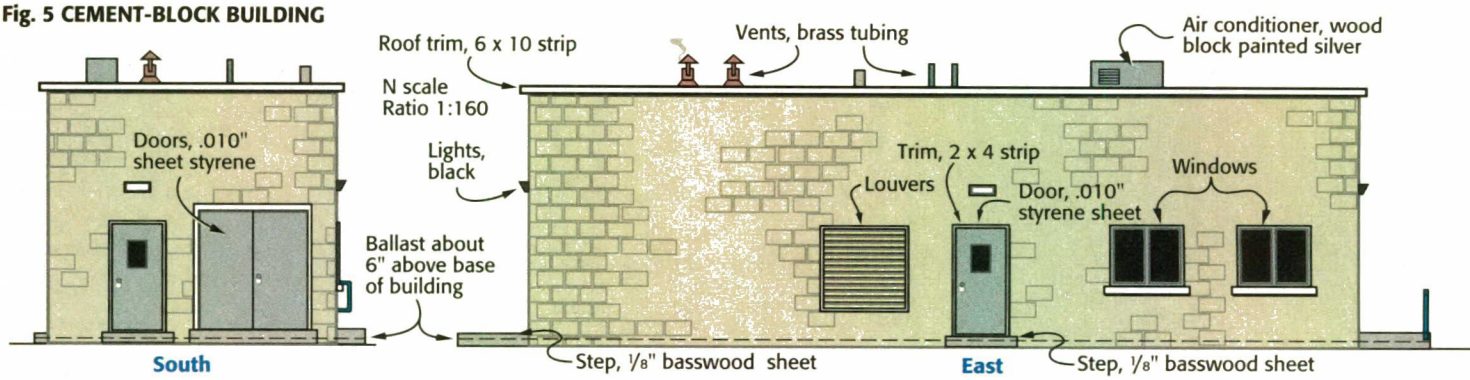


Fig. 6. MAIN BUILDING. Use stripwood to brace the interior of the structure.

five different types as shown in fig. 1. I pre-cut all the pieces to size before putting them together. After making the support columns I placed them on a strip of masking tape with the sticky side up. This held the columns upright while I sprayed them with Testor's Chrome paint. I chose Chrome rather than the prototype's duller aluminum color to give the model more sparkle.

After painting the support column foundation blocks flat black, I cemented them to the foam core base as shown in fig. 2, using the dimensions from fig. 3. Notice that the columns are located at 14-foot intervals except in the center area near the heat exchanger.

Bending and assembling the various pipes and lines is rather tricky, but these details make this model unlike other industries. I attempted to simplify the piping schematic by color-coding it in figs. 1 and 3. This should help you locate and place the pipes properly. There are three different sizes of pipes, all listed in fig. 1. The large one on the bottom represents the insulated asphalt pipe, the medium one is the insulated steam pipe, and the smallest one is the steam return pipe.

For the piping I used Plastruct material throughout, and the elbows, tubing, and tees go together nicely. However, in some less-critical places I decided to try to bend the pipe to fit. These 90-degree bends in the tubing are a challenge but I found a simple solution. By using a funnel made from an aluminum soft-drink can, I could concentrate the heat from a candle on a small section of the tubing as shown in fig. 4. This allowed me to quickly bend it around the 90-degree jig I had prepared. As a result, I can make multiple bends in one pipe. You'll be surprised how easy it becomes with a little practice.

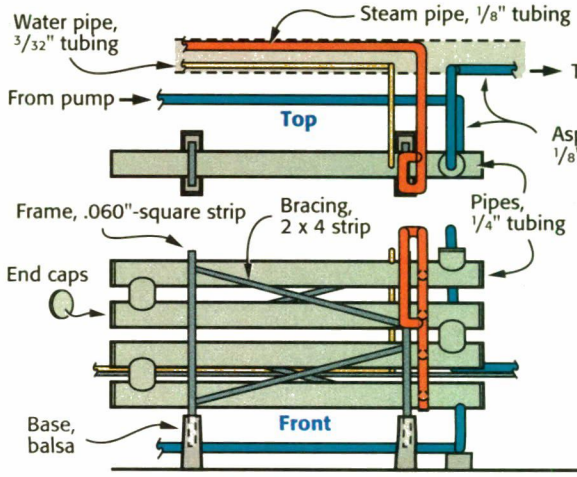
An important note: Paint the pipes *before* assembly, again using Chrome. However, don't completely assemble the piping with elbows and tees until you thread the pipes through the support columns. Since everything is still accessible, now's a good time to add ballast to the track and surrounding area as shown in the photos. I used Woodland Scenics ballast cement to hold the ballast in place.

Main building

The cement-block building shown in fig. 5 houses the office at one end and contains two boilers in the other. The

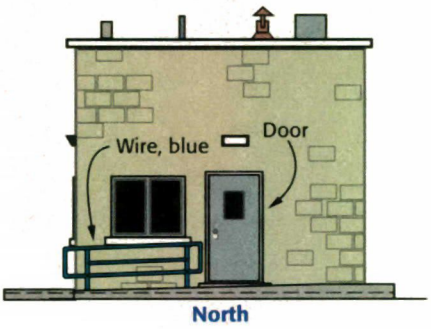
Fig. 7. PROTOTYPE HEAT EXCHANGER. This unit uses steam to heat the liquid asphalt so that it flows easily to a waiting tank truck.

Fig. 8 HEAT EXCHANGER



N scale
Ratio 1:160

Paint all pipes chrome before assembly



prototype has two office doors, but I eliminated one as I reduced the size of the building. Plastruct's embossed styrene sheet represents cement blocks fairly well. I used artist's illustration board to back the thin plastic sheet.

The office door is from Timberline but the two other doors and large rear cargo door are made from sheet styrene. I painted all of them gray, and I painted the Pikestuff sliding windows silver. I airbrushed the building before assembly with Floquil Big Sky Blue. For additional support I cemented balsa strips in the structure's corners and on leading edges as fig. 6 shows.

Because I like to operate at night, I always add lights to structures. I drilled a hole above each door and added a grain-of-wheat bulb. Using some scrap Campbell corrugated aluminum, I fashioned a light shade similar to the prototype. A screw-in socket and bulb are glued inside the office area. I made the building roof from illustration board, and covered it with strips of black masking tape. A couple of vent pipes and an air conditioning unit help to liven up the roof.

Heat exchanger and valves

The prototype heat exchanger in fig. 7 is one of the more interesting-looking

Bill of materials

Builders in Scale
250 chain

Central Valley
1602 stairs

Detail Associates
2506 .019" brass wire
2508 .028" brass wire
2509 .033" brass wire

Evergreen Scale Models styrene
138 .030" x .188" strip
143 .040" x .060" strip
153 .060"-square strip
159 .060" x .250" strip
169 .080" x .250" strip
188 .125" x .188" strip
4544 .040" board-and-batten siding, .125" spacing
8204 2 x 4 strip
8208 2 x 8 strip
8410 4 x 10 strip
8610 6 x 10 strip
8612 6 x 12 strip
9010 .010" sheet
9030 .030" sheet
9060 .060" sheet

Floquil
110007 Rail Brown
110010 Engine Black
110013 Grimy Black
110031 Reefer Yellow
110056 Big Sky Blue
110082 Concrete

Herpa
854000 tank truck

Kibri
9430 fuel tank

Northeastern Scale Lumber Co.
241 1/8" x 1" basswood

Pikestuff
2102 windows

Plastruct
E-4 1/8" elbow
GV-2 1/16" gate valve
PM-2 pump with motor
TB-2 1/16" tubing
TB-3 3/32" tubing
TB-4 1/8" tubing
TB-6 3/16" tubing
TB-8 1/4" tubing
TP-4 1/8" tee
TP-6 3/16" tee
102 1/16" angle
304 1/8" channel
10103 embossed plastic sheet

Rail Scene
highway lights (6)

Suethe
9 smoke unit (2)

Testor Corp. paint
1147 Gloss Black
1168 Flat White
1290 Chrome spray

Timberline
door

Woodland Scenics
91 ballast cement
94 blended medium gray ballast

Miscellaneous
3/4" plywood
3/16" foam core
balsa strips
brass screen/mesh
grain-of-wheat bulbs
hardboard
illustration board
N scale tank-car shell
wedding-veil material

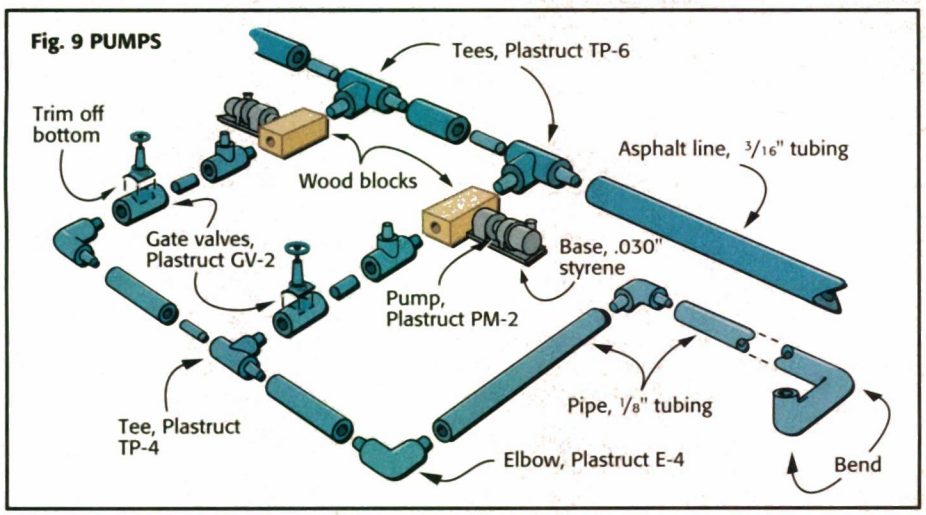
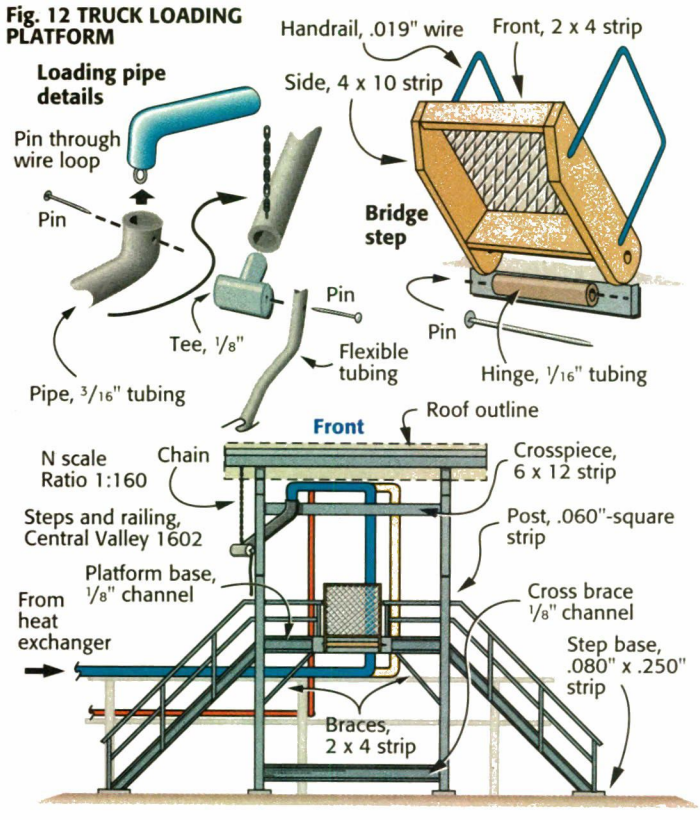


Fig. 10. BASE FOR HEAT EXCHANGER. Use foam core as a base for the pumps and heat exchanger. The pumps are already in place.

Fig. 11. LOADING PLATFORM. Trucks are weighed as they're loaded. The black tar paper covers the scale.



units in this complex and it's also relatively easy to build. The drawing in fig. 8 shows the components. Following the prototype photo, I sprayed the pipes Chrome and painted the other parts before assembly. I made the pipe end plates by punching .010" sytrene sheet in a three-hole punch.

Since the terminal system is divided into two parts, there's a main valve and pump for each half. Fortunately Plastruct makes all of the parts required to fabricate these elements: gate valves, pump and motor assemblies, elbows, and tees, all shown in fig. 9. I added a foam core base in front of the building to hold this unit and the heat exchanger as fig. 10 shows.

Loading dock

The loading dock shown in fig. 11 may look complicated, but it's also easy to build. On the prototype the bridge step raises and lowers, allowing workers easy access to the loading pipe and tank truck hatch as shown in fig. 12. The asphalt loading pipe should be movable as on the prototype as the drawings show. All of the incoming pipes are color-coded.

I cut the tower base from .060" styrene sheet, then sprayed it with Testor's Flat White. After masking the truck-scale area I airbrushed it with Floquil Engine Black. Yellow edging strips finish it off. I assembled the loading dock, except for the steps and handrails, and sprayed it with Chrome. I painted steps and handrails yellow and added them to the dock.

Tank car unloading areas

Each tank car in the unloading area has a sandbox underneath it, along with a black asphalt hose and two silver-colored steam lines as shown in fig. 13. If a bit of sizzling liquid leaks at the coupling under the car, it drops harmlessly into the sand, then cools and hardens like a lump of coal.

To represent these areas I used fine white sand, as shown in fig. 14. To secure the sand I used an eyedropper to add Woodland Scenics cement.

The black hoses and chrome steam lines are made from solder, which shapes easily. As a final detail, I added a thin strip of black masking tape on each side of every sandbox to represent sheets of tar paper.

Fuel and chemical tanks

The facility has two storage tanks: a large one for an asphalt additive and a smaller one for boiler fuel, as shown in fig. 15. When customers purchase liquid asphalt they sometimes request this additive, which allows the asphalt to more readily accept aggregates such as stone used in asphalt paving. The boilers are fueled by natural gas but the small blue tank contains backup fuel oil if needed.

I made the larger tank from a Kibri fuel tank, and the smaller blue one from an N scale tank-car body. A concrete wall, which I made using basswood sheet and painted Floquil Concrete, serves as a dike around these tanks to contain any liquid which might accidently be spilled.

As fig. 15 shows, a blue gas line (3/32" tubing) comes out of the ground and goes into the back of the building. A black fuel pipe (1/16" tubing) goes into the end of the building.

Tank cars and tank truck

This is a great opportunity to try weathering some of your tank cars just like the prototype cars. They all have some degree of spillage around the top hatch and walkway. I airbrushed some dusty tones over the entire car, then lightly sprayed Grimy Black in the midsection of the tank. After streaking a little more Grimy Black down the sides with a brush, I then stippled on a bit of Gloss Black to represent a fresh, shiny, wet-looking surface as shown in fig. 16. I painted the trucks a rusty color. The prototype tank cars vary a great deal from new, relatively clean cars to older, grime-covered ones.

To complete the unloading sequence we must have an asphalt tank truck. To be prototypical, the tank should have only one dome (with its hatch cover opened), a walkway, and a ladder. After being unable to find an exact replica, I remodeled a Herpa tank truck. The walkway on top of the tank came off fairly well, leaving just 3 holes. I covered the two outside holes with sheet

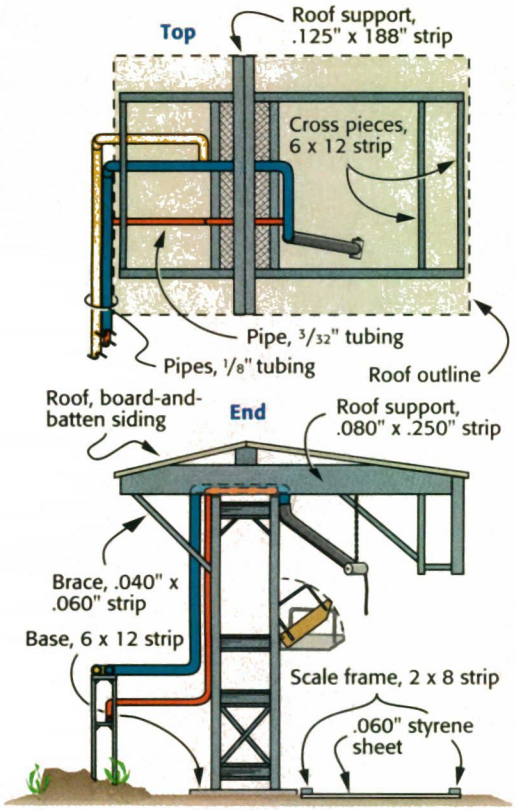


Fig. 13. TANK CAR UNLOADING AREAS. Sandboxes under each car catch spilled globs of asphalt.

Fig. 14. UNLOADING-AREA DETAILS. Use fine white sand for the sandboxes. Note the steam from the smoke units curling around the tank car.

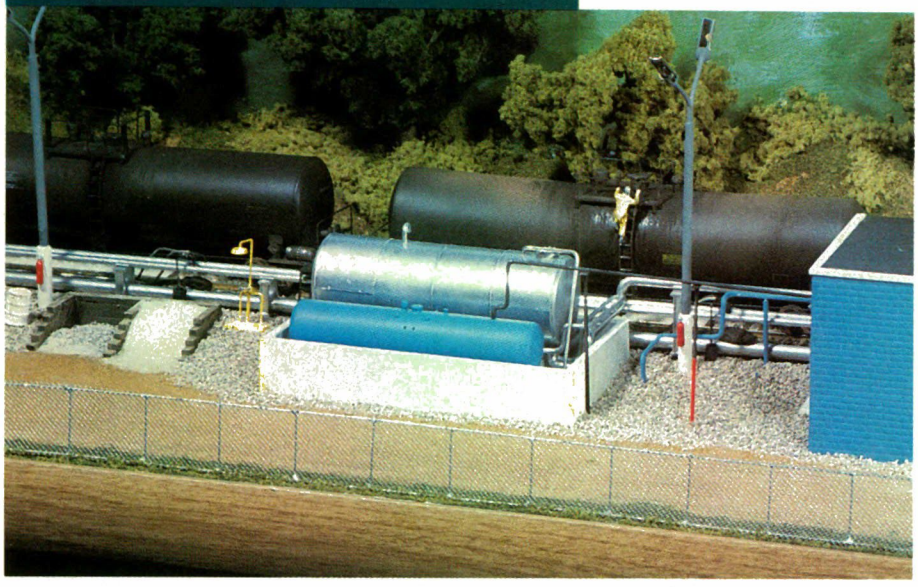


Fig. 15. STORAGE TANKS. The large tank is a Kibri kit and the small one is from an N scale tank car. The sand storage pit at left is a necessity.

styrene and placed a dome and walkway above the center hole. The removable hatch cover came from my spare-parts box, but could be made from styrene also.

I removed the tractor's sleeper cab and shortened the truck frame to a smaller wheelbase. This is a lot of work, but it improves the truck's looks, as fig. 16 shows.

Steam unit

Here's where we can have some fun. Steam swirls up around the prototype tank cars, as shown in fig. 17. On my model I mounted a couple of Seuthe steam-locomotive smoke units under the tracks opening into the sandboxes as shown in fig. 14. I mounted the switch that controls the smoke units on the rear of the building as shown in fig. 6. When it's turned on, the display comes alive. It's a real conversation piece.

To ensure that the smoke rises, the top of the stack must be almost showing in the sandbox and be off-center under the tank car. I learned the hard way that the smoke easily backs up if the unit is directly under a car.

Lighting

Lighting always enhances a display model, and it's necessary if you operate at night. The prototype Apex Terminal is open during evening hours and is very well lighted. A row of pole-mounted dual lights extends along the entire length of the facility.

For my six main light poles, I removed the base from Rail Scene's highway lights. This enabled me to add a length of 3/16" tubing to increase the height to a scale 53 feet. I left extra tubing on the bottom so the poles could be inserted into holes drilled in the baseboard, then drilled the top of the tubing open a bit to accept the light post. The lights were also carefully spread open at the wye as seen in fig. 14.

In addition to the lights already installed in the main building, I placed a grain-of-wheat bulb under the roof of the loading dock, one behind the heat exchanger, and another on the rear of the building.

Fencing

Chain-link fencing completely encloses the prototype Apex terminal. After I drew a plan of the fence on a scrap piece of foam core, I cut .028" wire for fence posts and .033" wire for top and bottom rails. I decided not to include the barbed-wire top section, but did leave room at the post bottoms to insert the fence in the ground. With these posts taped onto my foam core template along with the top and bottom wires, it was easy to solder each joint as fig. 18 shows.

After the wires were all soldered I drilled holes in a mounting board, shown in fig. 19, which I then attached to the front edge of the baseboard.

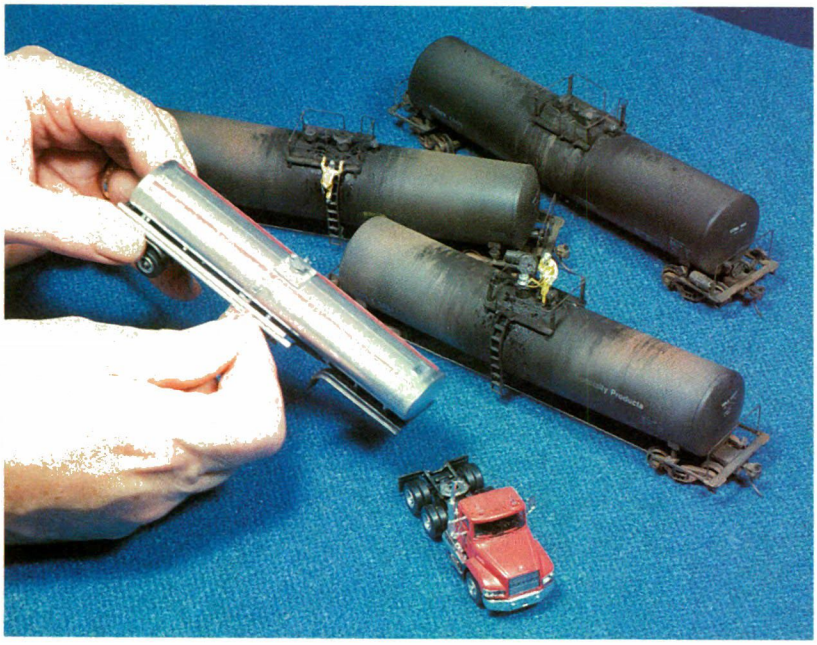


Fig. 16. TRUCK AND TANK CARS. A bit of weathering does wonders for the tank cars.

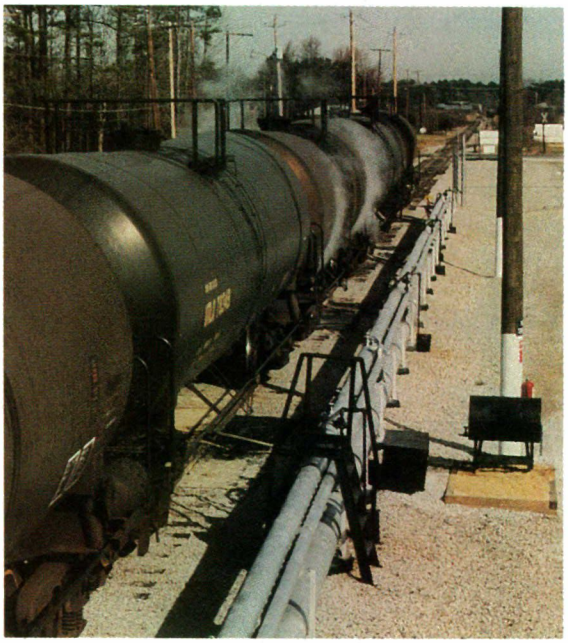


Fig. 17. STEAM. Steam rises from the cars during unloading.

Because of the model's length, I made the fence in two parts.

The chain link is made from wedding veil material, available from fabric stores. I cut the fabric to width with an X-acto knife, being sure that the strands ran diagonally. I glued this strip of fabric to the top and bottom rail, working on a small section at a time. After the fence was glued in place, I sprayed it lightly with Chrome.

I made the gates the same way. Since I wanted the gates to swing open, I worked out a simple hinge device by soldering a couple of small sections of brass tubing and connecting them with a pivot wire as shown in fig. 20.

Final details

Details are what make a model seem real, and there are lots of opportunities with this model. Fire extinguishers, emergency water showers, signs, clothing, and workers in protective clothing and hard hats are all easy to fabricate.

There's a series of small conduit lines which run from the rear of the main building to the loading tower which can also be added as in fig. 21. A sand storage pit near the chemical tank, shown in fig. 15, is another necessary item.

To finish my model, I added a painted backdrop, trees, ground foam, and other scenery material. If you add this industry directly to your layout you can easily blend its terrain with your existing scenery.

I wish you the best in making this unique model. I guarantee it will be a conversation piece. ✪

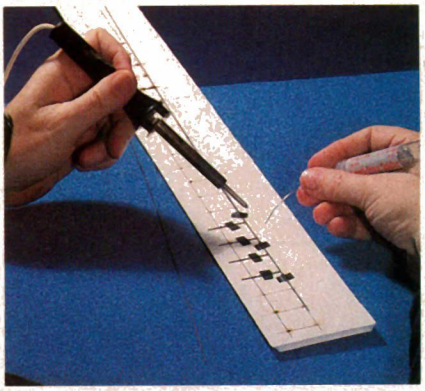


Fig. 18. CHAIN-LINK FENCE. Solder the fence frame on a scrap piece of foam core.

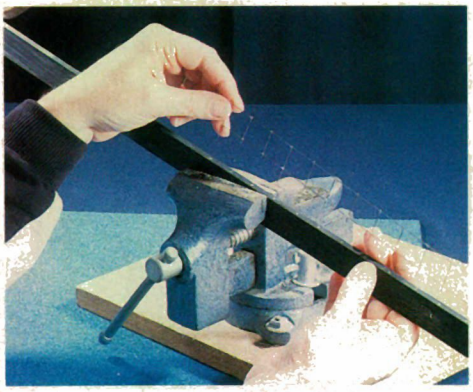


Fig. 19. FENCE MOUNTING BOARD. Mounting the fence on a board makes it easier to install later.

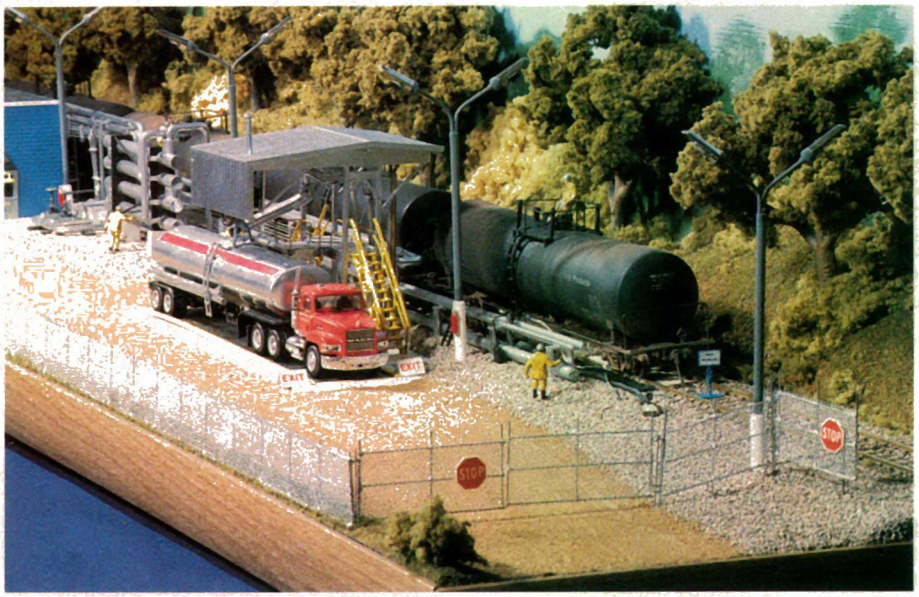


Fig. 20. FENCE GATES. Brass tubes soldered to the gate ends enable the gates to pivot on wire.

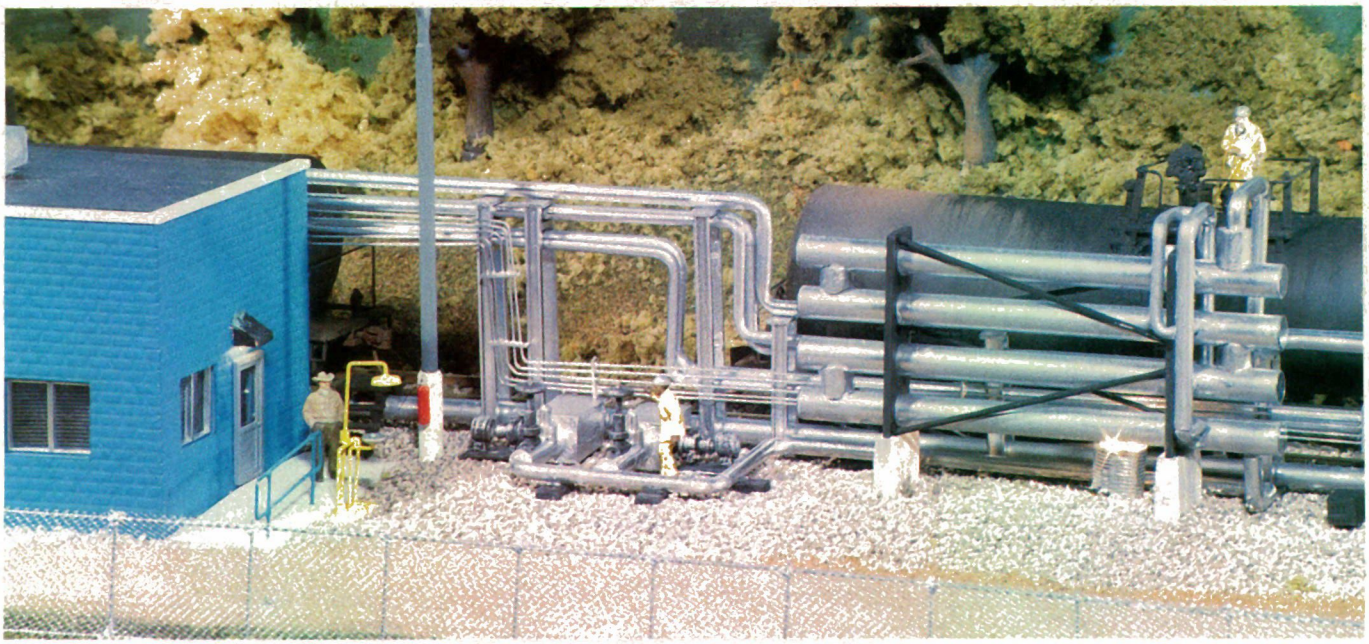


Fig. 21. CONDUIT LINES. The thin conduit lines, which run the length of the facility, are .028" brass wire bent to shape.