

How to Build a Simple Rail Barge for under \$10



– by M.C. Fujiwara
Photos by the author

The journey of a thousand miles begins with a single foot: 12 inches of car float opens your layout to the world ...



Admit it: carfloats are cool. Never mind that they also serve a very real function in delivering cars to and from “some-where else” and thus provide a lot of staging in a small area. The thought of pulling Big Cars off a Small Boat seems to bring a smile to most mouths, and many modelers purposefully include a

waterfront in their layout design just to have carfloat operations.

But while N-scale dockside structure kits abound, carfloat models, as of this writing, are limited to Sylvan Model’s 16 ½” x 2 ½”, two-track resin kit (rail not included). My 9-year-old daughter and I needed a 12” x 2 ½” carfloat for our “Summer Shunting

Shelf Layout” and, while we could have cut the Sylvan Model down to length, the \$30-something price went against our “use what we have” rule for the project. So styrene it is!

STEP 1: The Hull

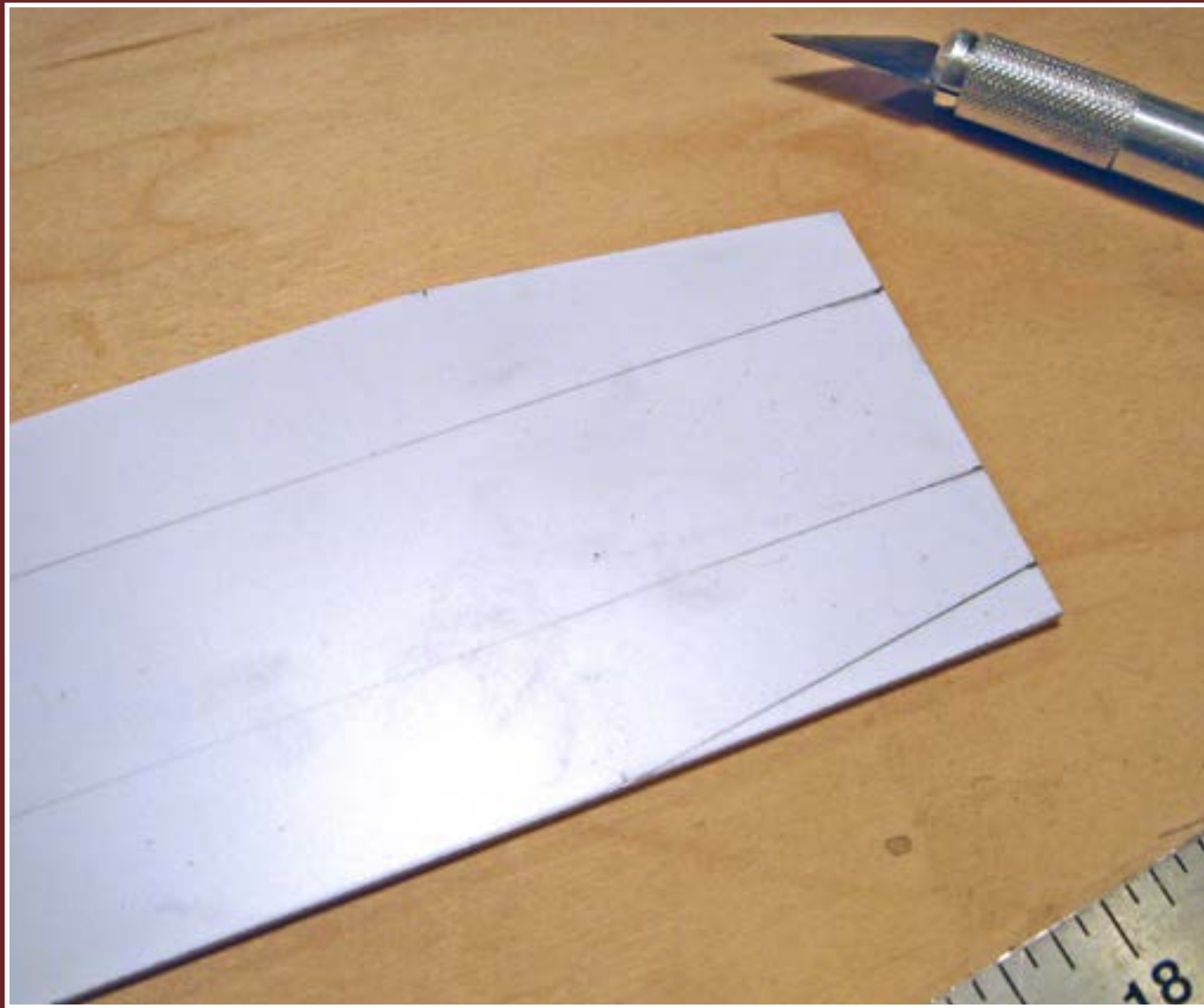


Figure 1: Tapering the front follows many prototypical designs, as well as helps prevent that “slab of styrene” look.

One sheet of .08 plain styrene is enough for two 12" x 2 ½" basic barge shapes. Following some photos of prototypical rail barges (i.e. www.northeast.railfan.net/images/cnj1001.jpg), we tapered the front of the float down to 2" across, started from about 2 ½" back. The two lines down the center are the guides for the 1" track centers.



Figure 2: Use a sharp blade to make multiple scoring passes until the styrene is smoothly cut through. If you attempt to “score & snap”, the thin end of the triangular section will break off unevenly.

To cut the taper, we clamped a straightedge onto the styrene to act as a guide for the hobby knife. Even with a straightedge, go easy while cutting: .08 styrene is thick stuff, so multiple scoring passes work better than attempting deep cuts.

Step 2: Rail & Deck Detail

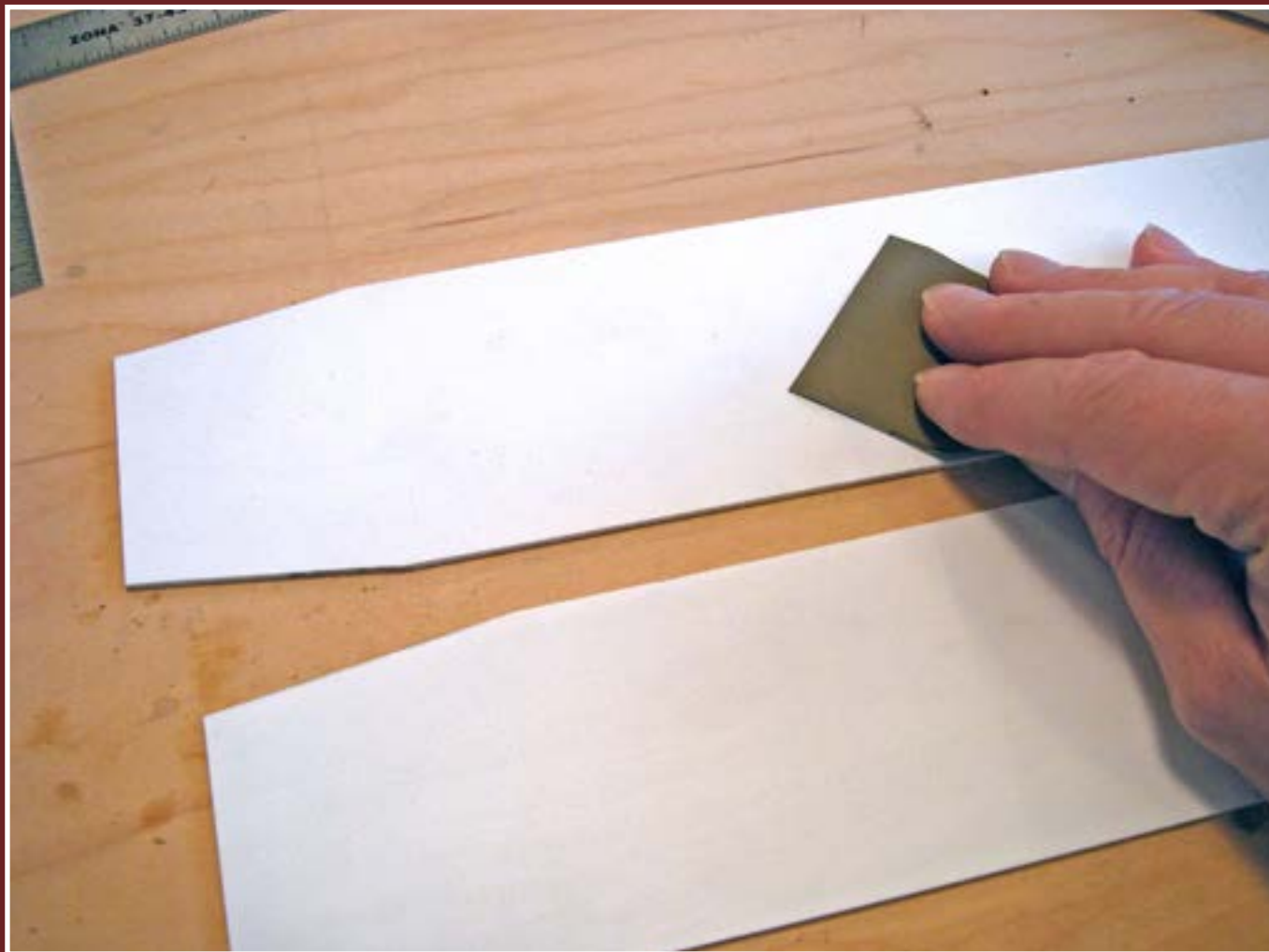


Figure 3: Use fine-grit sandpaper to rough up the interior surfaces and create more tooth for the CA to better bond the two sections of styrene together.

After cutting the hull shapes, we used fine-grit sandpaper to rough up the surface a smidge, as well as slightly round the side edges, as we wanted a small channel running the length of the hull.

Not only do many photos of prototypes show this kind of hull detail, but we also wanted to avoid our carfloat appearing like a block of styrene.

Using CA, glue the two sheets together to form the hull. After dry, use a file or a Dremel with sanding drum to slightly curve the corners and to smooth the sides, taking care to not smooth away the groove in the side.

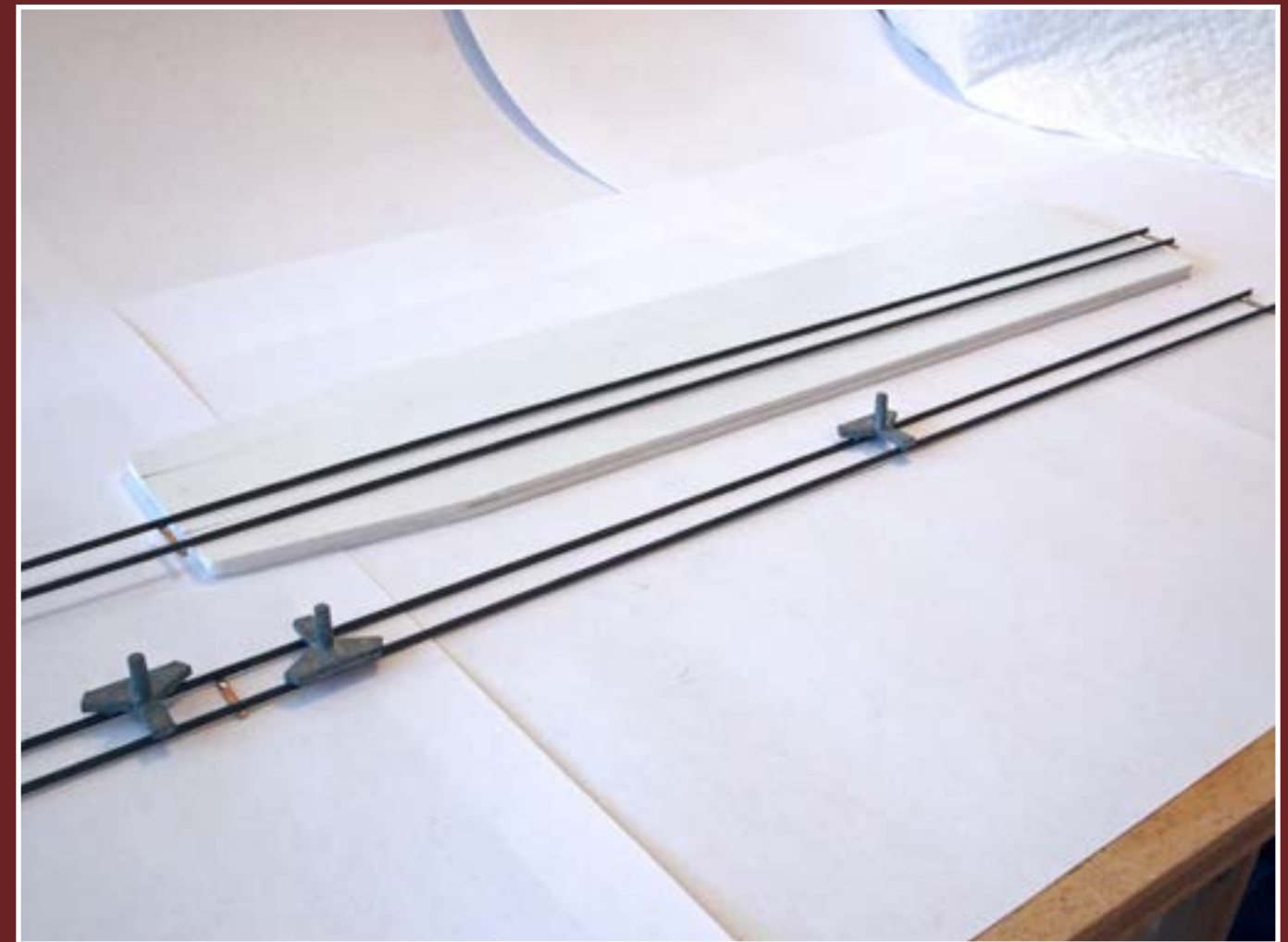


Figure 4: Two PC board ties and three-legged gauges will ensure rail spacing. After applying a thin layer of Gorilla Glue under the rails, trust your eyeball to align the rails along the 1" track center pencil lines.

While the Sylvan Scale Model's resin kit has the rail channels already cast on the deck, we needed to ensure proper rail spacing and gauge using other methods. We soldered PC board ties beyond the length of the carfloat, and then used three-legged gauges spaced out the length of the rails, along with various weights, to hold position while the Gorilla Glue, applied carefully under the rails, cured.

Step 2: Rail & Deck Detail *Continued ...*

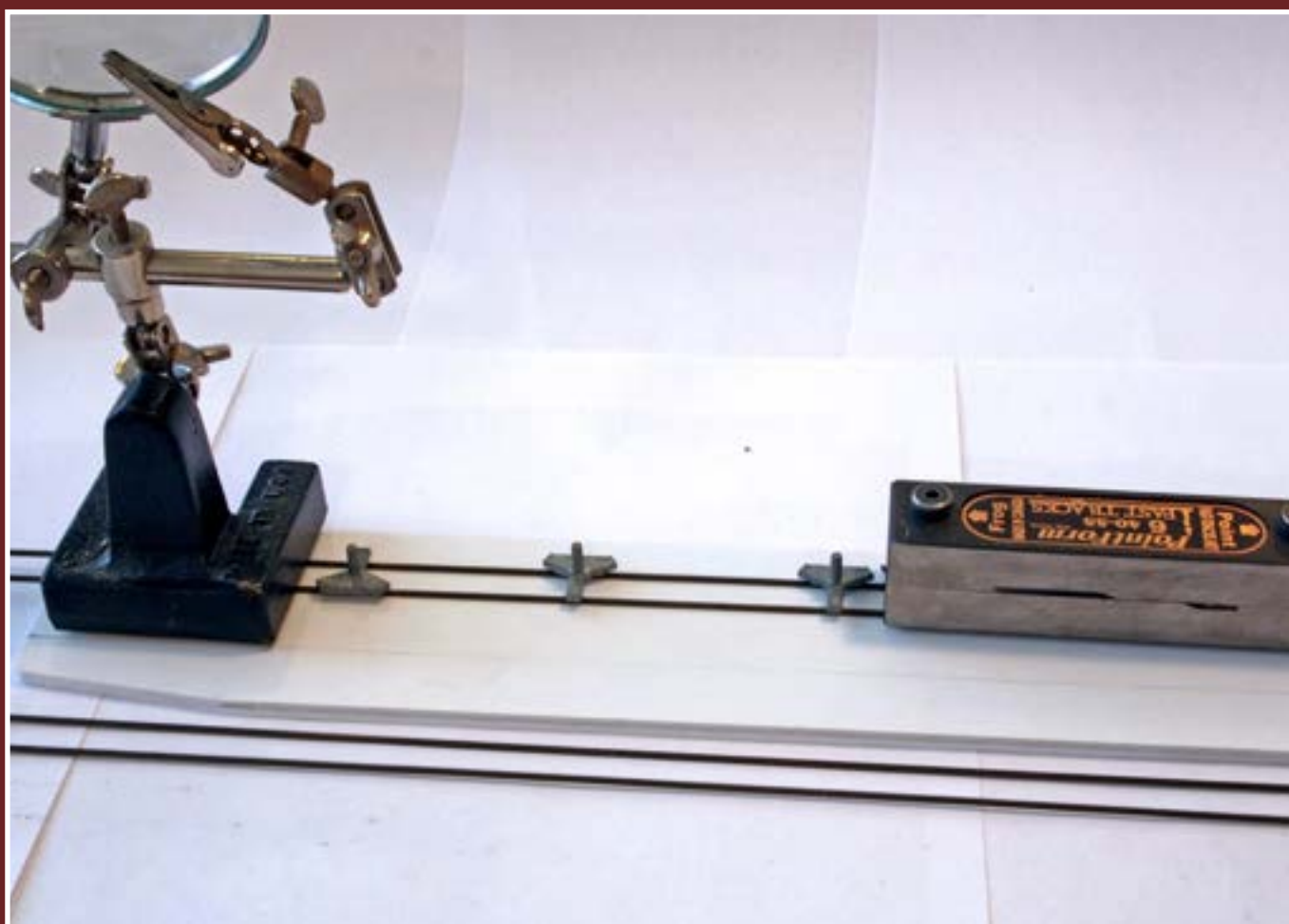


Figure 5: Keep the three-legged gauges spread out and in place while the Gorilla Glue dries to ensure proper rail spacing throughout the deck.

The most difficult aspect of this project is to attach the rails to the styrene deck: 1. straight, 2. consistently spaced, and 3. securely.

Gorilla Glue is a liquid adhesive that creates a super-strong bond with almost anything, but also expands and foams while curing. Using a toothpick, apply very sparingly along the bottoms of the rails. Keeping the three-legged gauges in place, hold the rails near the PC board tie spacers at the ends and carefully lower onto the deck. The PC board tie spacers should hang over the ends of the deck (the back end $\frac{1}{2}$ " of rail with the PC tie will be cut off later, and the PC tie at the front will be "burnt" off with the soldering iron after the glue dries, leaving a long length of rail to attach to the apron later). Use weights to keep the rails in place while the Gorilla Glue cures, but make sure that the rails remain straight. Any foaming from the glue can be filed down later: right now you want rails straight and secure.

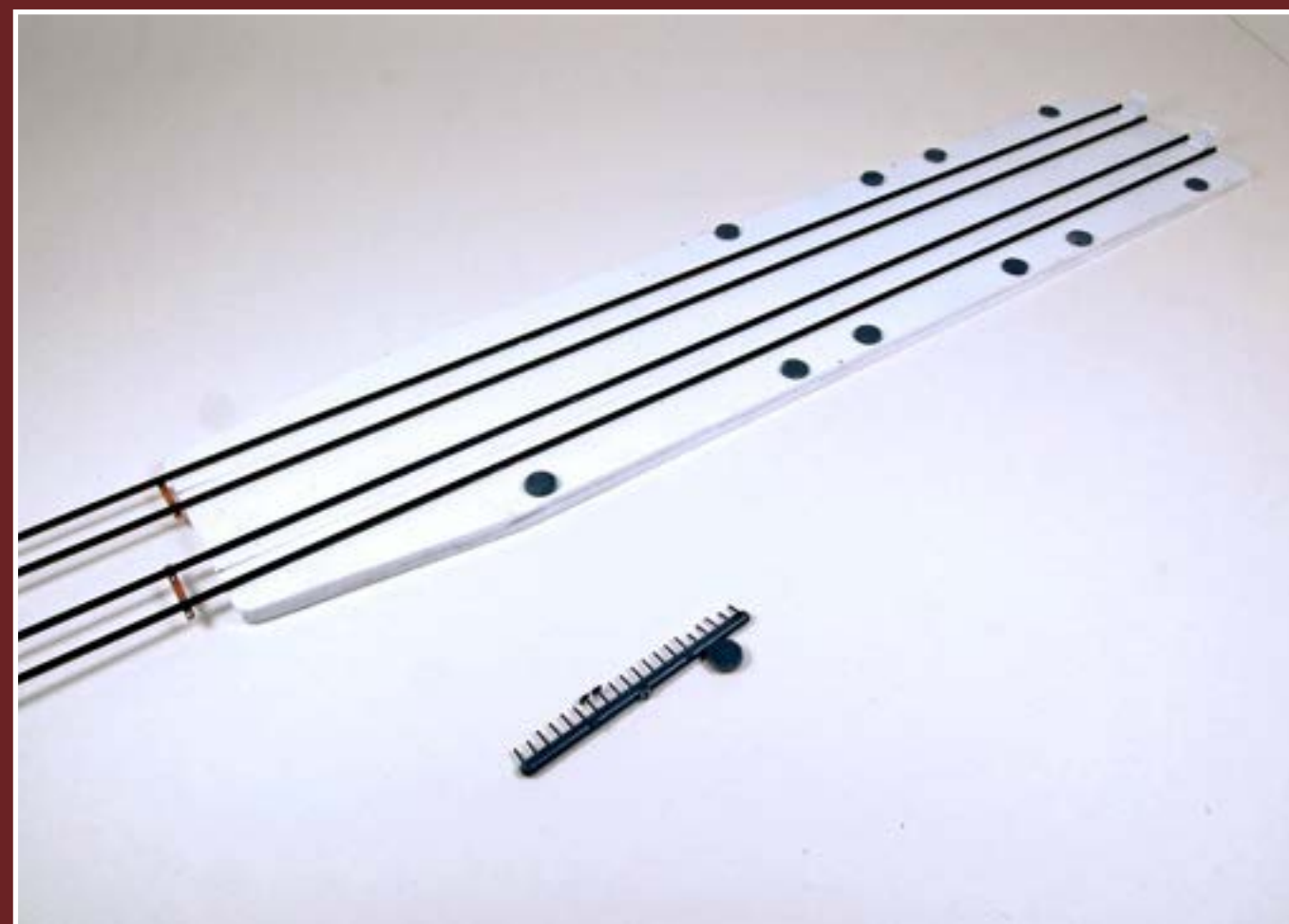


Figure 6: With the flash and lettering filed off, the round tabs on Grandt Line NBW details sprues make great N scale buoyancy hatches. They'd probably make good manhole covers, too, when buried in tinted-spackled road surface.

After using a Dremel with a cutting disc to remove the rear overhang of rail, we created the buoyancy ports by attaching circle-shaped tabs (taken from Grandt Line detail sprues and filed smooth) to the hull with CA.

Step 2: Rail & Deck Detail *Continued ...*

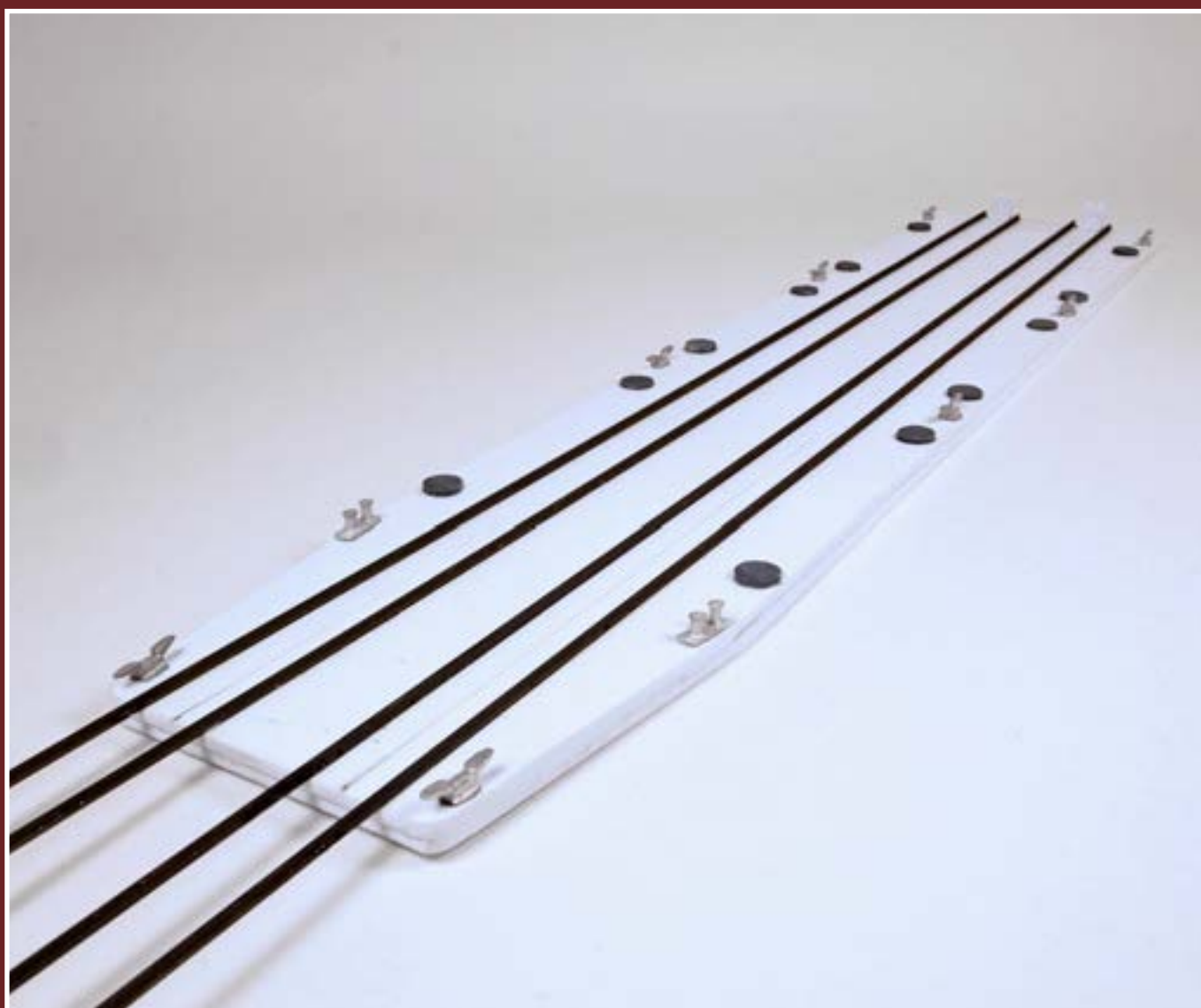


Figure 7: It's all in the details: you can make cleats and bollards out of shaped styrene or wood, but the Seaport Model Works cast metal details are relatively inexpensive, save time, and transform the styrene slabs into realistic rail barges.

We ensured even spacing by marking in pencil at measured distances, leaving space for the Seaport Model Works cleats and bollards left over from a previous layout. The white metal details have flash, and one must file the bottom smooth for flush contact. Attach with CA.



Figure 8: It's all in the textures: Adding the .06 channel strips to the back of the bumpers takes a whopping 1-2 minutes, but adds a level of intricate interest to an otherwise blah backside that, being at the end of the layout, will be a point of photographic prominence.

We constructed the bumpers out of scrap styrene and .06 channel strips that extend from the top of the L-shaped bumper to the bottom of the back of the hull.

STEP 3: Painting and Weathering



Figure 9: Floquil Grimy Black spray paint (our favorite go-to color for track, buildings, details & tree trunks) provides an even, unobtrusive base coat. Highlights, soot, oil stains, guano, and rust will be added with a little dry brushing and a lot of powders.

When all glue dried, we spray painted the entire model with an even coat of Floquil Grimy Black. A slightly lighter shade of grey would have been preferred, but we used what we had. A light “misting” of ScaleCoat Graphite helped create the appearance of metal without being overbearingly shiny.

Given that no engines will travel onto the float, we did not scrape off the rail-top paint.

To weather the carfloat, we brushed on patches of slightly-diluted white glue and then applied fine-sifted gravel and coal to simulate spill-off. Using a paint brush trimmed down to short, stiffer bristles, we covered the carfloat with a variety of Bragdon’s Weathering Powders: mainly a medium grey, but also working in some darker soot and some rust streaks around the hull and detail edges.



Figure 10: After the diluted white glue that secures the gravel/coal/dirt droppings dries completely, brushing grey, soot and rust powders over all surfaces help create a uniformly weathered look.

Do not use a fixative agent, such as Dullcote, as it wets and renders the powders invisible.

For the carfloat apron, we couldn’t use a tower or any structure over $\frac{1}{2}$ ". Our portable shelf layout, made from two 12" x 36" sections connected by a 12" x 3" spacer with hinges, folds over on itself to create a 1' x 3' x 4" box, and the vertical space around the float and apron was already “occupied” by the power pack box and oil storage/refinery on the other section. So we created a low, floating apron by placing a wood/pc board deck between two truncated sides of an Atlas C55 girder bridge.

STEP 4: Building the Apron Deck



Figure 11: PC board ties, spaced out every $\frac{3}{4}$ " or so between the $\frac{1}{32}$ " x $\frac{3}{64}$ " basswood boards, provide a secure place to solder the barge rail to the apron deck.

After installing the carfloat, we soldered the rails leading from the turnout to the float on the PC board ties, and then painted the ties a mix of Floquil SP Lettering Grey and Foundation to match the stained basswood (figure 11).

I-beams attached to the deck outside the apron help conceal the lack of machinery, and Grandt Line NBW details along the wood side beams add something to an otherwise plain structure (figure 12).

To permanently attach the carfloat to our folding, portable layout, we followed David K. Smith's suggestion and drilled two holes through the hull's surface, the cured Magic Water, and into the MDF baseboard, and then secured the float with flat-head screws.

After the carfloat, apron and track were installed, we added Mod Podge gloss to create the water effects around the float. Fine-sifted gravel, dirt and some ground foam gave some basic ground cover around the pier and its adjoining two-track storage yard. As the engine is not allowed on the float itself, we use a 50' flat car as the idler until we can make a proper idler gon with weighted load.



Figure 12: After soldering the rail to the apron deck, we cut the rail at the car float edge to relieve any tension on the Gorilla Glue bond along the rails. A few coats of Floquil mixed paint turn the PC boards into wood ties.



M.C. Fujiwara is a writer and editor, as well as the model railroad layout designer of Yardgoat Layout Design (www.yardgoatlayoutdesign.com). He lives in his native San Francisco Bay Area with his wife and two children, who enjoy helping their dad build his 23"x 41" Mt. Coffin and Columbia River N-scale layout by making trees, painting rocks, and running trains.



In addition to soccer, reading, karate, drama and the 4th grade, Uki Fujiwara prefers shunting operations over the roundy-round, and thinks that drill-twirled twine pine trees look better, and are more fun to build, than scrub-pad and bamboo-skewer conifers.

She solders hand-laid turnouts while talking The Little Prince with Dad, and will probably earn her MMR in the next few decades.

STEP 5: Finishing Touches



Figure 13

Figures 13-14: A two-track, ten-car storage yard alongside the dock allows the space necessary to operate the carfloat. Each carfloat track holds three 50'/40' cars, or four 36' cars (barely). An extra one inch on the carfloat will allow four 40' cars per track. Don't forget to include coupler lengths when planning car spots!

The carfloat holds between 6-8 cars (depending on car lengths between 36' -50'). The layout includes industries / docks with 23 car spots, plus an interchange with the Southern Pacific with space for 6-7 cars, coming or going. So while a small (12") sliver on a small (1'x6') switching layout, this carfloat becomes the source and destination of transcontinental traffic, and so will have to make several trips to and from Oakland during the day just to keep up with all the traffic traversing the terminal.

Model railroaders are always grappling with issues of limited space, but with a couple sheets of styrene, some rail and paint, you can build a carfloat and expand both the operations and the boundaries of your layout far, far beyond the shelf.

And, of course, car floats look cool.



Figure 14

As we complete more scenery around the carfloat, we'll add some ropes, chains and other dockside details, but for now our trackwork is complete and our carfloat staging is operational and ready to send and receive traffic from the off-layout world of Oakland and beyond.

List of Materials

- .08 plain styrene sheet, Evergreen (1)
- .06 channel styrene strip, Evergreen (2")
- Code 55 rail, ME (four 16" lengths)
- Cleats, Seaport Model Works (8/1 package)
- Bollards, Seaport Model Works (2/½ package)
- Circle-shaped sprue tabs, Grandt Line detail parts (8)
- Grimy Black Floquil spray paint
- Fine-sifted gravel/coal droppings
- Bragdon Weathering Powders (Grey, Soot, Rust)
- Gorilla Glue
- CA
- White Glue
- Flat-head ¼" screws (2)
- File/Dremel with Sanding Drum

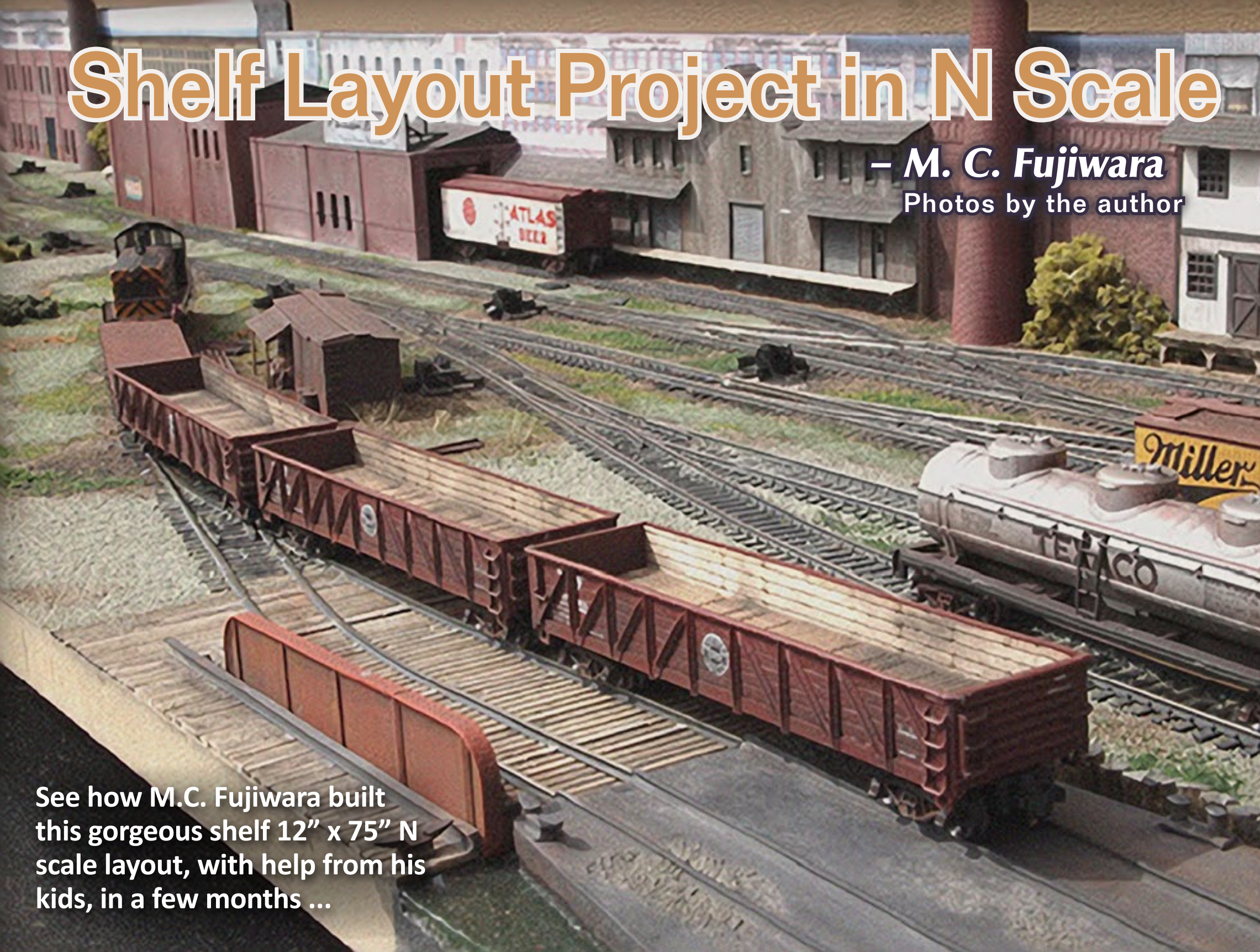


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Shelf Layout Project in N Scale

– M. C. Fujiwara
Photos by the author



See how M.C. Fujiwara built this gorgeous shelf 12" x 75" N scale layout, with help from his kids, in a few months ...

Based on the MRH website thread: mrhmag.com/node/5666. Byron Henderson's "Alameda Belt Line" (*Model Railroad Planning 2005*).

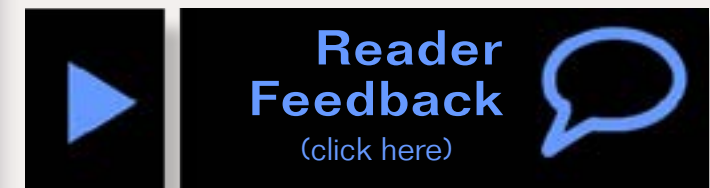
I built an N-scale shelf switching layout with my young daughter and son. Even though layout design is one of my trades, my

daughter brushed aside my ideas and jumped on Byron Henderson's "Alameda Belt Line": a 1' x 6' shelf designed to fold in half for portability.

My daughter does have good taste: the design includes a long runaround to facilitate switching an oil company, wharf, team track, and a large

fruit canning industry. The plan also includes off-layout traffic transfer capability via car float and an interchange with the Southern Pacific Lines.

She also likes the fact this location is local: Alameda, near Oakland, California, is a short car ride away from us. So it looks like she's picked



up on Dad's San Francisco Bay Area pride, too!

I redrew the design for Atlas Code 55 track and to use the Fast Tracks templates I use to hand lay turnouts. I added one more siding to service a brewery (Dad gets thirsty), and renamed the industries for fun (sometimes including a reference to local lore).

Having moved an average of once a year for the past 11 years, we wanted to keep the hinged design for portability, but we also wanted structures on the layout. My brilliant brainstorm (if I do say so myself), was to insert a 3" piece between two sets of hinges and a 3" backdrop / vertical support on the far left of the layout. Now, instead of pancaking, the shelf wraps into a box with a 3" gap between sections, providing an interior space for structures and scenery (4).

Doing the benchwork

The shelves are 1/2" MDF cut from one 2'x4' piece. The three sections are not of equal width: the left ("base") section is 12"x36", the center is 11 1/2"x3", and the right is 11"x36". This allows the permanent attachment of 4"-tall strips of 1/8" Masonite (cut from scraps salvaged off a previous layout, but could come from a single 2'x4' sheet).

There are 1" MDF strips under each section edge, with four adjustable 7/8" furniture feet at each corner of each 3' section.

I then spray-painted the backdrop flat dark grey primer, and painted the boards with Krylon ultra-flat khaki. I constructed a 6"x7" box out of scrap Masonite and MDF to house the DC power pack (3).

A roof with detailed parts will fit over the power pack area for photography. I can also screw a Masonite hard-board front cover on to the box.

I made the bulk oil tanks using 4" and 2" ABS pipe caps. The large tank, at 2.5" high, will be permanently attached to the layout. I made the two smaller tanks removable, making them also serve to cover the front two pairs of hinges.

I use a removable power house to cover the back pair of hinges. Those three structures are the only non-permanent buildings on the layout: I use flats, low relief, or position structures to not get hit by the backboard or

any other structure when closing the modules for transport.

I installed a handle on the bottom of the right section, and a latch on the left (4 next page). When folded up, it's a 1'x3'x4" box that's easily carried.

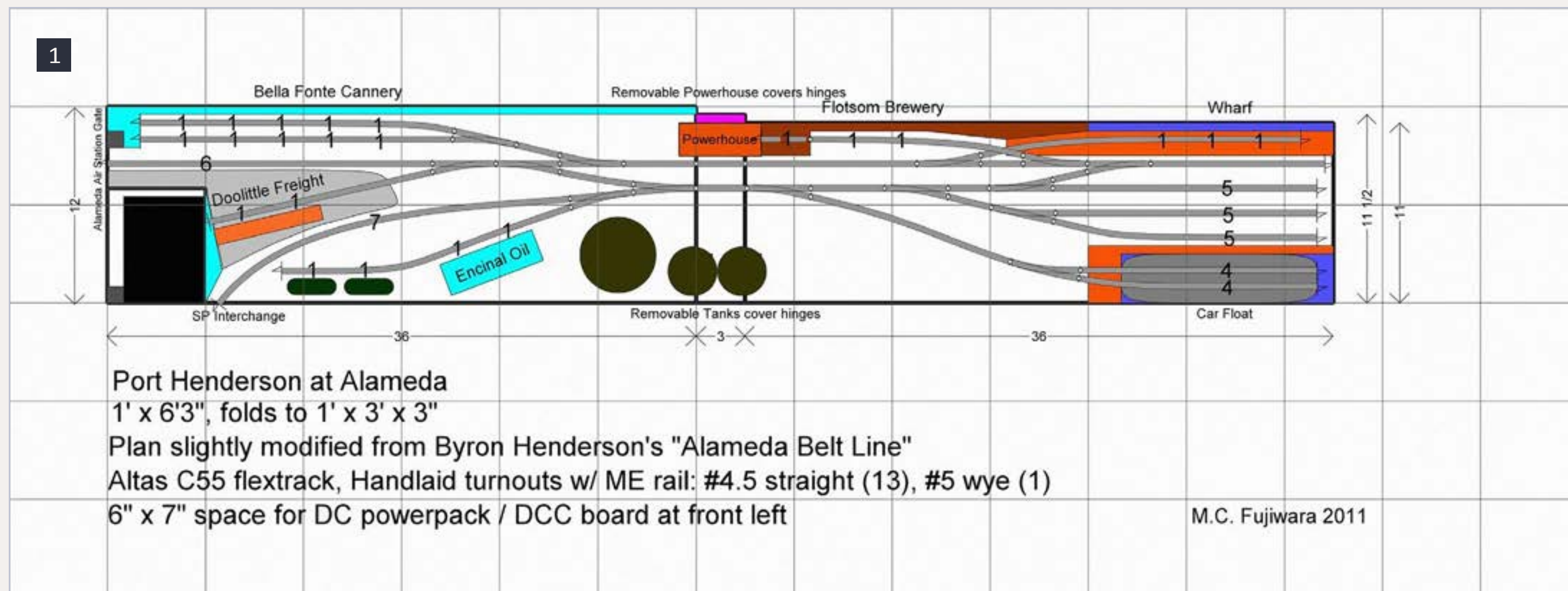
You can see a bus wire runs the length of the bottom and through the end-strip supports. I connect feeder wires with suitcase connectors. To mount this as a shelf, I thought about placing foam on the brackets (like for weather-proofing windows) on the brackets to take up the wire space and still support

the boards (see actual mounting practice at end of article).

Doing the track

I laid a small section of track over both joints, and then cut the rails when the Gorilla Glue cured. I find the Dedeco ultra-thin cutoff disk cuts as thin as a jeweler's saw (or seems like it). Having the hinges on top actually lifts the track up, preventing any crimping or squishing of rails (5).

One of my goals for this layout has been to build as much ourselves as



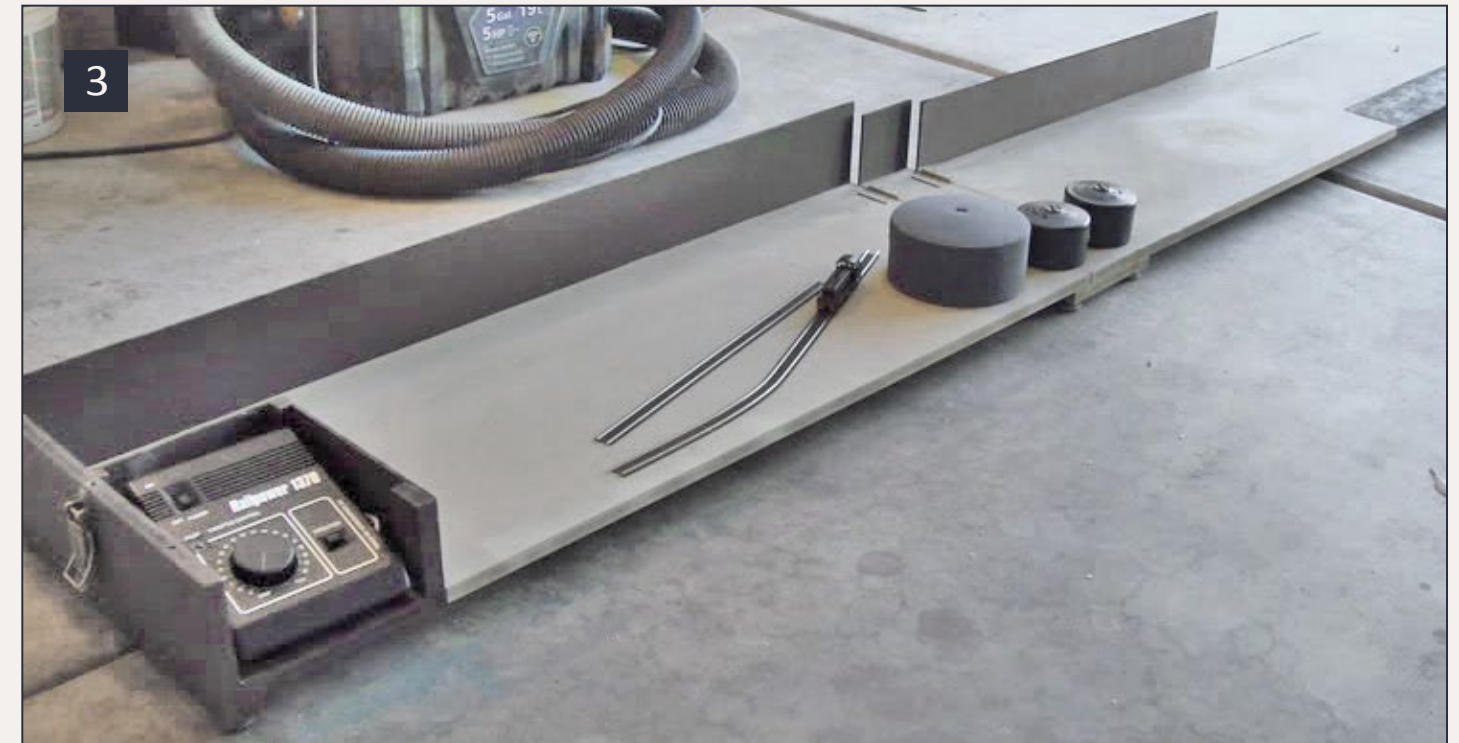
1: M.C. Fujiwara's N scale shelf layout track plan, inspired by Byron Henderson's Alameda Belt Line.

we can, and to use up much of the train stuff I've accumulated over the past couple years. I'm using Atlas C55 flex track and building our own turnouts using Micro Engineering code 55 rail on PC board ties. We use Fast Tracks printable templates as guides, but adjust to our needs.

The crossing turned out pretty well. I did it with a lot of eyeballing and relying on the trusty NMRA gauge. I'm sure I'll do even better on the next one I build (6).

For the first couple of turnouts we built, my daughter and I used the jig I've had collecting dust for a couple years (7 next page). We used some spare trucks to test out the turnout as we constructed it.

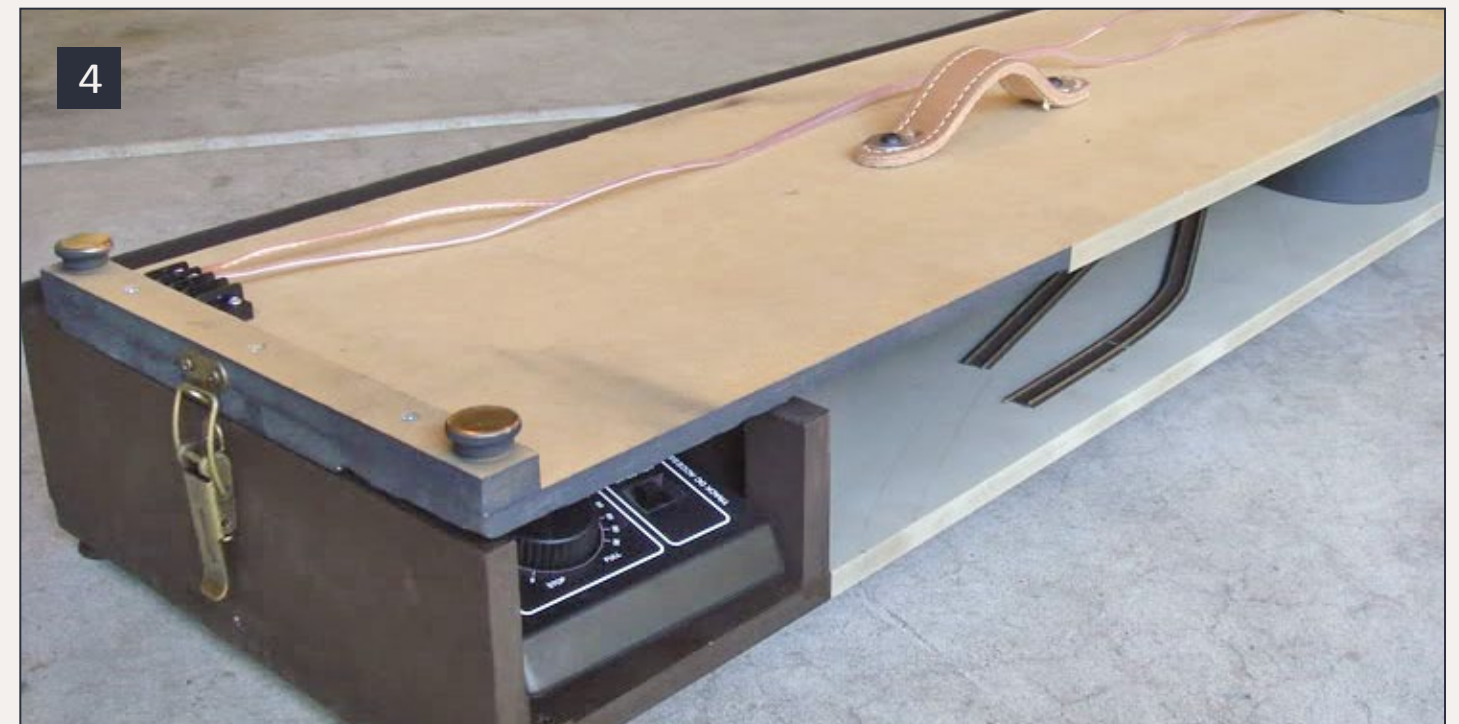
My daughter now knows how things are glued or soldered together, she's learned about hard and soft metals, and why not to touch the soldering iron tip (dad accidentally demonstrated why touching a hot soldering iron tip is a bad idea).



3: After painting the benchwork a basic gray, you can see the cubby for the power pack fits perfectly (we later switched to using a Stonebridge Models e-Z throttle tethered to a jack under the layout). The test placement of some track and some bulk oil tanks gives some idea how the module will look and allows a fold-up test in photo 4.



2: Here's the basic "benchwork" configuration for this shelf layout. Notice the 3" section in the middle between the two modules. In photo 4 you can see the modules folded up for transport. The 3" middle piece helps the two sections form a box, providing room for structures and scenery, yet allowing for easy transport.



4: Here are the sections folded up to see if the unit is easy to transport and it passed the test. The addition of a handle on the underside of the second section, and a latch on the two section ends, creates a solid unit that is portable.

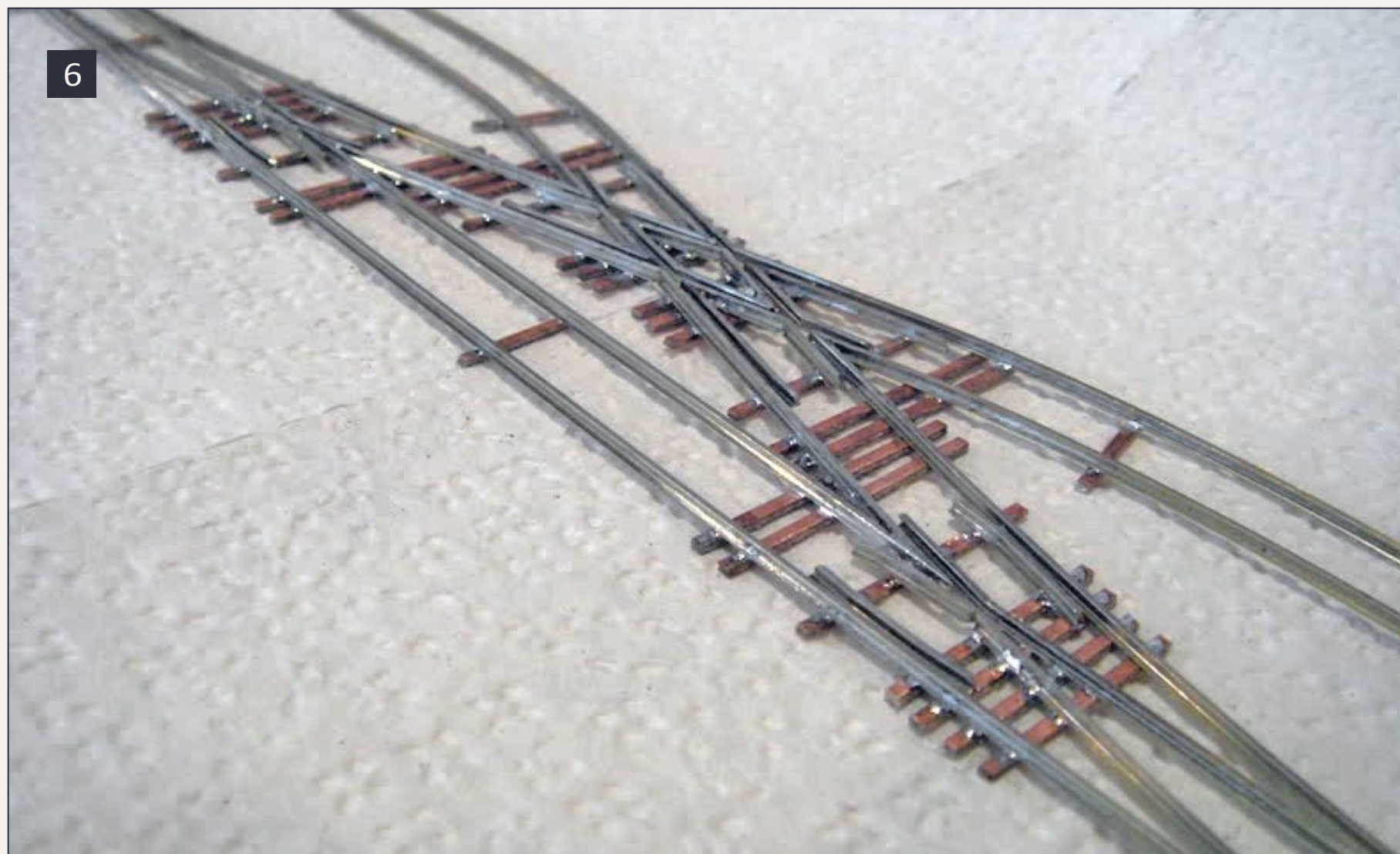
We Gorilla-Glued the pc board ties of the turnout fixtures to the MDF base for added stability, but used caulk to fasten down the flex track. Having no foam in which to easily push T-pins, we used canned veggies to weigh down the track while it cured.

We drilled feeder holes, soldered the feeders to the rails and used suitcase connectors underneath to fasten the feeders to the bus wire. Then we just had to take the SP NW2 for a spin (8).

We used a thin layer of Magic Water to coat the thin strip of water off the wharf and to fill in the carfloat quay area. After we installed the permanent carfloat, we used Modge Podge to create wave and ripple effects.

And then there's the most incredibly exciting part of N scale model railroading: doing tie replacement!

The PC board ties are slimmer than Atlas flex or even the ties Fast Tracks sells, so I slip 1/32" x 3/64" basswood strips (after a dip in my "Big Jug O' Stain") under the turnouts. Yes, it's tedious. Luckily, "family bonding" also



6: The addition of the brewery to Byron's original plan required a crossing between two turnouts that started curving immediately after each turnout, so I got to try out building a crossing for the first time.

includes a Chopper II, thin strips of white glue between rails, tweezers, and my daughter sharing the joys of tie replacement (8).

Giving the shelf a more permanent home

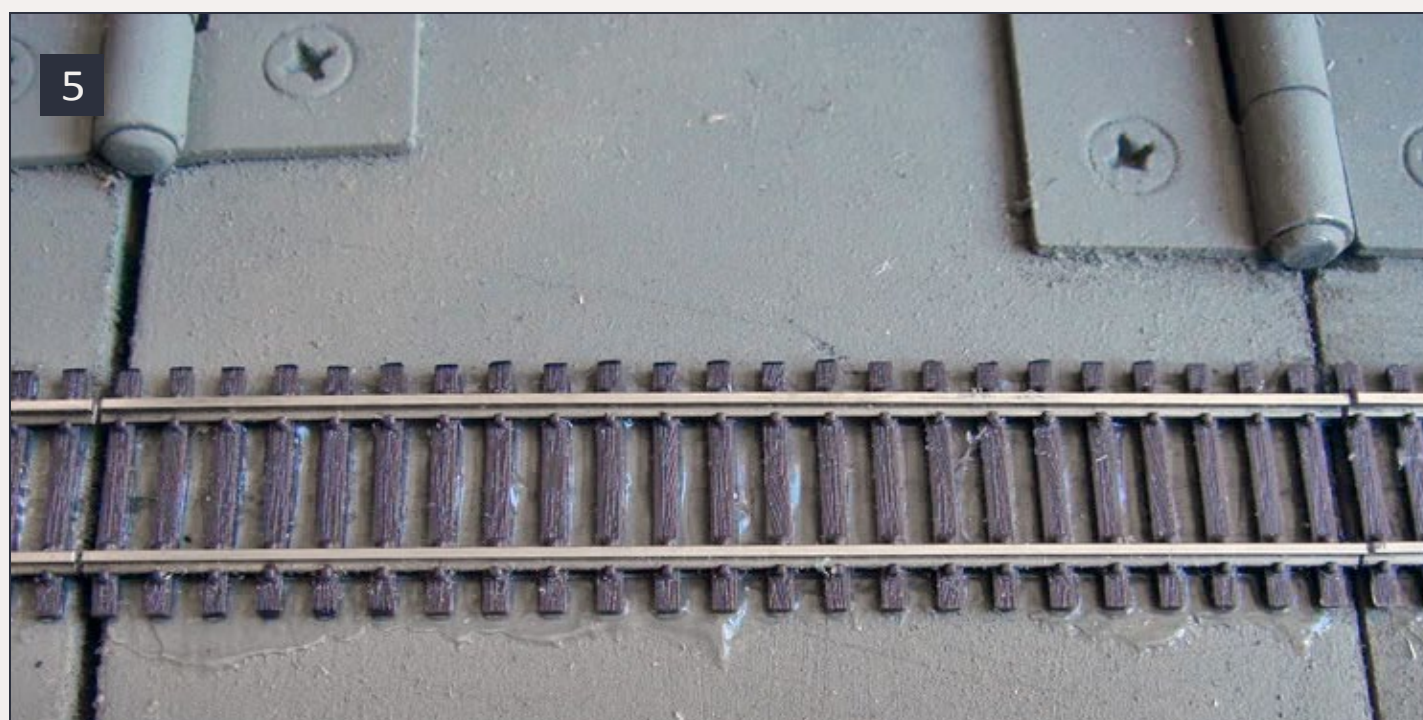
The growing number of Free-moN modules in the garage and the desire to actually run trains prompted me to finally build a shelf for the "Alameda-Belt-in-a-Box" layout. I was going to put the shelf in the bedroom until my

daughter reminded me that my wife goes in there too.

So out in the garage the layout goes!

For even more details on the construction of this shelf layout, see M.C. Fujiwara's MRH website thread: mrh-mag.com/node/5666.

More pictures and captions on the following pages ...



5: For track joints, just cut the track as shown here. By having the hinges on top, folding up the sections pulls the track away from the joint and causes no problems.



7: In a great moment in father/daughter bonding history (no CA involved), I taught my pre-teen daughter how to use a soldering iron to build turnouts.



9: My daughter helps me cut replacement ties using our NWSL Chopper II. Busy hands are happy hands!



8: We took the SP NW2 for a spin on the wharf deck we built out of pc board ties and 1/32" x 3/64" basswood strips. After taking this photo, we painted the pc board ties to match the stained wood.



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M. C. lives in his native San Francisco Bay Area with his wife and two children, who enjoy helping their dad build his 23" x 41" Mt. Coffin and Columbia River N-scale layout by making trees, painting rocks, and running trains.



10

10: Filling in the gaps in the ties with replacement ties made from stained 1/32" x 3/64" basswood strips. I just coat the back of the tie with white glue and slip it in place using tweezers.



11

11: We masked off everything but the track, made sure the turnout points were covered, and then, working in thirds, we sprayed the rails with Floquil Grimy Black, scraped the rail tops with bits of wood, and then Bright Boy'd the rails to clean off all the paint off the railheads.



12: : We pulled off the masking and here's the result. We went back and touched up the points and the ties around them by hand with Floquil Grimy Black and a small brush. (Note: we've since found that NeoLube works much better to stain ties and rails around sensitive areas like throwbars and point rails.)



13: We started putting together the "Bella Fonte Cannery" (based on the Del Monte facility on Alameda. See the prototype at [flickr.com/photos/40361283@N06/3708909019](https://www.flickr.com/photos/40361283@N06/3708909019)). We got this structure by kit-bashing two DPM Gripp's Luggage Mfg kits (Woodland Scenics) into a single 25" long flat. Here my daughter discovers the joys of painting around window panes.



14: My young son decided to pitch in by helping superglue in the window "glass" on our Bella Fonte Cannery.



15: To prepare the cannery location, we affixed some cardstock background buildings that will show up behind it. On the upper left, you can also see the freight house concrete pad we poured using thinned and tinted light-weight spackle. When it dries we'll sand it smooth (so the ties still show through a little), and then weather it.



17: At the very end of the cannery is a little jog in the building to help block off the end of the module. I put some cinders on the roof to mimic a tar-and-gravel industrial roof. Each track holds 5 cars, for a total of 10 cars that can be placed at this one industry.



16: My daughter sprayed the structure with Red Oxide primer. Then we applied a mortar wash and weathering. We superglued the structure flat to the black styrene backdrop. This industry will eventually have an awning and concrete dock.



18: We decided to install just the concrete loading dock with Gold Metal industrial stairs at each end, but we elected not to do the awning. On the upper left, we're starting the Doolittle Freight structure that will disguise the power pack box. We've also installed an old decommissioned SP tank car at the end of the oil industry spur.



19: I finished weathering the carfloat by dry brushing on some light gray, then applied some glue and put gravel and coal droppings down. I drizzled some of my “Big Jug O’ Stain” on there, and then powdered it up nice and good. You can see the construction details of my carfloat project in the January 2012 issue of MRH.



20: I installed the carfloat and apron, applied some water effects using Modge Podge, and added some basic ground cover. Following the advice of David K. Smith, I screwed the float to the layout to ensure proper rail alignment. It’s nice to have the track 100% done, along with our staging connection to the off-layout world through the carfloat.

21: We’re continuing to make progress on this end of the shelf layout. We’ve finished the Doolittle Freight house and we’ve installed a wood fence between the freight house concrete pad and the SP interchange track. We weathered the road and crossing, put in a little fine foam of “weed” and “green blend”, and added some fine gravel under the tank and around the cannery. I’ve used cinder “ballast” for the SP interchange line in front of the fence.



22: Here's a closeup view of the Doolittle Freight loading dock. This makes a nice structure to hide the power pack box. That blue and white box car sticking out of the freight house behind the loading dock is a quarter-length car that's been chopped off to disguise the fact the spur does not really go inside.

23: I got my 0-8-0 going and weathered a little for some photo ops, rolling back the layout era to Alameda in the late 1940s. The scene's coming along nicely.

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24

24: Here's the middle of the layout, with the two smaller oil tanks. The concrete berm, two small tanks, and the larger brick structure beyond the two tracks are all removable, and disguise the hinges of this "Alameda-in-a-Box" layout (see 25). Remember, because I mounted the hinges above the boards, folding the layout lifts the sections out and up, meaning track and scenery can be nearly seamless when flat.



26

26: Got more done on the oil unloading platform / complex, as well as some more bushes and details like the pile of pipes and the handrails on the top of the large oil tank at the right.



25

25: Here are the structures removed and the hinges exposed. As you can see, the structures do a nice job of disguising the joints. The structures plus a few judiciously placed bushes ought to make the joints practically invisible when the layout is deployed and being operated. Note the angle stop at right.



27

27: Here's a close-up of the oil facility, with a truck and more details like oil drums and some wood debris behind the "office shed". In this closer shot you can see the weathering powders I've added to the oil platform, the office shed, and the large oil tank.

28

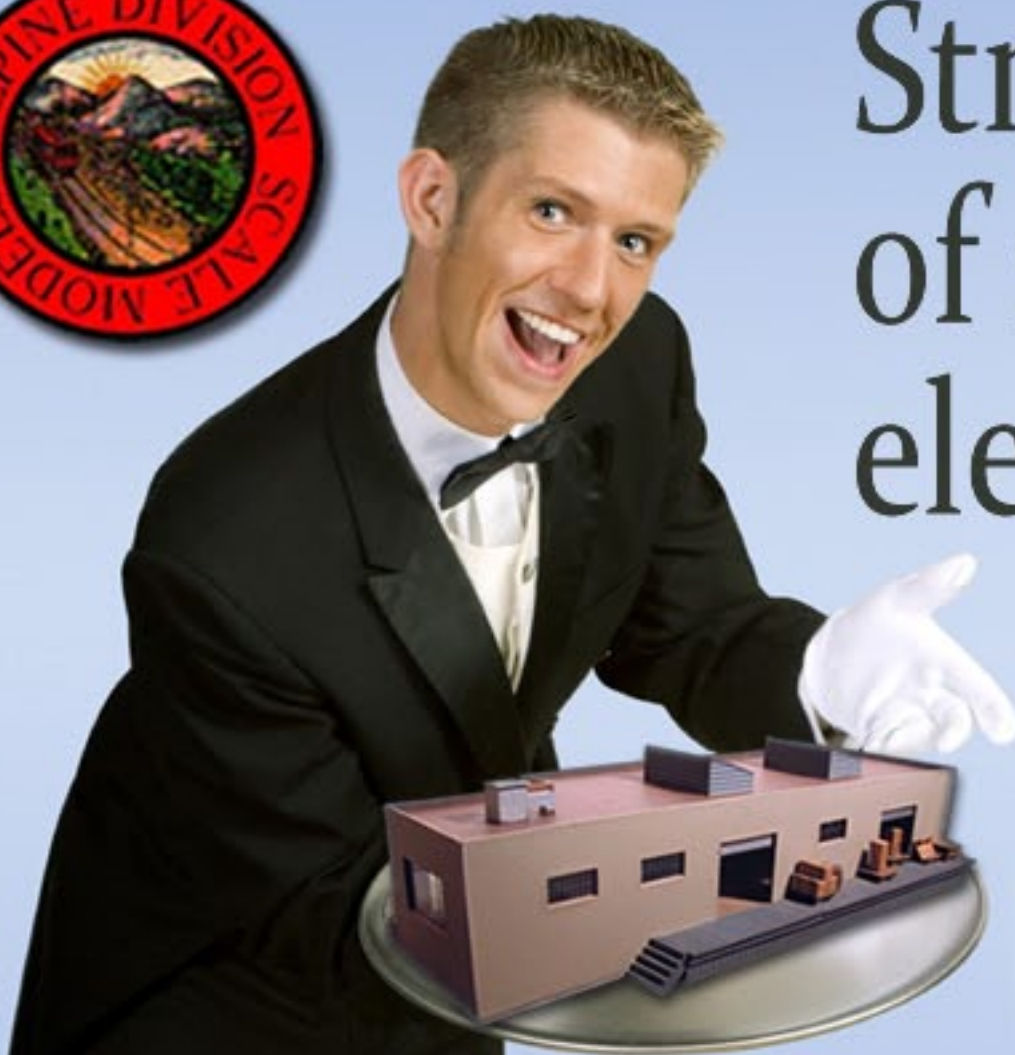


28: I added a Quonset hut to the other side of the oil tanks. In hindsight, I should have thought more about a foundation for the Quonset. I experimented with some bushes and gravel but I'm not entirely pleased with it. I'll probably build up a real foundation for it later.

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29: To create a place to mount the layout, I used Rubbermaid shelving with 1"x4" framing top and bottom. Had to mount it tall enough to clear the Mt. Coffin and Columbia River layout (18" tall) that I place on the table below, so the rail height is about 54".



30: I added 4" of 1/8" hardboard fascia to the front and sides top and bottom and painted everything flat black.



31: I installed two packs of Ikea "Inreda" LED pucks along the underside of the valence framework. They put out no heat whatsoever (which is good, since my garage already gets over 100 degrees F in the summer) and can rotate / adjust some to direct the light.

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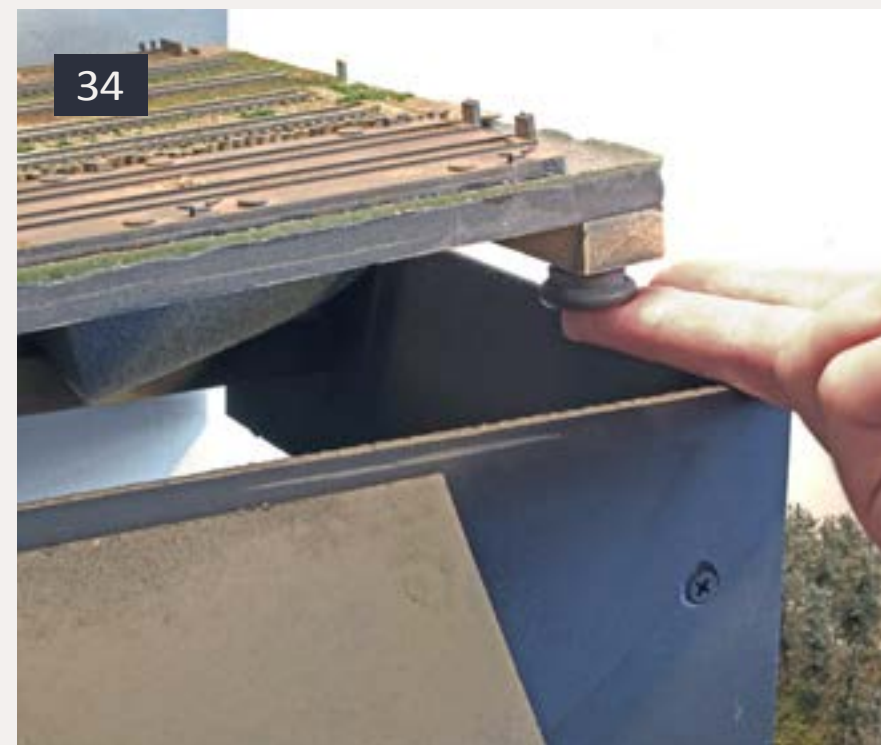
32: A view angled from below shows how the open valance framework allows diffused “house light” in as well as the eight LED pucks that provide direct illumination. For a backdrop, I got some 0.060” styrene sheet cut to 18” x 8’ from Tap Plastics and notched out the spaces for the upper supports. I spray painted it grey primer, then slate blue, and finally misted it with flat white, feathering the white in heavier along the bottom horizon.

33

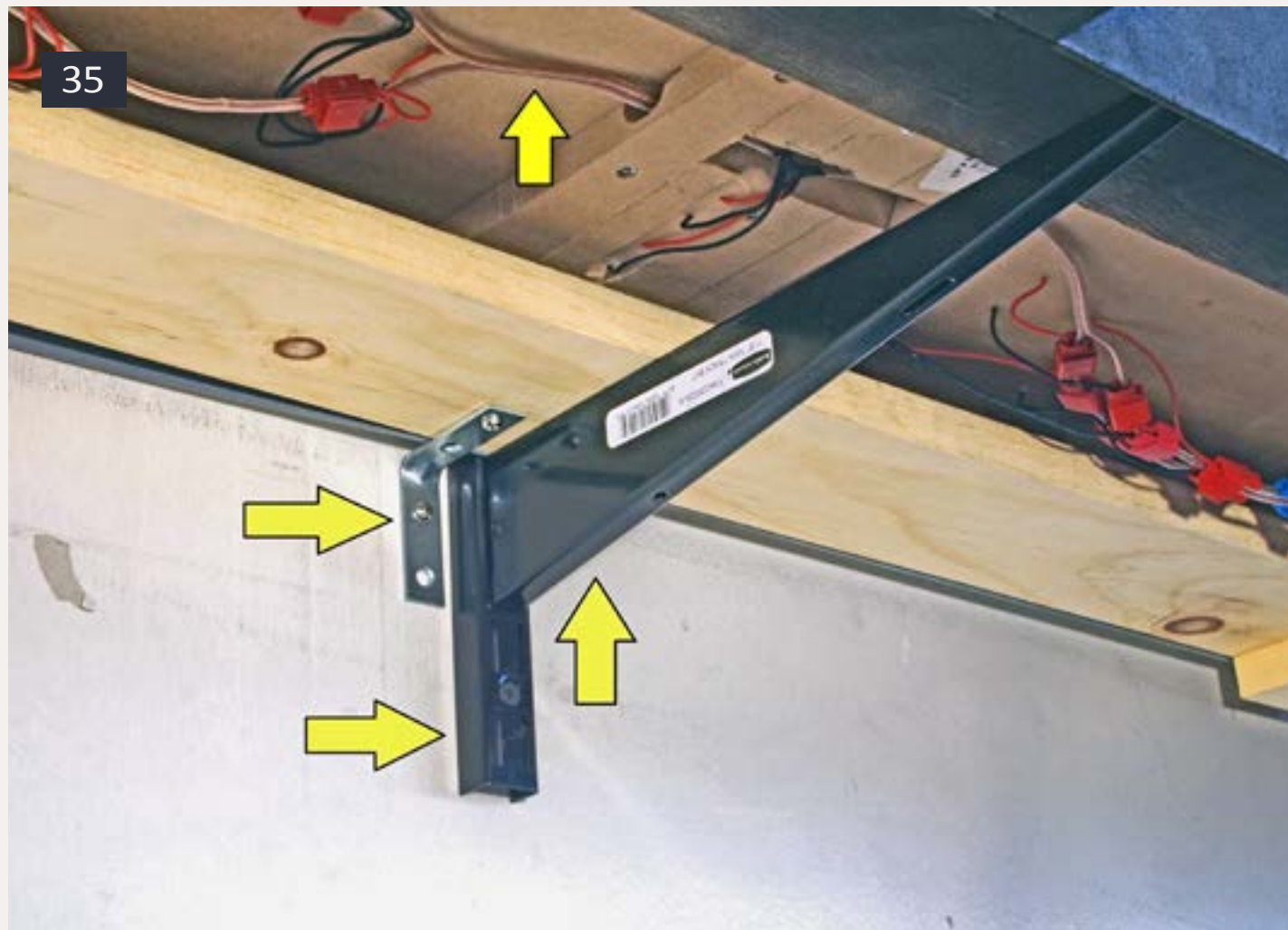


33: I added 5” angled shelves with a strip of molding along the bottom to provide a place for uncouplers, throttles, phones, and car cards – keeping the layout free from clutter.

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34: The fascia extends about 2” above the shelf itself, creating a “pocket” for the actual foldable and portable “Alameda-Belt-in-a-Box” layout (here being lifted up by me). When placed on the shelf, the fascia comes up even with the scenery.



35: A view under the shelf reveals the bus wire attached to the folding layout, the plywood shelf framing, the 11" bracket on the 24" double-slot support (screwed into studs), and the small metal "L" anchoring the shelf itself to the wall (very important here in California earthquake country)

36: Here's the final shelf layout in its new home. It's been a rewarding project, and we learned a lot along the way. This just proves you don't need a lot of space to have a fun model railroad.

37: My young son enjoys running trains on our Port Henderson at Alameda layout. Who says model railroading can't be a family affair?

