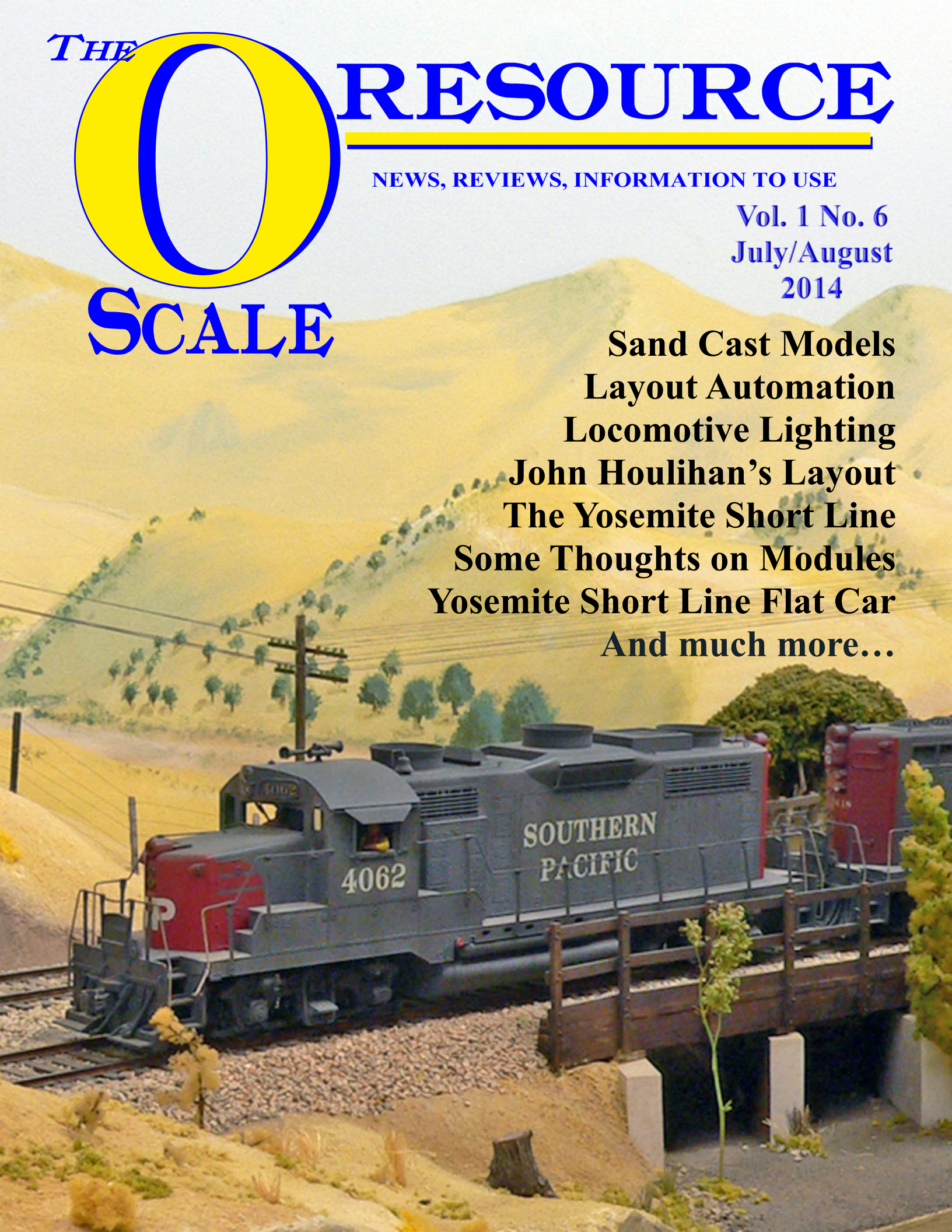
THE O SCALE RESOURCE

NEWS, REVIEWS, INFORMATION TO USE

Vol. 1 No. 6
July/August
2014

Sand Cast Models
Layout Automation
Locomotive Lighting
John Houlihan's Layout
The Yosemite Short Line
Some Thoughts on Modules
Yosemite Short Line Flat Car
And much more…



THE O RESOURCE
NEWS, REVIEWS, INFORMATION TO USE
SCALE

Bill Of Lading

Published Bi Monthly

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Welcome to the online O Scale Resource magazine. The magazine is presented in an easy to use format. The blue bar above the magazine has commands for previewing all the pages, advancing the pages forwards or back, searching to go to a specific page, enlarging pages, printing pages, enlarging the view to full screen, and downloading a copy to your computer.

Front Cover Photo

A Souther Pacific local freight heads up into the Tehachapi mountains on John Houlihan's layout

Rear Cover Photo

Small town on the Yosemite Short Line Railroad.

Advertisers Index

Editorial Comment

Summer is here, and the train shows are over for a while. For this issue, we will get back to modeling a bit more. To start with, I was at the O Scale West show in February and was talking to some of the people from the Yosemite Short Line sectional layout group. They always set up for the show, and have a very nice layout. I mentioned that I thought people who read the magazine would like to know about the group, and they jumped at the chance to tell you. Two of the members wrote up some of the history of the group while the other members all contributed photos. Take a look at the article to see how they did it, and how they are doing today. While we are on the subject of the Yosemite Short Line, I also included some drawings of the only remaining Yosemite Short Line flat car. You may find this article interesting even if you are not interested in the railroad. Since I was thinking about the sectional nature of the Yosemite Short Line club, I decided to show you some ideas that Jerry Huth had on module construction. There are some interesting ideas here, and I made some drawings for you to use. These ideas will be of interest if you are considering building some modules. In addition, the ideas can be applied to existing modules and will provide better module alignment.

In the last issue of *The O Scale Resource*, we looked at some of the history of Kemtron. I worked quite a bit with John Houlihan on that article. He sent me some photos of Kemtron models on his layout, and I was impressed with the layout, so I asked John if we could do an article on his layout. He got busy digging out old photos and sent them to me. There is some good information on how the layout progressed, and who all helped. Take a look at the finished work, along with the things that are still going on.

For some history this month, I went to see Bob Stevenson. He has been collecting tooling from many model manufacturers that do not exist anymore. I was really impressed when I saw what Bob had. I decided to do an article on how some of these old models were sand cast. This is not about any one manufacturer, but more about the casting itself. To see how these models were made will put them in a whole new light.

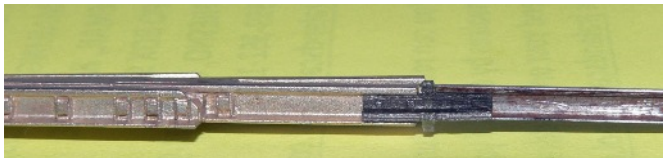
Dan has been doing more with electrical stuff. This issue he is going to talk about using the NCE Switch It accessory. Dan has some main line switches on his layout that are controlled with powered switch machines. There is a small control panel at each location. The Switch It device allows the powered switches to be controlled from the hand held throttle. This worked well, and Dan also goes through how to retro fit a powered switch machine to a switch with some other means of control. After this, he touches on some of the possibilities of using the JMRI computer software to be able to control switches as if a dispatcher were doing it. The electrical side of the hobby is making great strides that are offering much more realistic operation.

So enjoy the June August issue, and we will see you when the shows start up again.

Glenn

News And Reviews

John Houlihan of the Irish Track Layer sent us some samples of insulated rail joiners he is offering. They are designed to fit code 125 and code 142 rail. The center is made high so it can be sanded flush with the top of the rail for smooth operation. See their website for pricing.



I talked to Leo from Crow River Products on June 9th. He is doing very well after heart surgery and back to work already. Leo had a bad heart valve, and they were considering a replacement valve. He went in for some preliminary work prior to valve replacement, and they found he also had two blocked arteries. He was taken in immediately and bypass surgery was done to repair the bad valve. All very good news! He has been home about a month and sounds good. Glad it all worked out.

Bob Stevenson, Stevenson Preservation Lines, is working on an all new switch engine. The model will be a New York Central 0-6-0 Class B-11. There is one on display in upstate New York. The same class of engine was also used on the Nickel Plate. The model will feature cast cylinders, cross head hangers, eccentric hangers, and frame from all new patterns. Bob is taking reservations. If you would like one, contact him at 847-683-7249.

Sea Port Model Works of Hampton, New Hampshire is known for their craftsman kits of New England theme sea port structures and accessories. They are branching out into O Scale with some new items. I talked to Bruce Nickerson, owner, and he pointed out the new Lobster boat. This model comes as a water line model or a full hull model so it can be displayed out of the water. The models all feature resin, wood and soft metal parts. Take a look at their website for more information.

Norm Buckhart at Protocraft has new decal sets being added to his line each month. In addition, there are many versions of brass double door box cars available. Another item that Norm has added is a scale ARA type E coupler. The coupler features a steel locking pin that can be lifted with a magnet to uncouple the cars. The coupler works well, and looks good. Check the website for more information.

Lou Cross from California sent a letter with some information about the Kemtron Union Pacific passenger car sets that were made in the 1950's. We talked about these in the May/June 2014 issue of *The O Scale Resource*. Here is what Lou had to say.

Glenn,

You might wish to add the following information to your fine article on Kemtron, contained in "O Scale Resource" Vol. 5.

On a June day in 2010, I was given the following information by Elbert Swerdferger, son of Mark, concerning the Union Pacific passenger cars constructed by Mark and Chester Taylor.

From about 1950 to 1955, five 11 car sets were made for the Union Pacific RR. There was one set each for the "City of Los Angeles", "City of St. Louis","City of Portland","City of Denver", and one for the UP museum in Omaha. Each "City" name train was displayed in the window of the UP ticket office located in downtown areas.

Additional sets were made for Dr. Andes in Arizona, Chet, Mark, and someone in Bakersfield, California. Mark's train, after his demise, was thought to have been sent to Auto Train. Chet's train went to an individual, or club, in San Fernando Valley, then sold to someone in the Chatsworth, Reseda area of California. I saw a complete set of cars with the three power units for sale a the O Scale West show a few years ago. They were in sad shape. At another show, Mike Mancini and I spied seven cars in a carton next to a table. Mike, with his superior strength and speed, ended up with four cars, with three for me.

All of the cars originally were lettered with "Union Pacific" on the letter board, with the diesel units bearing the "City Of" names.

Adams and Sons made the engine noses and perhaps the roofs. Bud Upshaw built the original engine trucks.

The five sets took five years to build in a small shop in one of their backyards. Kemalyan cast the passenger car trucks, while the decal art work was done by Jerry Best. Elbert did the priming, and Chet did the painting. Best did the striping and lettering.

The cars were shipped four or five each in a plywood box with the three engines in a separate one. They received $100.00 per car with each engine going for $150.00.

Anyone with more information or corrections, I hope will take the time to share them with us.

Lou Cross

Dave Vaughn of Nickel Plate Models sent a note that he is doing some Nickel Plate road steam engine decals. He will be producing three separate NKP steam loco sets: Berkshires, Mikado and small steam. These will be screen printed and are based on artwork supplied by Dr. Dave Campbell. They will be very complete, including class designations and tractive effort lettering, Wheeling and Lake Erie lease information, tender lettering, including gallon and ton information for appropriate classes, and air tank stenciling. The price will be approximately $13.00 each. Contact Dave if you need some of these.

Bill Davis of American Scale Models said his father passed away, and he has been busy with family maters. Our condolences to Bill on his loss. He told me that he will have things back in order soon, and expects to have his new website humming along. Bill said to tell everyone that he will be at the O Scale National in Indianapolis in September. Be sure to stop by and see him.

Ron Sebastian at Des Plaines Hobbies is doing a custom run of Chicago Great Western GP-7 diesels with Atlas. The Great Western had two of them, numbered #120 and #121. Both numbers will be available on the models. The models will feature the colorful maroon and red with yellow striping paint scheme that the units were delivered with. They will also have the "lucky strike" herald. The contract calls for delivery in January, 2015. The models will be available in 2 or 3 rail. Contact Des Pains Hobbies at 847-297-2118 to make your reservation and be sure you get the numbers you want.

Dennis Loep from peolini-design.com sent photos of some O Scale vehicle projects they are working on. They make a crawler track conversion kit for a Back Woods Miniatures Mack Truck kit. The conversion replaces the rear wheels of the Mack truck with a crawler track. The kit can also be used for scratch building. In the photos below, the crane truck was scratch built by Bill Davis. The Mack conversion was done by Dave Reed. The kits are produced in the Netherlands and are shipped in secure packaging. Take a look at their website for more information.

Island Model Works is doing some modern street cars and light rail cars in O Scale. They are resin kits and some have interiors. These Scota cars are modeled after the cars in Portland, Oregon. See their website for more info.

The Neenah O Scale Club in Neenah, Wisconsin celebrated their 50th year with an open house. I took a photo of some of the members who were there at the time. Many families with young train fans stopped by to look. They took donations and had cookies and soda for sale. This was a good way to promote the hobby, their group, and make a few dollars. From the age of some of the members, it looks like they will be around for another 50 years.

Renee Grosser has been busy making structures again. This one will be a model of the Louisville and Nashville depot in Paris, Kentucky. Renee doesn't crop and cut her structures and the size of this building is evident in this photo. The building is much farther along, but I wanted to show you this photo because it's a good illustration of the size of the building.

HOTTEST MODELS FOR 2014

RDC-1 & RDC-2

B&O - B&M - C&O - C&NW - CN - CP - LIRR - LV - NH - NP (RDC-2)
NYC - PRSL (RDC-1) - SF (RDC-1) - SP (RDC-1) - WP (RDC-2)

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Polycarbonite Flush Windows - Lighted Interior w/ Figures
3R - ERR -TMCC - NEW IMPROVED RAILSOUNDS
2R - QSI "TITAN" DC/DCC with Digital Sound

TIMKEN 4-ACES #1111
NP A-1 #2626 (GREY OR BLACK)

Timken 4-Aces was built in 1930 by ALCO. Used to demonstrate Timken Roller Bearings. Ran on C&O, NH, NYC and PRR and 10 other railroads for over 90,000 miles.
In 1931 NP bought her and she was renumber #2626. Painted both Grey and Black.

ERR Cruise / TMCC/ 2/4 Puffing New Improved Railsounds. Pittman Powered.

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CB&Q - ERIE - GM&O
GN - LV - Milwaukee (Yellow)
NP - NYC - Reading - PC
PRR Green/Tuscan - Rio Grande
Rock Island - Southern
SP Black Widow / Daylight
Santa Fe Freight / Warbonnet
UP Yellow - Wabash
WP & MORE

GM OR UP TRAIN OF TOMORROW

General Motors toured its all-dome concept train, the Train of Tomorrow, across the country beginning in 1947. It was operated on many Railroads during it's cross country tour. After the tour ended, Union Pacific purchased the four cars and assigned the Astra-Dome train, powered by an Electro-Motive 2,000-horsepower diesel locomotive, to pool service on the Seattle-Portland run.

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Sand Cast Models


FIG. 31

By Glenn Guerra

The other day I was visiting Bob Stevenson and we were talking about the old manufacturers. Many of you know Bob as Stevenson Preservation Lines. Bob has made it his mission to collect all the old tooling and parts from out of business manufacturers. I have talked to Bob a lot at the shows and have seen his reproduction parts, but I was not prepared for what I saw when I got to his house. Before I get to that, let me tell you a little about how Bob acquired his stuff. Bob started around 1999 by purchasing the Baldwin Model Locomotive Works line from Clark Benson in Connecticut. The Baldwin line was sold by Walthers under the B-Lectric line in the 1940's. Bob said about 6-8 months later he saw an ad selling the estate of Henry Pearce from Lapeer, Michigan. After some time negotiating with Pearce's daughter, Bob was able to purchase the tooling that Henry Pearce had produced, as well as, a lot of tooling he had acquired. Henry was a tool and die maker for General Motors, and was very accomplished at his craft. Bob seemed to remember hearing that Henry made some tooling for the old Hines Line of O Scale models. As Bob remembers it, there were some problems with payment, so the tooling was repossessed by Henry, and he sold the Hines Line kits under his name, Pearce Tool. After three trips, Bob had all the stuff in one pile at his house. He started to sort through some of what he had,

Bob has this shipping trunk in his collection of stuff. You can see on the inside cover that the patterns were going back and forth between Adams & Son in Wichita, Kansas and Central Locomotive Works in Chicago, Illinois.

This is a small sample of the 100 plus patterns Bob has hanging on the walls of the shop and in boxes. I was there with Ron Sebastian visiting Bob, and while they talked, I marveled the patterns. There they were, the original patterns for so many of the old models.

and was starting to sell parts to people. Bob went on the trail again, and it led to Jan Lorenzen of Locomotive Workshop. He was able to purchase the material from Jan Lorenzen, Jr. when Jan, Sr. passed away. Many trips later, Bob had more stuff at home. Next came retirement and moving from St. Charles, Illinois to Ames, Iowa to take care of Bob's mother-in-law. Phone calls were made to Bob's sons for moving help. After Bob's mother-in-law passed away, he and his wife Miriam decided to move back to Illinois to be near their two sons. More calls for strong backs went out to the sons to help move the train stuff again. Bob thinks that was the last time,and they will not help anymore. So, that is how Bob acquired all the stuff he has. Now that you know a little of what he has and how he got it, let's get on with the story.

This ad appeared in the January, 1947 issue of Model Railroader. These models were probably being cast by Adams & Son.

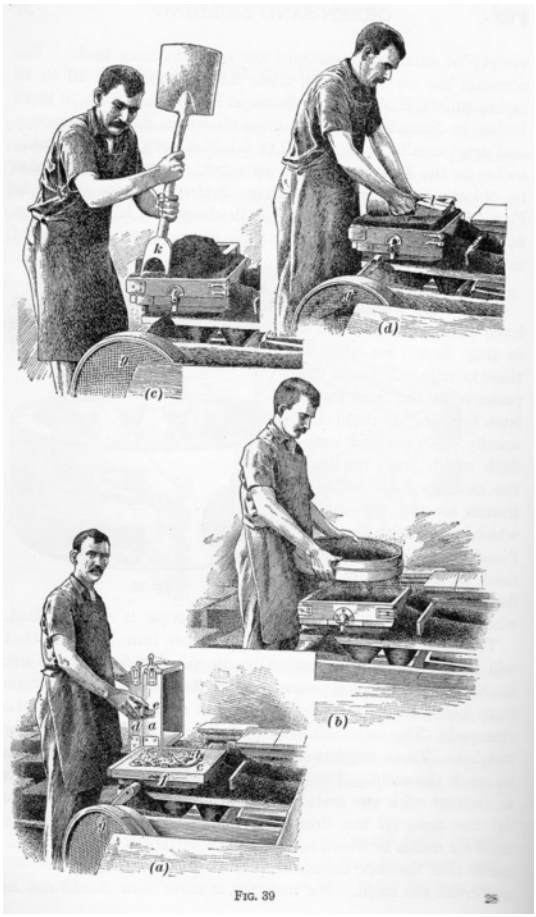
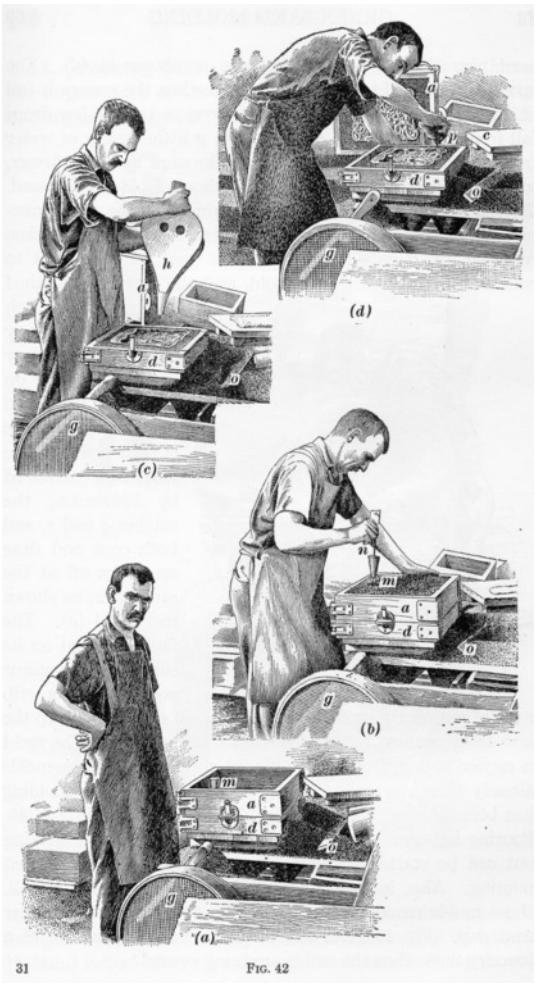


FIG. 39



31 FIG. 42

Hanging on the walls of the garage were sand cast patterns from many different old manufacturers. I was amazed, and knew we had to do a story about these patterns. In the 1930's, through the 1940's, and into the 1950's, sand casting was the predominant technology for casting model trains. By today's standards, they seem very crude and clunky. There is a group on one of the online forums that affectionately refers to these models as "door stops", and they have fun telling each other about the latest treasure they have acquired. I have made many sand cast patterns for the museum work I did in the past, and have dealt with many foundries. I have made patterns for window hinges, queen posts, pedestals, and even a bolster pattern. In addition, I have made some small patterns along with some friends for their 3" to the foot backyard railroad. We have been to small foundries that were in their 4th family generation and large steel foundries. We were never able to get the results of the old foundries. These models, as crude as they seem, cannot be made today the same way they were made 80 years ago. To help explain this, let's start with the technology of sand casting.

When you want to mold molten metal that is 2500 degrees Fahrenheit, you need to have a mold that will withstand that temperature. Also, you need a mold that you can make. Sand was the preferred material. Remember making a sand castle on the

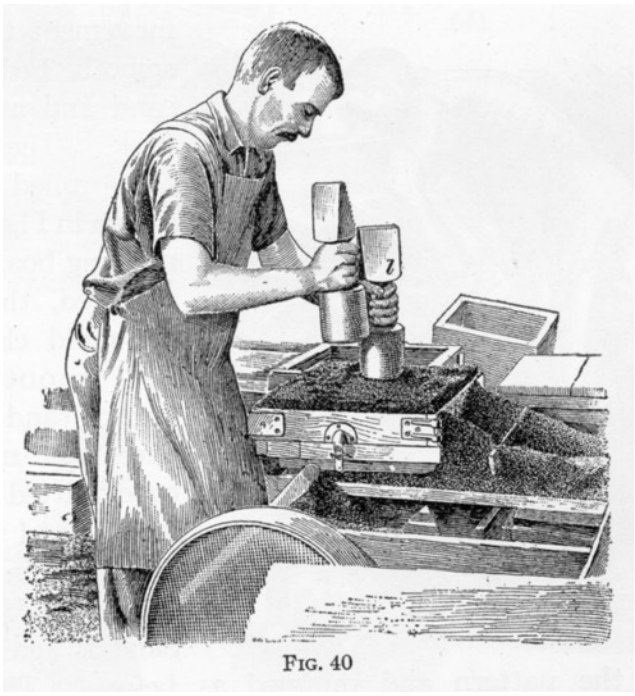


FIG. 40

The illustrations on this page come from the International Library of Technology textbook 1923 edition. The textbook covers pattern making, as well as, green sand molding and core making. In the illustration on the upper left @ is our mold maker getting ready to start, (b) is riddling the sand, (c)is starting to tamp the sand, and (d) is starting to ram it. Above in Fig. 40, you can see the wood rams that he would pound the sand tight with. In the lower left, he is ready to fill the cope of the mold. If you look close, you will see a small cone, m. This will make the cone that the metal is poured into. In (b), he has finished ramming the cope and is removing the cone. The next illustration, (c), shows him with the mold separated and he is blowing out any loose sand. In the final illustration, (d), he is doing some hand work on the mold cutting gates and risers.

beach or in the sandbox. By forming the sand in a bucket or your hands, you could make shapes. The sand would stay that shape as long as it was damp. So, already you know something about making a sand mold. The composition of the sand is very important. Let's start with an iron foundry. In iron foundries, a mix of sand, clay, sawdust, water, and coal dust is used. The clay helps to bind the sand. The sawdust adds some fiber strength and resiliency to the mold. The water helps the clay hold the sand in place, and the coal dust improves the surface finish of the cast iron. In a steel foundry, the coal dust is left out because the steel already has carbon and anymore would make the surface very hard and brittle. The coal is also left out in brass and aluminum foundries. This is why you don't see steel and iron cast in the same foundry. All the foundry people I talked to said it was to difficult to keep the sand separated. Brass and aluminum seem to be compatible, therefore, a lot of foundries do both. The last consideration with the sand is the moisture content of the sand. As you would expect, the minute the molten metal hits the sand the water turns to steam. Too much moisture and the mold will burst from the escaping steam. This is not good because now you have molten metal running around the floor by your feet. The last thing component is the sand itself. The sand used in foundries is processed for foundry use. The type of sand and the size of the grains is important. This is where we ran into so much trouble with the small patterns we were making for the backyard trains. I will have more on that later. The last thing I should mention about sand is "French Sand". This term gets associated with Adams & Sons' work. The casting of bronze statuary demanded very fine surface finish. The French artisans doing

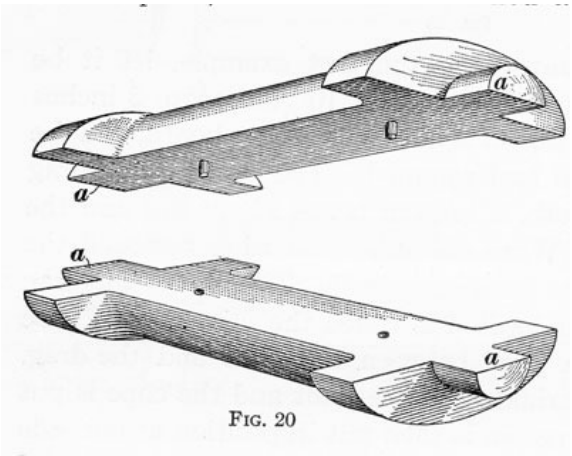


FIG. 20

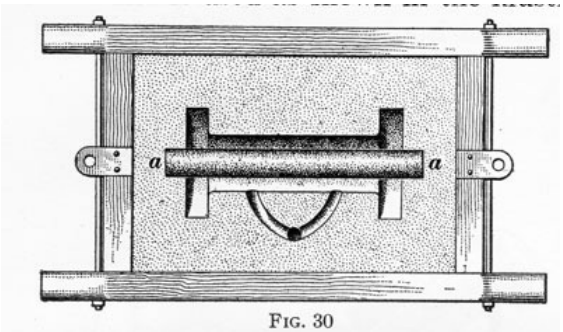


FIG. 30

These two illustrations from the 1923 textbook are good examples of a pattern with a simple parting line. The part labeled a is the core print. In the mold on the bottom, you can see how the core is supported at the points labeled a, which were made from the core print on the pattern.


These are the core prints. Can you visualize how the core would look and how it would be supported?

This is a good example of a loose pattern. This appears to be a Pennsylvania K-4 boiler. Bob is not sure who it belonged to, but it's possible that it's a very early Scale Craft pattern. The K-4 was one of their first models, and they were sand cast. The pattern is made out of Mahogany which is very nice to work with, and is a common wood for small patterns. Most patterns in this era were painted with shellac. In this pattern, the shellac has been tinted with lamp black. The pattern is shown open so you are able see the alignment pins.

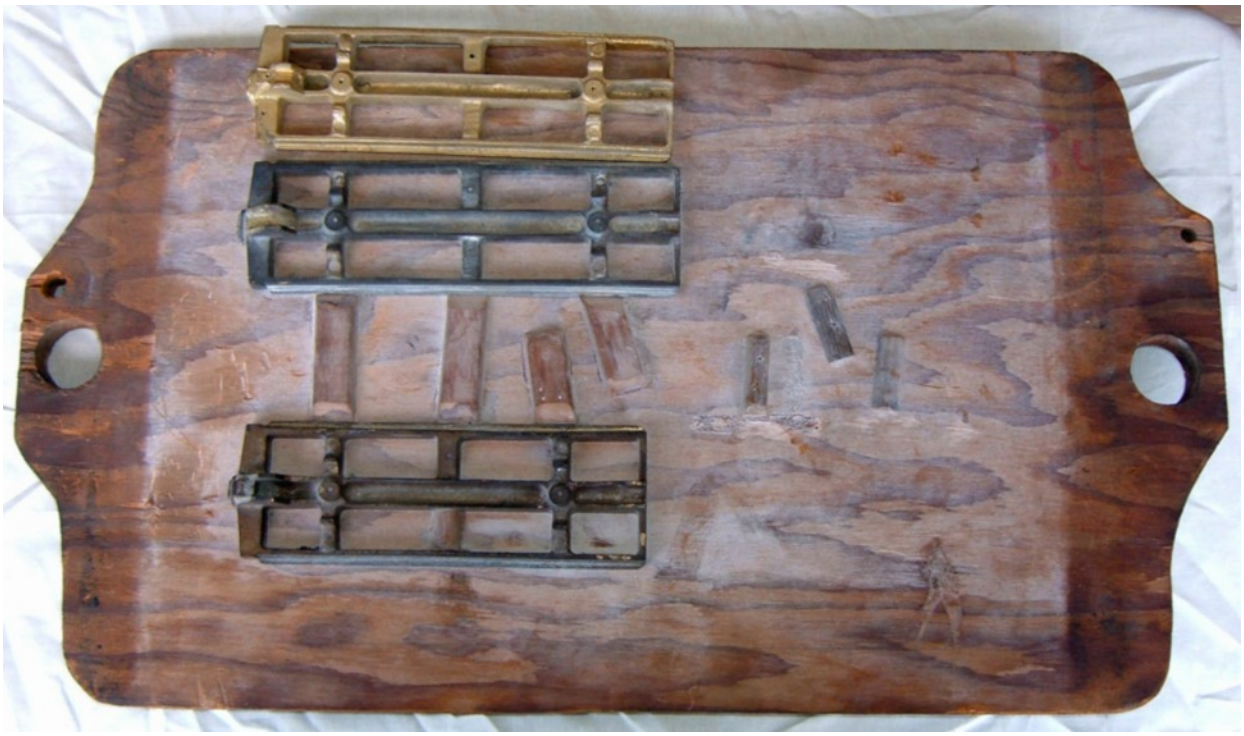
Not all patterns are wood. In the lower left, you can see two fuel tanks made of metal with a #2 on them. They are patterns as indicated by the vents sticking up out of them. The wood pattern is to the right. From the wood pattern, a few metal parts were made, and then joined together to become a new pattern. This allowed faster production and minimal tooling costs. There are two other wood patterns here also. Jim DeBruin sent me a note that stated the engine block was sold as an extra weight in Baldwin Model Locomotive Works models. He has an E-7 with two of these weights in it.

this work developed a sand mixture that would give very a good surface finish that would hold up. The mix came to be called “French Sand” in the art world. Basically “French Sand” is a mix of particle sizes, clay, and water like normal foundry sand, only more attention is paid to the recipe to get the desired results every time. The object was not just to get a part, but to get one with a good surface finish. A lot of clay will give the good surface finish, but will not let air escape very readily, thus causing voids in the part. The solution was to vary the grain size of the sand. By having a mix of grain sizes, the foundry was able to get the venting, surface finish, and durability of the mold. For some very special foundry work, sands are exported from around the world to get the desired results. In the case of Adams and Son, I suspect it sounded good in the advertising. So, enough on the sand. The next thing is to make a mold we can pour some metal into.

Forming the sand is not as easy as on the beach. We need to form the sand tight so it will hold it’s shape until the metal cools. That can take a long time for large castings. We also need some way of creating the cavity that we will pour the metal into. Since we are talking about O Scale size models, we will look into how that is done. To start with, you use a box to form the sand in. Since most molds will be two halves, we need two boxes.

These two patterns are examples of loose patterns again. They were made by making a mold with the two parts in them. The gates and riser were cut by hand in the first mold. You can tell this because they are all different. When the mold was opened the parts were not trimmed off, and this became the new pattern. The initial mold was done with extremely fine sand to get the smooth surface. These parts would set on a flat surface called the molding table, and the drag box would be put around them. The sand would be packed and the mold turned over. There is a hole in the other side of the well that you can't see, but that locates the filling cone. The cope box and filling cone would be put on, and the cope would be filled with sand and rammed. Bob is still trying to identify all of these, but this looks like it could be early Lobaugh parts. The coupler attachment looks suspiciously like the Lobaugh tenders.

Next, we need some way of locking the boxes together and aligning them again when pouring the metal. In foundry work, these boxes are called the cope and the drag. If you imagine that the two boxes are stacked on top of each other, the top one is the cope and the bottom one is the drag. Where the boxes come apart is the parting line. To start making a mold, the drag is usually placed on a surface with the parting line to the surface of the molding table. We will skip the pattern for now. The first step is to put some of your sand in a container with a screen bottom and sift the sand. This is called riddling the sand. This will make sure that only fine sand and no lumps will be on the parting line. That sand is patted down and then the box is partially filled. A wood ram is used to pound the sand to compact it. This is why you need a box to contain the sand. When this has been compacted, the rest of the box is filled to a mound and compacted. The last step is to scrape the excess sand off level with the edge of the box. Then, the drag is turned over and the cope box located to it using the alignment



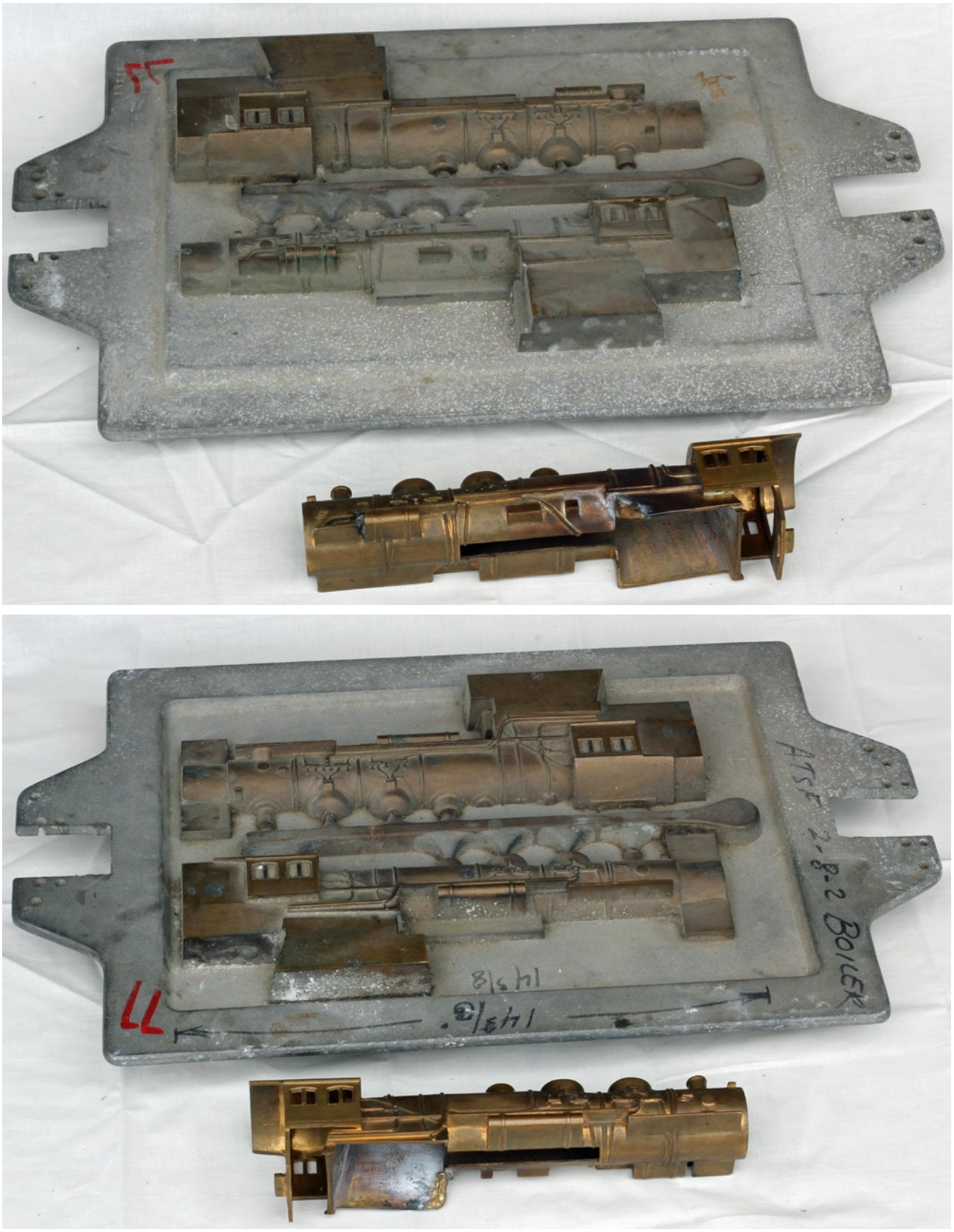
This pattern is an example of a match plate. The parts are one sided and the patterns are mounted on one side of the match plate. The patterns are brass. The gates are wood and you can see them between the parts. This side of the pattern is the cope side. The other side, which is the drag, there is a riser for feeding metal to the gates. At the top is a brass tender frame that came from this pattern. Bob thinks this was a Hines Lines pattern and Henry Pierce probably made it.

This is another match plate pattern. The frame on the left is from my Lobaugh Berkshire. You can see the similarity. Bob thinks this pattern was for the Lobaugh Challenger tender.

pins. Now, you need to do the sand the same as before, but you need to make sure the new sand will not stick to the old sand. To prevent this, the mold parting line is sprinkled with flour or very dry fine sand. This material is called parting. Then, riddle and compact your sand as before. Now you can separate the cope and the drag. At this point, you have two boxes of sand but no place to pour metal. I know that, but I wanted to cover the basics of pounding the sand first. Lastly, is the procedure called green sand molding. Green sand molds do not last very long because the sand will dry out, therefore, they need to be poured within a few hours of making the mold. Many foundries today use what is called no bake sand which is a mix of sand and epoxy. The epoxy is the binder replacing the clay and sawdust. Foundries making large parts will make the molds during the day and pour them at night when the electric rates are cheaper for melting the metal. Now, back to the mold we just pounded. In some applications, the sand is carved with a small scoop to make the cavity, however, this only works for one copy of a part and is not very accurate. What we need is a pattern so we can make duplicate parts.

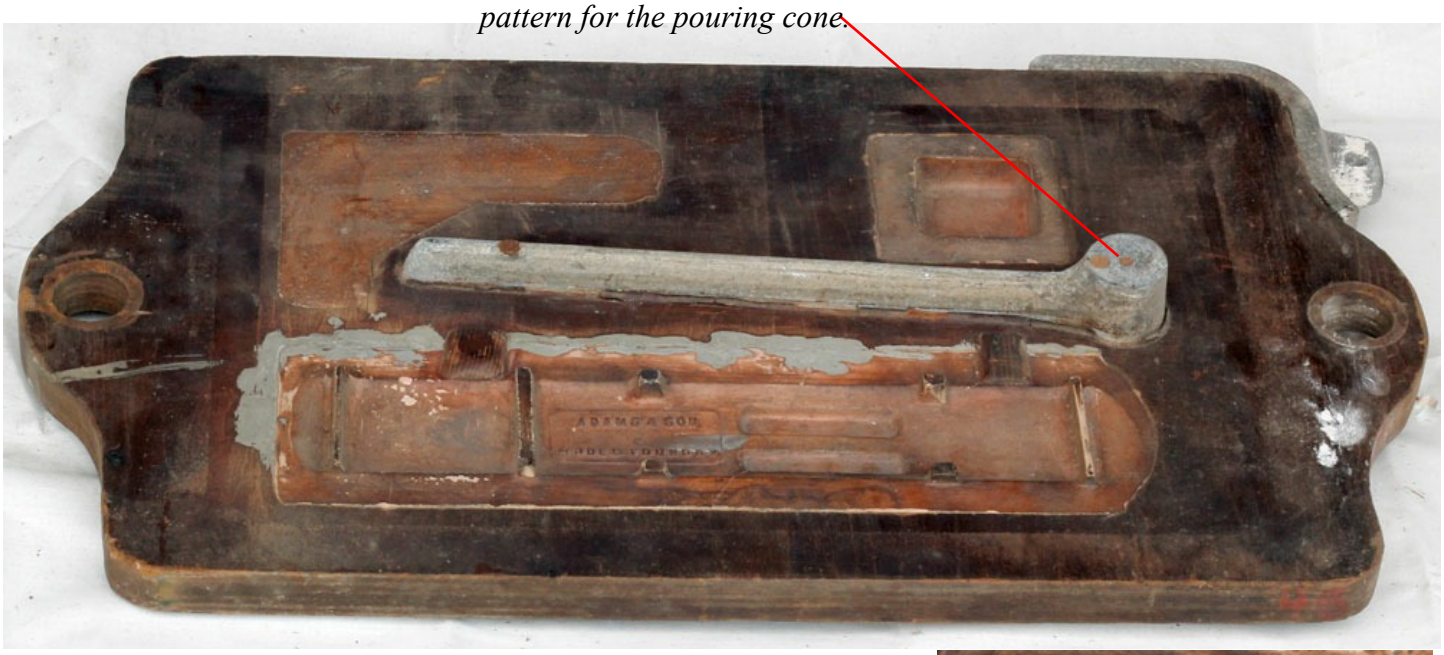
The patterns can be made of many materials. The concerns are the durability of the pattern, the ease with which it can be made, and how it will be handled. Most short run foundry patterns are made of wood. Wood is used because it is easy to work and to repair when the pattern needs repair. It is also relatively inexpensive. For long runs, patterns are made of metal. When designing your pattern, you need to think about where the parting line will

This ad appeared in the June, 1946 issue of Model Railroader and shows the prominence that Adams & Son had in the model casting business at the time.



This pattern has some interesting features. When you remove the pattern from the mold and put the two mold halves back together you need to keep them in register. Usually the cope and drag boxes have pins or other means for doing this. On this pattern you will notice that there is a raised area on one side and a matching depression on the other side. This is to keep the two sand molds in register. Also on this pattern there is no distinction between the cope and the drag. Look close at the surface finish on the part that came

There is a small hole here for the mold maker to locate the pattern for the pouring cone.



This pattern from Adams & Son appears to be for an EMD FT locomotive. The top view is the drag, and the bottom view is the cope. Notice that the roof is hollowed out on the cope. Not all parts of the pattern are higher than the match plate. There appears to be a part missing from this pattern. Also, it's not clear why they would cast one side frame when four are needed for each roof they make. The roof part of the mold seems to be a separate pattern that was inserted into the match plate. It was probably easier for the pattern maker to make it this way.

be. Also, when you go to separate the cope and drag, you want them to come apart without pulling the sand with them. In other words, you want your part to have draft. Remember on the beach that you could not make a sand cylinder because the sand would fall apart when you tried to remove the mold. When you used the tapered bucket things worked much better. Same goes here. If you need to have an overhang on the part, there are ways of doing it. You can use a core or a slip pattern. The simplest core to understand is to imagine you wanted to

Here is a pattern for a flat car. If the car was brass, which I suspect it was, it must have been heavy.

cast a pipe tee. By laying the pipe tee on the table, you will see that there is a parting line you can use. The problem is, how do you cast the inside of the tee hollow? To do that, you add some parts to the pattern called core prints. These will stick out from inside the legs of our tee. Now, we make our tee in two halves separated by the parting line. To keep them in alignment, we add dowel pins between them. So, now we have a pattern, almost. Let's make our mold. Lay one half of the pattern on a flat surface and place the drag around it. Pound the sand until it is tight and scrape it off. Now, turn the drag over and place the cope on it. Sprinkle the flour on, and put the other half of our pattern in place. This is why you need the dowel pins. They keep the pattern halves aligned. Pound your sand and scrape it level. Now, remove the drag and the half of the pattern will come with it. Carefully remove the two patterns from the sand revealing your mold cavity. There are two problems however. One is how are we going to cast the center of our tee hollow and how is the metal going to get in? First the core. That is the part that will cast our part hollow. A separate pattern was made that looked like the inside of our tee plus the core prints. Those parts we added to our first pattern. The core pattern is carved into a block of wood which is called a core box. One half of each part of the core is carved into each box. In our case, one box would work because our part is symmetric, but let's say we are using two halves to our core box. The cores are made ahead of time and placed on a shelf for when the production starts on the part. Because the core will be handled a lot, and will sit around for a while, we need to use a different sand mix. The core sand mix usually has flour and linseed oil mixed with it. In addition, the coal dust in the iron foundries is usually left out of the core sand. The sand is

Even the delicate side rods could be sand cast. This pattern is full of them.

Adams & Son cast this model of the first Fairbanks Morris switch engine for Baldwin Model Locomotive Works. The cope and drag side of the match plate are shown above. Notice how the delicate parts of the pattern were made from brass. This gave the pattern more durability. Bob actually took this pattern to a local foundry in Des Moines, Iowa, where he lived at the time, and had a few models made. This model is not one of them.

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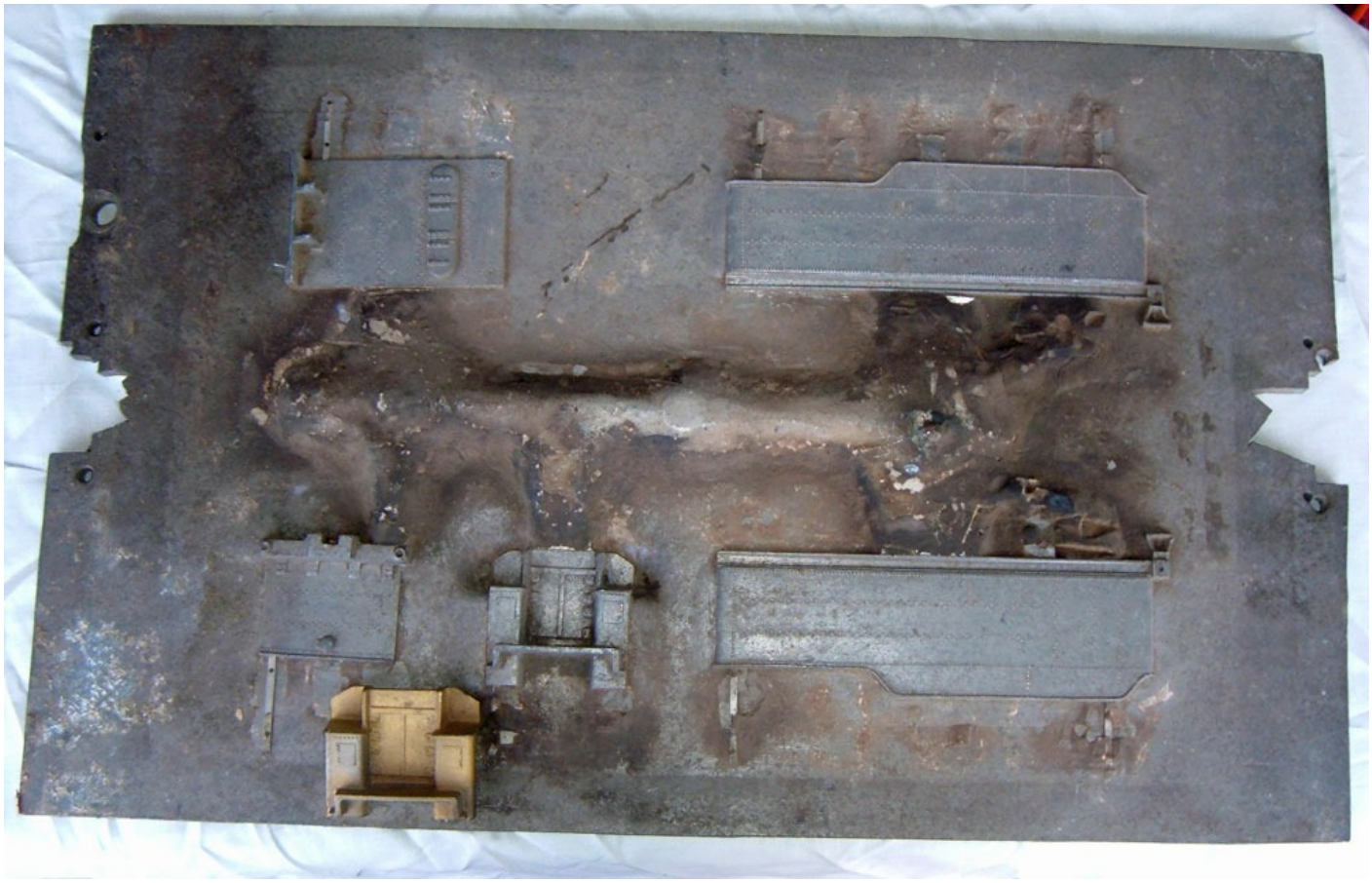
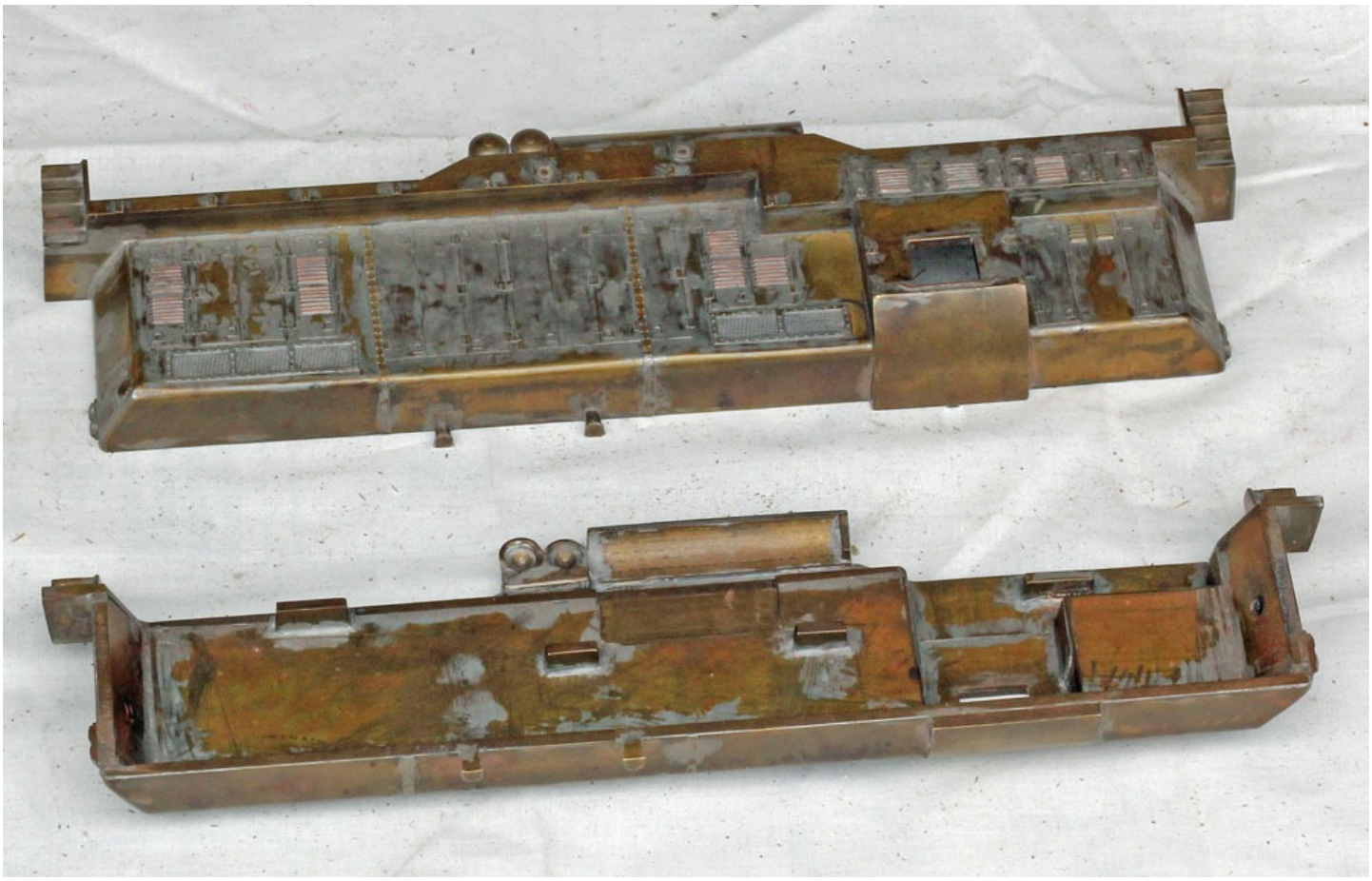


This pattern is for a Hines Line tender. I had the brass tender front in my scrap box and laid it on the mold so you could see what a part would look like from this mold. This pattern really shows the talent and cooperation between pattern maker and foundry man. Notice how the aluminum match plate is carved around the tender front. The match plate is only about 5/16" thick so the other side is just as irregular. This match plat pattern was cast. The pattern maker made brass patterns similar to the part I placed on the pattern. The first step was to pack the drag with some sand. Then the patterns were placed in the sand and more sand was packed on top of them. Then the mold maker cleaned the sand off down to the parts and around them. Next the cope was packed and the mold separated. Then the riser and gates were cut into the cope by hand by the mold maker. Now we have a mold that will make one set of parts. This is a lot of work, each time you make a mold you need to clean out around the parts by hand because of the irregular parting line. What they did was to put a spacer between the cope and drag of 5/16" and cast the whole in aluminum. Now the had an aluminum match plate

This center page ad from Hines Line in the December, 1947 issue of the Model Railroader shows the tender that was made from the pattern shown above.



Bob thinks this pattern was made by Bill Linoir. It appears to be intended to be a loose pattern.

pounded in our core box like the mold would be and pulled out of the box. The two halves are then glued together using the flour and linseed oil mixture, and the whole core is placed in an oven to bake. This sets the linseed oil and bonds the core. The epoxy mixed sand gets it's name "no bake" from the core making process. The molds and cores made this way do not need to be baked. Our core is placed in one half of our green sand mold. It rests in the area made by the core prints of our first pattern. The core is hanging out in the air and the metal will flow out around it, making our tee hollow. So, now that we have that problem solved, we need to get the metal into the mold. I will describe what I am familiar with from the iron foundries I have dealt with. The patterns Bob has are slightly different. Let's start with what I am familiar with first. When you pour the metal into the mold, there will be some erosion of the mold as the metal flows in. For this reason, there are some specific things you need to put in your mold. The first is a place to pour the metal in. The molder will take his scoop and cut a hole in the cope half of the mold. Then, in the drag half, he will make a well for the metal to drop into. This well takes the first violent action of pouring the metal into the mold. The next thing the molder will cut is a riser. The riser is a place for the metal to run out of the well and toward the part. Sand that is eroded when the metal is poured into the well will settle into the well, and clean metal will flow down the riser. The riser is usually rather large. Next, the metal will come to the gate. The gate is at a higher level than the bottom of the riser, so only clean metal will flow into the part. Now, the metal is moving slowly and filling the cavity of the mold. When the metal enters the mold cavity, it is usually near the bottom of the cavity. On the patterns Bob has, there is no well. The metal was poured directly into the riser first. The metal then flows into a low spot on the cavity and fills it from the bottom. This is the same on the iron molds I am familiar with, and the reason is to force the air to the top of the cavity and eliminate any porosity. What I did not see in these patterns was the well to take the initial pour. These are small patterns, and possibly the pouring action is not as violent. After the mold cools, the sand is broken away and we have our part, along with part of the riser and the gates. This is how it is done using just the pattern. When you make a pattern like this it is called a loose pattern. This is where we had trouble dealing with foundries. The knowledge required for knowing where to cut the gates and risers just

does not exist with most people working in foundries today. Once a foreman told me that he was the only one in the foundry that knew how to do that, and he did not have time to do our parts. When we did find people who would do this, we paid a price for the extra work. In some cases, it's worth the extra cost if you only want a few parts. The way to do this for production work is to mount your pattern on a board, and this probably deserves a new paragraph.

When you mount your pattern on a board, the board is called a match plate. The match plate has locating notches or holes that the cope and drag locate on so everything stays in alignment. If you are going this far, you should put the gates and risers on the match plate also. As I mentioned, the location and size of the gates and risers is somewhat of a black art. More than once, we made patterns like the foundry said, only to get them back and see that they had been modified. Match plates work well in production work. Very early on foundries realized that there was a considerable amount of work involved in pounding the sand. Machines were developed to speed up this process. Today, a foundry man can pack a mold like you see in this article in about two minutes or less. The molding machine riddles the sand and dumps it into the mold. The foundry man lightly packs the mold and flips it. He fills it again and then the machine squeezes the mold. This packs the sand very tight. He

Fig. 8.18—Commonwealth Locomotive Bed for Canadian National 4-8-4 type locomotives.

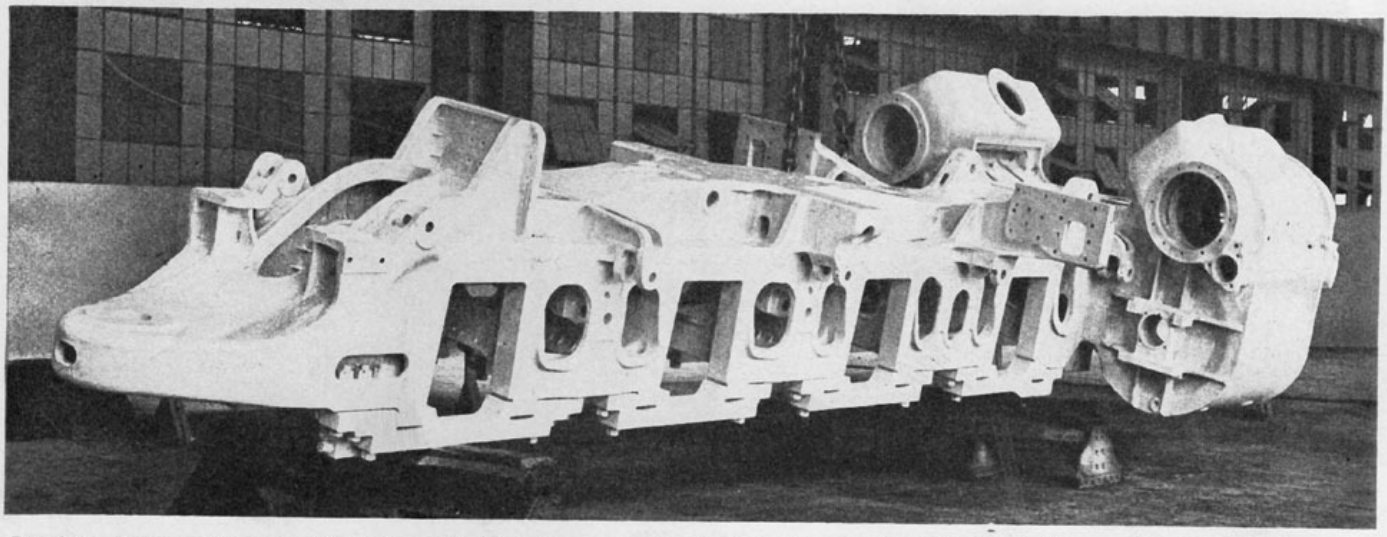


Fig. 8.19—Commonwealth Locomotive Bed with integral rear cylinder heads for Front Unit of Norfolk & Western 2-8-8-2 Type Articulated Locomotives.

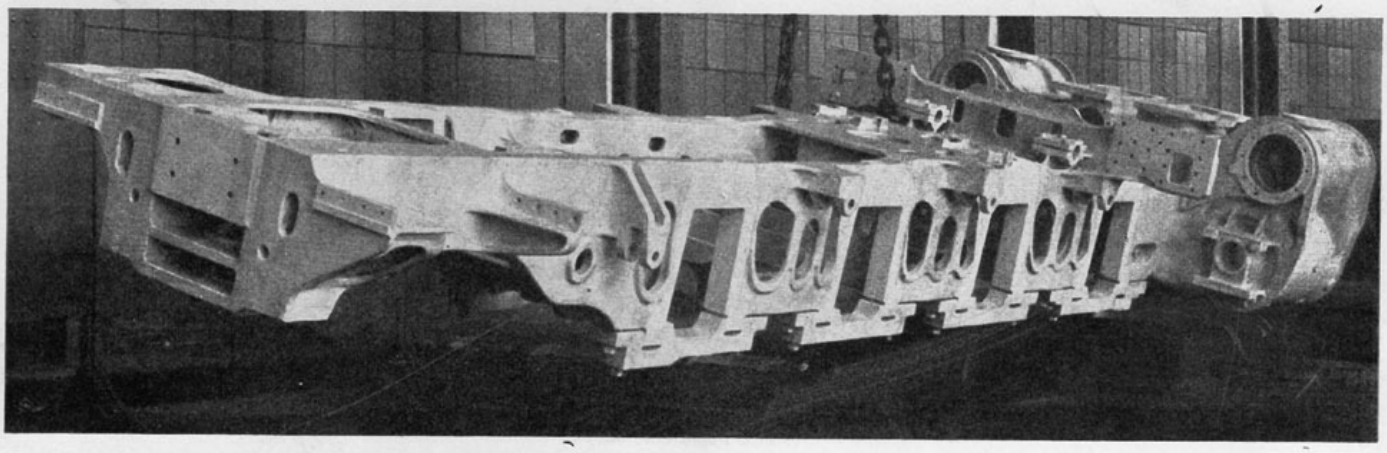


Fig. 8.20—Commonwealth Locomotive Bed with integral rear cylinder heads for Rear Unit of Norfolk & Western 2-8-8-2 Type Articulated Locomotives.

General Steel Castings Corporation

(See also Pages 607, 609)

The locomotive castings produced by General Steel Castings are right up at the top of perfection in the casting art. Next time you are at the train museum, look closely at some of these engines. Imagine what it took to produce one of these, and the skill of the workers.

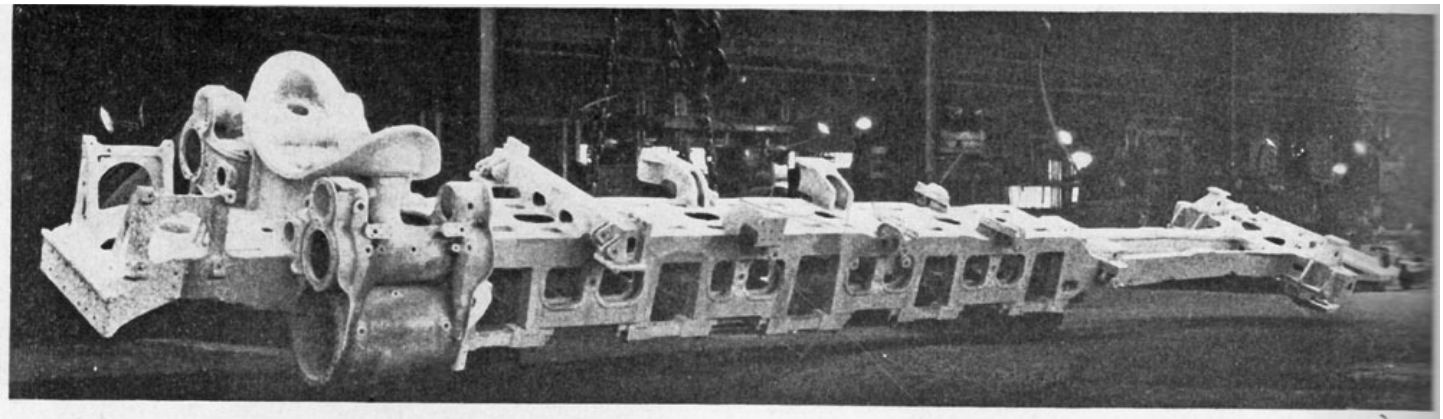


Fig. 8 12—Commonwealth Locomotive Bed Casting for Atchison, Topeka & Santa Fe 2-10-4 type locomotive. Cylinders, back cylinder heads, air compressor brackets, deck-plate and valve-motion supports cast integral. Shipping weight with pedestal binders, 84,520 lb.
(Description: *Railway Age*, December 3, 1938)

We talked about making the model trains ,and how good the foundries were at small parts. This is the other extreme. All this is a one piece casting.

scrapes the cope and drag level and separates the mold. The match plate is pulled out. Any cores are added and the cope and drag are reassembled. They are locked together and pushed down the line. The process is repeated with a new cope and drag using the same match plate. When you set your patterns up for this, you get the best price. This is the basics of how a foundry works. Foundry work for very high volume parts like automotive engine blocks, involve many different techniques. What I have described is basic foundry work that would be used on the patterns in this article. Like all crafts, foundry work has many tricks and techniques that can be used. I have pointed out some of these in the captions which accompany the photos.

Before we leave, I want to mention the prototype trains a bit. We have been talking about making model train parts, but imagine casting a full size locomotive. By the late 1890's, foundries were able to cast large locomotive cylinders and frame rails in steel. This grew into whole tender frames cast in one piece. By the 1930's, they were able to cast an entire locomotive in one piece. The next time you go to the museum to admire the steam locomotives, take a closer look. Think about the process we have been discussing, and try to imagine how patterns that large were handled. Look at the photos from the 1940 Locomotive Builders Cyclopedia that I included in this article. The cylinders, valve hangers, even the air tanks were cast at one time. The process was slightly different than what we did on our models. I knew about these castings, done by General Steel Castings, when I started making patterns around 1979, but had no idea how it was done. A friend of mine from work said his dad worked at General Steel Castings near Chicago during WWII. They were making tanks at that location. I talked to his dad, he was a mechanic, but he told me about the process as he saw it. I have also read some material on this which confirmed what he was telling me. The first big thing you see is how the mold is moved, and how it stays together with tons of steel in it. Here is how this is accomplished. There is a pit that serves a similar function to the cope and drag of our mold and that is to contain the sand. The first step it to pack the sand floor of the pit very tight and level. Georges' dad said he remembered them using surveyors transits to make sure the floor was level. Now, remember how we made the cores by baking them? The same thing went on here. Look close at the photos; you will notice that the area around the axles is the same. There were large core boxes that were packed, and the cores baked. Each assembly made one axle area. By adding more parts, more axles were made. These cores, along with others, were brought to the pit and lined up. The transit was used to check the alignment. Next, he told me that a separate crew came in and smoothed out the joints between the parts of the pattern. This was like plaster work. Again, look close next time you are at the museum and you will see the trowel marks. The next crew came in and did hand work to finish the mold. He stated that he remembered seeing guys with hand drills, like the brace drill carpenters use, drilling holes to place pins in and other cores. They also put small ribs in for strength. Look close at these, and you will notice how irregular they are indicating they were hand cut at the site. This is a technology that is rarely used today. For a lot of applications a fabrication will work, but General Steel Industries and Locomotive Finished Materials still cast trucks for the railroads. Look for the shield with the G in it or LFM on the casting.

Knowing a little about the sand casting technique, you can see why I was so excited to see these old patterns. When I look at these "door stops" as they call them, I don't see an exquisite model, but what I do see is the perfection of a technology that rarely exists today. I can appreciate the work and innovation that the pattern makers and founders put into these models. Bob has put together a wonderful collection of the tooling used by our early model manufacturers. One last note. Bob said that he does not cast parts from these patterns. Many of them are in poor condition and there are no foundries that will do the work you would want.

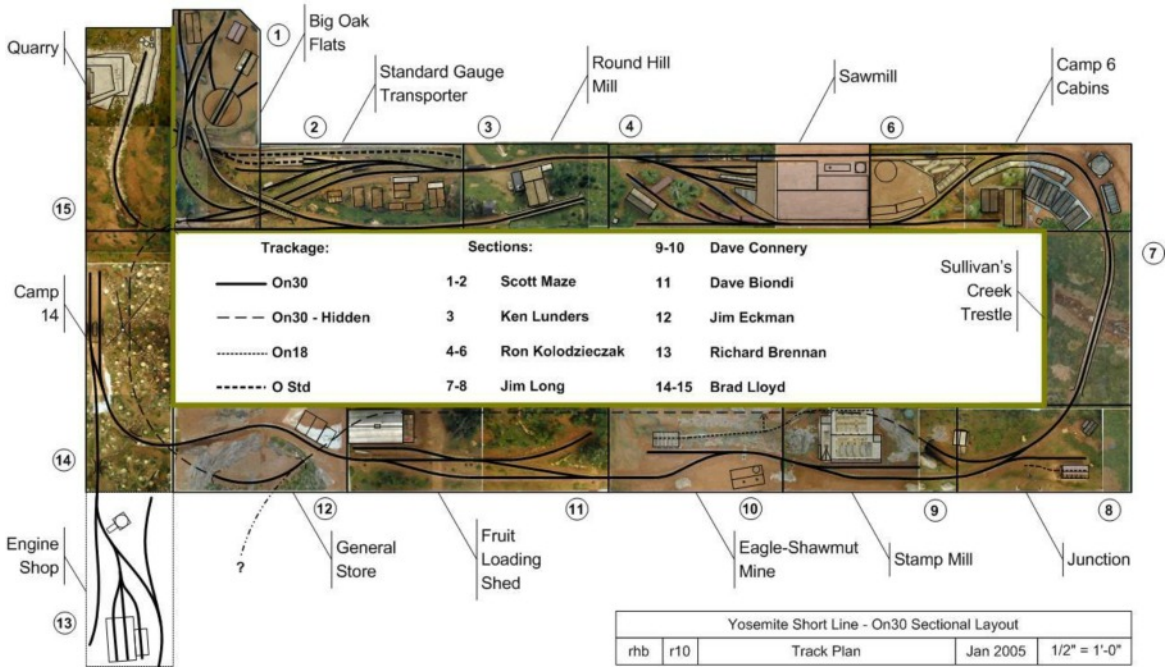
THE YOSEMITE SHORT LINE

A SECTIONAL PORTABLE On30 LAYOUT

By Frank Markovich and Jim Eckman
With pictures from members of the group

About the Group

Our group first started talking about building an On30 layout in December, 2002, for showing at the 2004 National Narrow Gauge Convention. It was a very informal group who knew each other from the Coast Division of the Pacific Coast Region of the NMRA. The original idea was the child of Dave Connery and then the others just came along side of him. In the beginning, there were 9 members in the group and 12 sections. Three of the members built 2 sections each. Some of us knew each other before this project, but this is the first thing we have done together as a group. We have an agreement, every section will be made available whenever the group displays the layout, even if the owner can not make it. We also agreed that if anyone leaves the group, their sections will stay in the group and a new "owner" will be found. Group members are (original members in itallics): *Dave Biondi, Richard Brennan, Dave Connery, James Eckman*, Isaac Good, *Ron Kolodzieczak,* Pat LaTorres, *Jim Long, Brad Lloyd, Ken Lunders, Scott Maze*, Frank Markovich (joined later) and John Roth. Current members include Dave Gill, Reg Shaffer, and David Kreutzinger. Unfortunately, Jim Long passed away and we dedicate the layout to Jim. Ken Lunders, Dave Biondi, Brad Lloyd and Ron Kolodzieczak are non-active members.We settled on modeling a generic 30" gauge railroad, based on the several 30" gauge railroads in California. Most of the sections are inspired by the Yosemite Short Line, so we called the layout the Yosemite Short Line Railroad. There was further inspiration from the Empire Railroad, which is also in the same area.



Track plan by Richard Brennan, 2005 version. Changes keep being made to the layout, and as you look at the photos, you will notice that some of the scenes have been added since this plan was made.

Dave Connery working on the wiring underneath a section of the layout.

Dave Connery, on the left, and Ron Kolo working on the framing.

Brad Lloyd applying a door skin. These were used as fascia and helped keep the weight down.

Jim Long working on the wiring. The nice thing about modules is you don't need to bend over.

The basic frame work of the layout is complete and it's time for a photo. Brad Lloyd, Jim Long and Ron Kolo with completed base of the layout.

December 7th 2003 first public showing at Coast Division, PCR, NMRA.

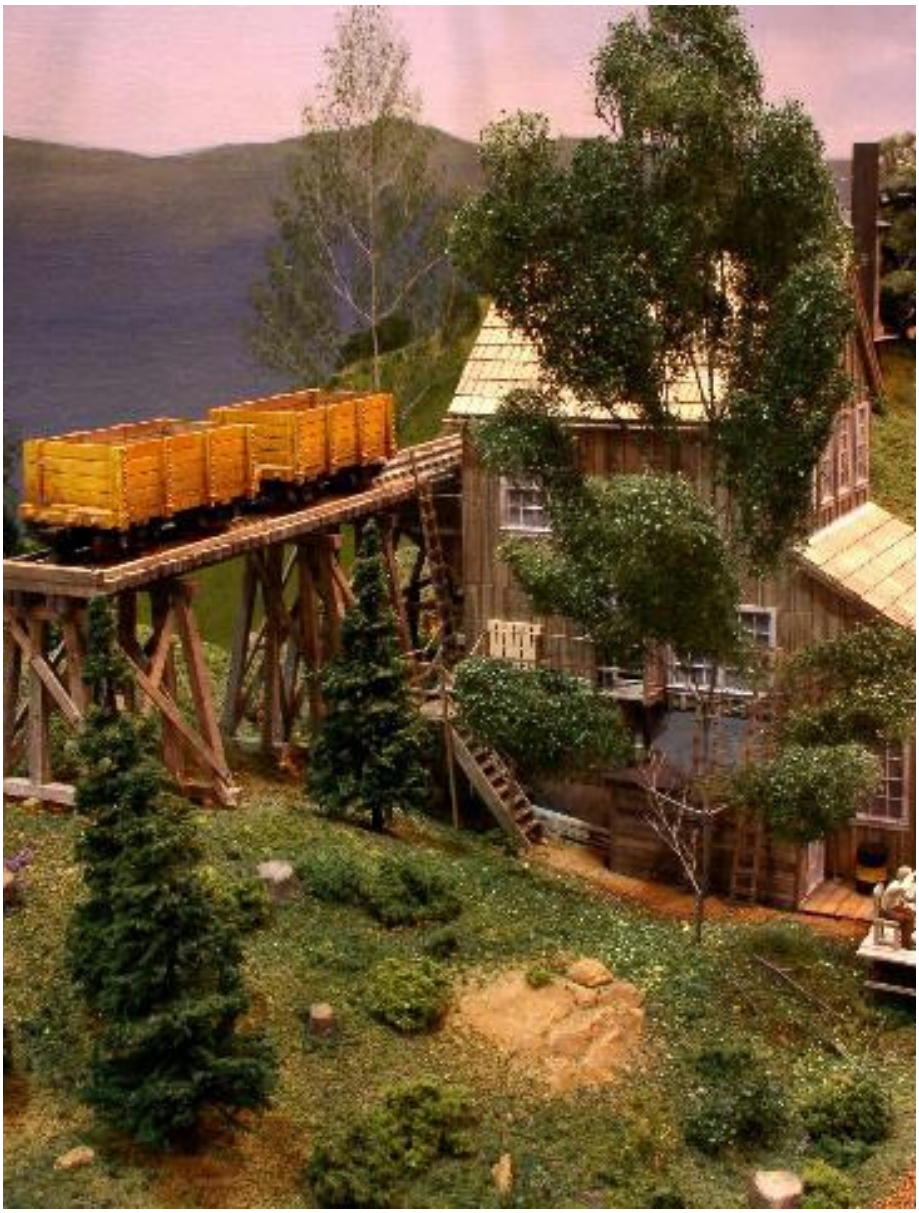
Scott Maze, one of the members of the group, built two of the sections. Scott likes British prototype equipment, and his equipment reflects that.

About the Prototype

The Yosemite Short Line Railroad was organized to tap into the lucrative Yosemite tourist trade, the several mines located south of the Sierra Railway in Tuolumne County and the rich timberlands near Crane Flat (owned at the time by the General Manager of the Sierra). This line was started in 1905, but work stopped in spring of 1906, immediately following the San Francisco earthquake and fire. The line was never finished, service never started and the 8 miles of completed track was removed by 1915. A lumber mill was planned for Buck Meadows, near Groveland.

Scott Maze likes British prototype equipment and operation. He has incorporated some of that in the two sections that he built. This site loads narrow gauge ore cars onto a special standard gauge flat car for transport. This practice eliminates the trans loading.

When work was stopped, the line had two small Porter locomotives with two additional Porters on order. All of these were transferred to the Empire City Rwy, a 30" gauge railroad higher in the Sierra mountains in Tuolumne County. The Empire City Rwy was owned by the Standard Lumber Co. At the time, the same men controlled both the Sierra Railroad and Standard Lumber Co. Standard added a 5th Porter locomotive and purchased two used 3' gauge Shay locomotives, which they re-gauged to 30". The YSL also had 30" gauge flat cars, and both passenger and general freight cars on the drawing board. One flat car remains today, and is now at the California Railroad Museum's Railtown 1897 site in Jamestown, California. This car had worked on the Empire City Rwy. with the Porters following the closure of the Yosemite Short Line. When the Empire City Railway ceased operation in 1913, the 30' gauge equipment then found its way to several other locations. These included the Molino Timber Company in the Loma Prieta area of Santa Cruz, the Johnson & Pollock Lumber Company in Siskiyou County north of Mt. Shasta and the Sloat Lumber Company in the Feather River area of Plumas County.



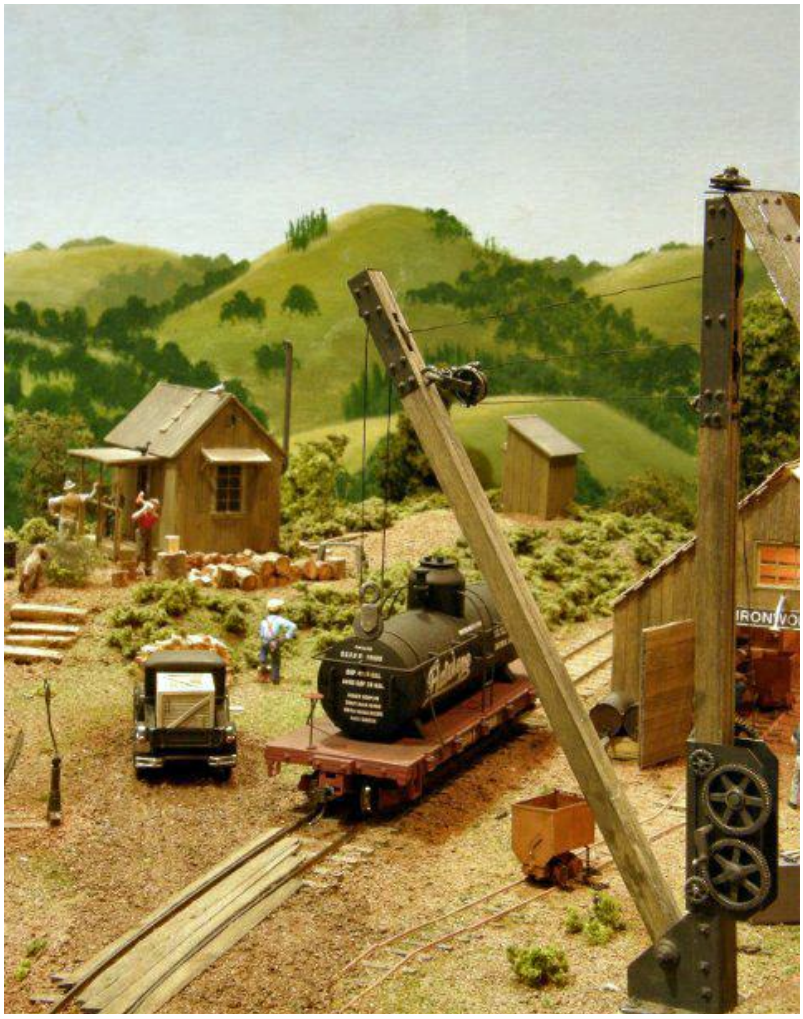
Ken Lunders built section 3, and this small mill is on that section.

Ron Kolodzieczak built sections 4 and 6 which contain the saw mill. These sections are now under the care of Dave Gill. It's lunch time for some of the crew at the mill.

The Layout:

Our layout was designed to be sectional but not modular – every section is needed to operate the layout and sections only mate one way. The basic framework was designed by member Jim Long and is made mostly of door skins and blue insulation foam. Our only standard was, the Bachmann 2-6-0 had to be able to operate everywhere on the

These views are around the saw mill on sections 4 and 6 that Ron Kolodzieczak built. Dave Gill "owns" these sections now.



mainline that loops the layout, and on the branch line that extends to the logging area. Since we are not modular, it was not felt necessary to have other standards. Sizes of the sections are all 24" deep but vary in length from 44" to 72" and group members have either one or two sections. The various lengths were set by members' ability to store and transport their sections. Each member selected a theme for their section(s), and a track plan was developed. When construction started, each member paid for their own section – all supplies. If they left the group, the section was willed to the new "owner". Track is Micro Engineering set on California Roadbed Co. "Homabed", and turnouts are by Railway Engineering. Basic work on the sections was done as a group, but structures and most scenery are the work of individual owners. We attempted to unify the look of the layout by trying to do all track and scenery at the joints between two sections while they were connected together. The group regularly met to join parts of the layout and work on common projects (wiring, lighting, track work, fascia, scenery). This took place at the Fremont, CA School for the Deaf that member Jim Long worked at. Without that location, the layout may have never been completed. Group member Dave Biondi painted all the backdrops.

Jim Long built sections 7 and 8. These sections have a small iron works on the corner of the layout, and a trestle crossing one of the many ravines in the mountains.

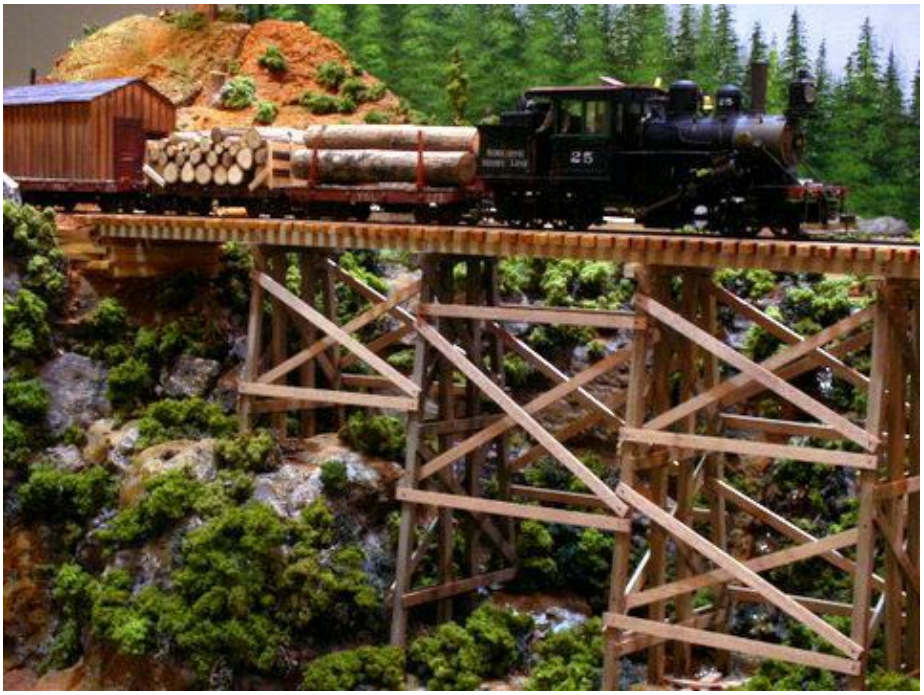
We decided a prototype that existed, but really never operated, offered almost unlimited advantages for us to model. Virtually anything we wanted to build, anything we planned to model, could/would/should be prototypical within the limitations of a small Sierra mountain railroad. In practice, that led to our "Bachmann Mogul" rule for curves, clearances, distance between track center, etc. All we required was that a Mogul would fit, and even that rule was broken on the logging branch and the quarry line.

The layout was first shown publicly at the 2003 Coast Division NMRA meet. At the 2004 National Narrow Gauge

Brad Lloyd's quarry operation with British motive power, don't ask me what the engine is! I can only recognize Stirling singles. I have been told that this is a "Quarry Hunslett" since so many were used in the Welsh slate quarries. Brad built section 15 of the layout, and that is now "owned" by Pat and Roni LaTorres.

Pat LaTorres who "owns" section 15 of the layout now has been making some changes in the tracks leading into the quarry. You need to look close to see where the scenery ends and the back drop starts.

This is section 12, and is shown as proposed on the plan. Jim Eckman started section 12, and it is now "owned" by Dave Gill. Like all the sections on the layout, changes keep being made.



This view is on section 12 also, and is the same location as the photo above. The layout sections are "owned" by members of the group, but work on the sections is contributed by other members of the group. Currently Dave Gill "owns" this section. They needed to do some track realignment to make it work better, and Frank Markovich added some trees. If you look close at the 2005 plan, you will see that the upper track had a tight curve. The curve was taken out, and this trestle installed to straighten out the track,

Brad Loyd built section 14 which has this logging scene on it. This photo was taken at the 2014 O Scale West meet where the layout was on display. The layout is mounted high so most of the view is at chest height.

Another scene on section 13 built by Brad Loyd. This photo was taken at a different time than the photo abov,e and shows some cars spotted by the gin poll.

This stamp mill is on section 10, and was built by Dave Connery. Dave left the roof off to show the interior of the mill. The raw ore was loaded in bins at the top. Just below the windows, you can see the stamps for crushing the ore. The crushed ore was then placed on tables just below the stamps for a first sorting. Next the crushed ore was moved to the next level down where it was placed on wiffle tables. These tables mimic the prospector panning his ore to separate the gold out. The have an agitation motion that was powered by the line shaft near the bottom of the photo.

Dave Biondi built section 11 of the layout and this warehouse. Dave's section of the layout is now "owned" by Dave Gill.

Convention in Santa Clara, California, the layout won the layout award for that show. Since then the layout has been shown at least two times per year and sometimes as many as five times in one year. It has won numerous awards. When the layout is not being shown, each member stores their own sections. This has not been a problem so far. Every so often we will connect either two sections or the whole layout together. This happens mainly for work times to tune up track, or make scenery changes. The layout keeps changing as the "owners of the sections" keep working on them. A recent addition is Carlon. Carlon was the planned terminus for the Yosemite Short Line, though it was doubtful the Forest Service would have allowed this. The local community is called Carlon after the owner of a popular resort, Donna Carlon. Just before you leave the park was the rustic Carl Inn, built in 1916 by the Carlons; it burned down several times. The local attraction, Carlon Falls is a rare year-round waterfall on the South Fork Tuolumne River with somewhat of an unusual shape. Even though the falls lies within the boundaries of Yosemite National Park, the trail starts outside its boundaries near Yosemite's Big Oak Flat Entrance.

Currently, there are no plans for the future. We are looking for a few new members to help with the layout. This would be both at shows and in-between to even maybe add in that final section. We could use at least three new members going forward. Contact Frank Markovich for details.

Yosemite Short Line Flat Car

By Glenn Guerra

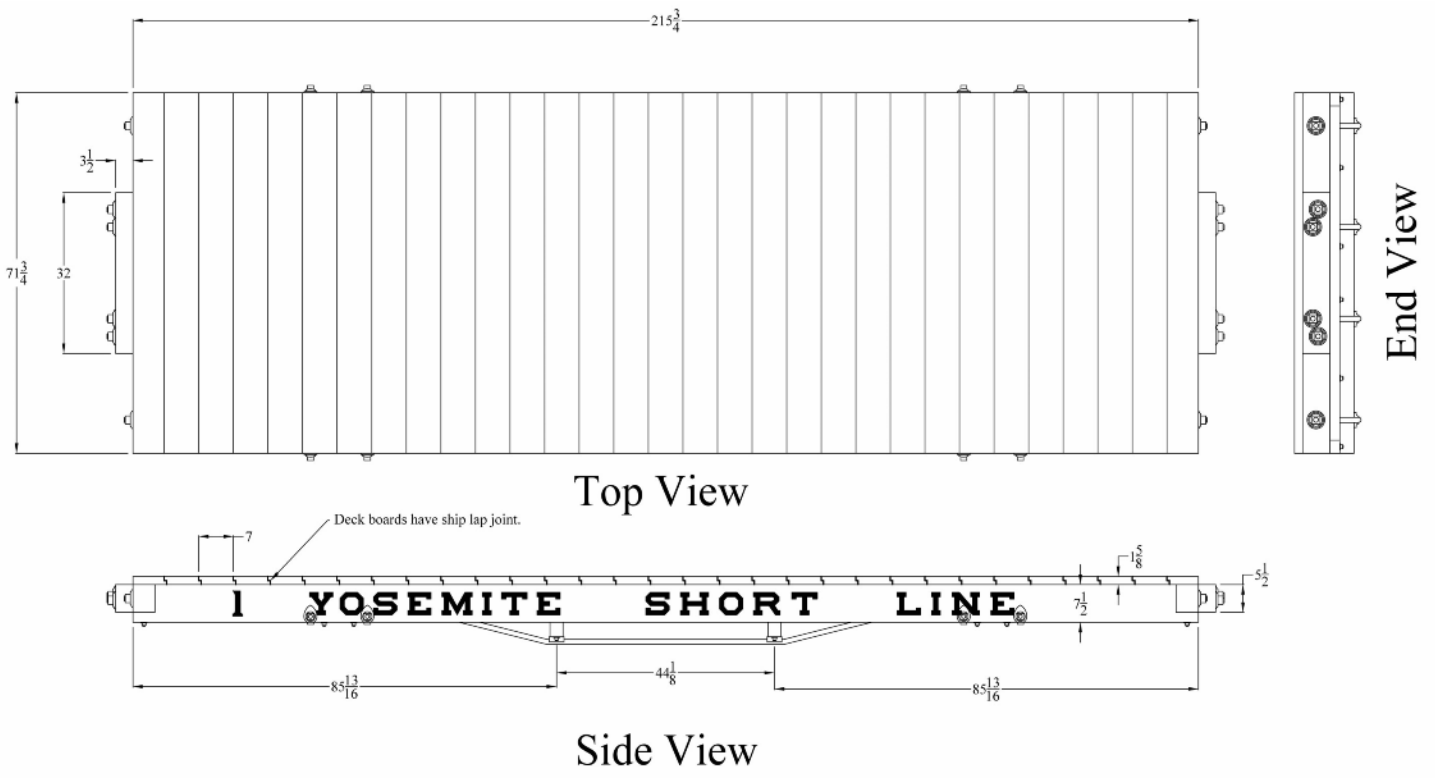
Drawings by Glenn Guerra

When I was doing museum work, I did some conservation assessments for the California State Railroad Museum. One of the cars I had to look at was the Yosemite Short Line flat car located at the Jamestown, California site of the museum. The car was built by the J. Hammond Co. of San Francisco, California for the new Yosemite Short Line Railroad in 1905. The 1906 San Francisco earthquake stopped all construction on the railroad, and it was never finished. The few cars and locomotives that were purchased and being used for construction were sold. The history of this particular car is not very clear. While I was working on this article, I talked with Kyle Wyatt, Curator of the California State Railroad Museum. Kyle told me the car was being used as a storage shed in Oakdale, California by the Sierra Railroad. When the museum acquired the Railtown site in Jamestown, California, the car was brought to that site. Someone, in an over eager matter, noticed that there was some lettering under the siding of the car and cut some of it away. What was revealed was Yosemite Short Line flat car #1. Someone built a box car body on the flat car. Kyle suspects that the box car body was installed very early on since the painting and lettering was in good shape under the box car. The construction of the box car

This photo was taken at the Jamestown, California site which is part of the California State Railroad Museum. The box car body was added to the flat car. With some of the siding cut away, you can see the original flat car and lettering.

body follows railroad practice, and not house practice. The parts are held together with draw rods and use mortise and tenon joinery. Kyle also told me that the car had a plug door similar to a modern car. This is another feature that would indicate a railroad shop had built the box car body. When the wood railroad cars were sold or became line side structures, the iron parts were removed because they had scrap value. That is why there is so little iron left on this car. I was fascinated by the little car and took some measurements while I was doing the assessment. Many other people over the years have done the same and drawings have appeared before of the box car and as a flat car. The drawings I made for this article are from notes I made when I looked at the car. I did not include the box car body. In addition, I made some drawings of how the joinery may have looked to give some idea how the car was held together. Since we heard from the Yosemite Short Line sectional layout group in this issue, I thought you would like to see the sole remaining car from the railroad.

The drawings show the actual dimensions of the car. To make a model of the car, divide the dimensions by the scale you are using. For O Scale divide by 48. I decided to do the drawings this way so they would work for all scales, and to give you some practice converting scale dimensions to model dimensions. Finding some of the exact sizes of wood or styrene may be difficult, but that is part of modeling. Finding compromises and designing your model are all part of making a model. I will go through a sample exercise in a side bar in this article.



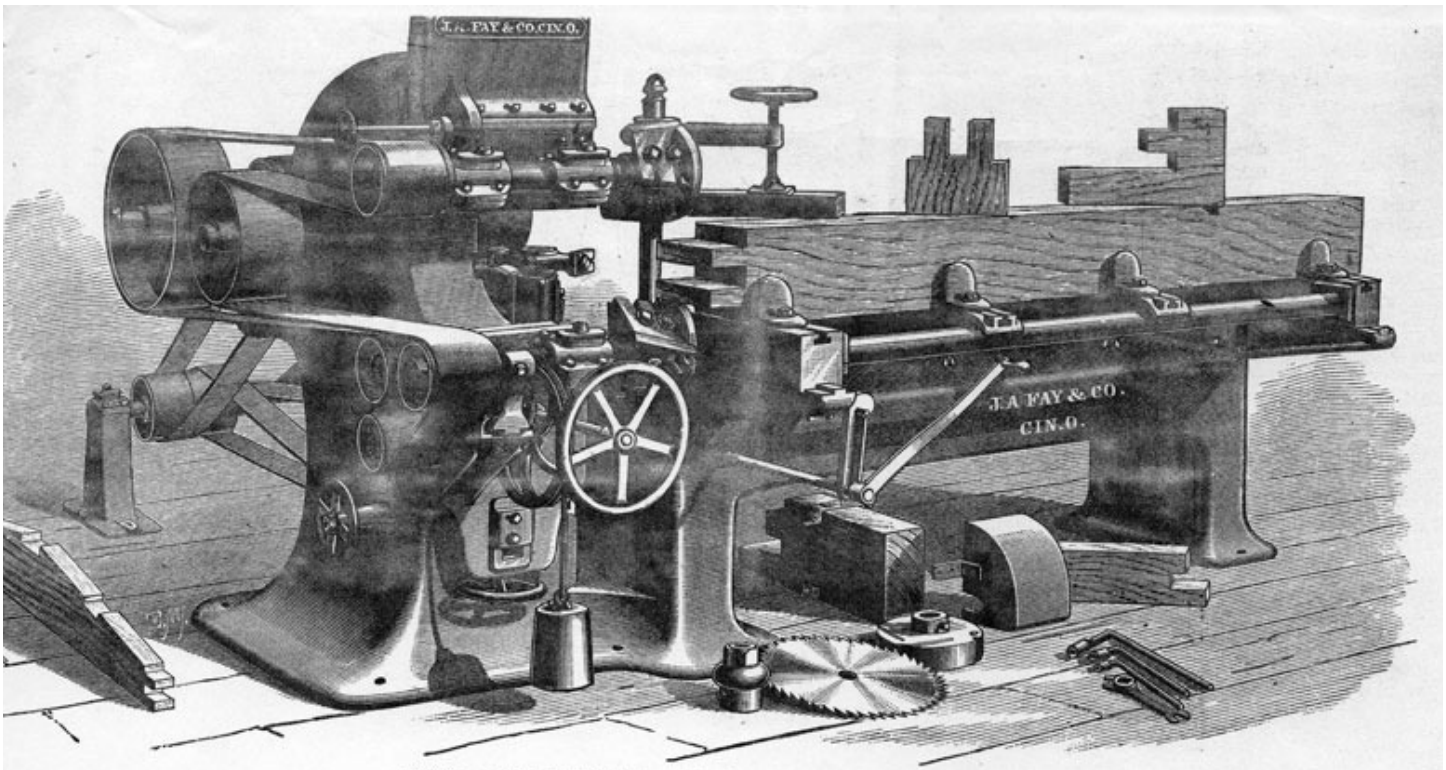
Typical joinery on wood cars was mortise and tenon joinery. The joinery was done by machine, and there were some standard sizes. The mortises were cut using a hollow chisel mortising machine. The hollow chisels come in standard sizes and 1” would have been a common size. The tenons were cut using the same machine, a single end tenoning machine, or a gaining machine. The car could not have been glued together, so there were draw rods and bolts to hold things together. The holes for these bolts and rods were always drilled 1/16” larger in diameter. When you see a hole specified on an old drawing at 9/16”, that was for a 1/2” bolt. On all the cars I have worked on, and all the drawings I have seen, the longitudinal sills usually had two tenons to join them to the end sill. For that reason, I put two on the drawings for the parts of this car. Notice that the center sill and intermediate sills are notched to clear the needle beam. This helps keep the sills in place. The bolster block is done the same way. Also, notice that there are draw rods from the side sill to the intermediate sill next to the bolster block. These rods hold the side sill on the tenon which is on the end of the bolster block. In addition, these rods go from the side sill, over the top of the center sill, to the other side sill, and become the tension

These three photos show some of the lettering that was left on the car when I looked at it. Notice that the #1 is a different size than the name and has different serifs than the rest of the lettering.

This view under the car shows a needle beam and truss rods. Notice that the queen posts were just blocks of cast iron locating the truss rod on the needle beam. You can also see how the needle beam was notched at the sills.

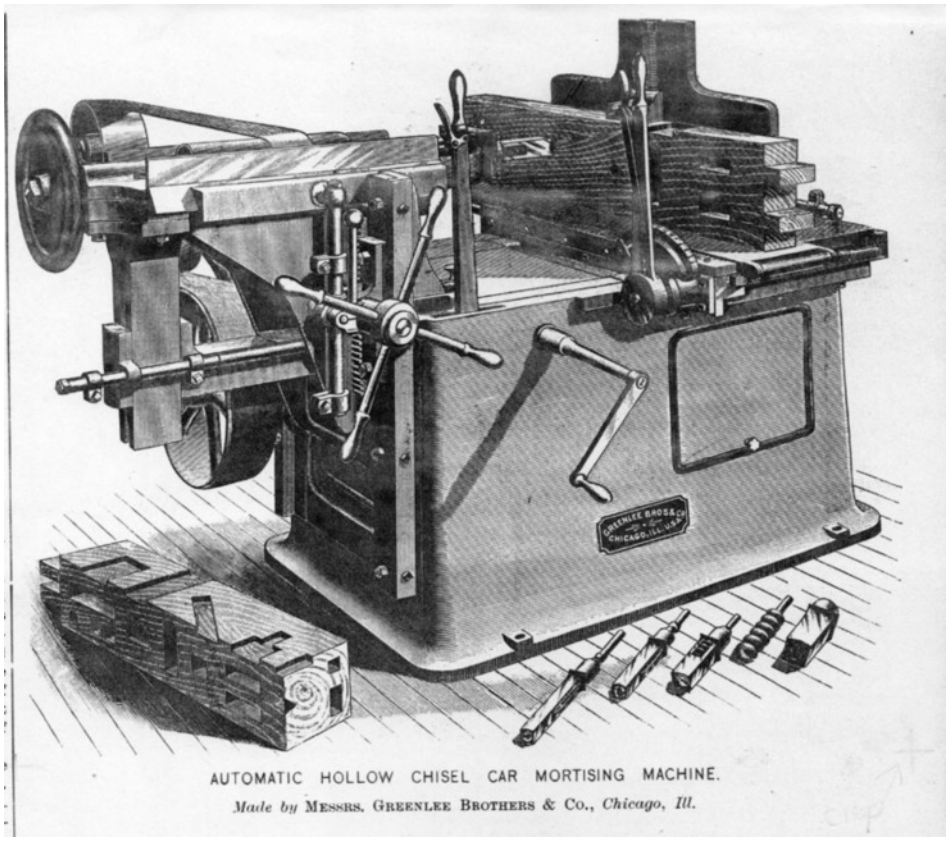
member of the bolster. The draft sills are a short block of wood bolted through each center sill between the bolster and the end sill of the car. The draft gear is missing, but it most likely was a simple spring arrangement. Lastly, the car appears to have had air brakes at one time. There are some mounting boards under the car that look like brake parts were bolted to them.

As I mentioned, this car is at the Jamestown Site of the California Railroad Museum. The car was available to be seen when I was there. If you are interested, stop by the museum and take a look at it.



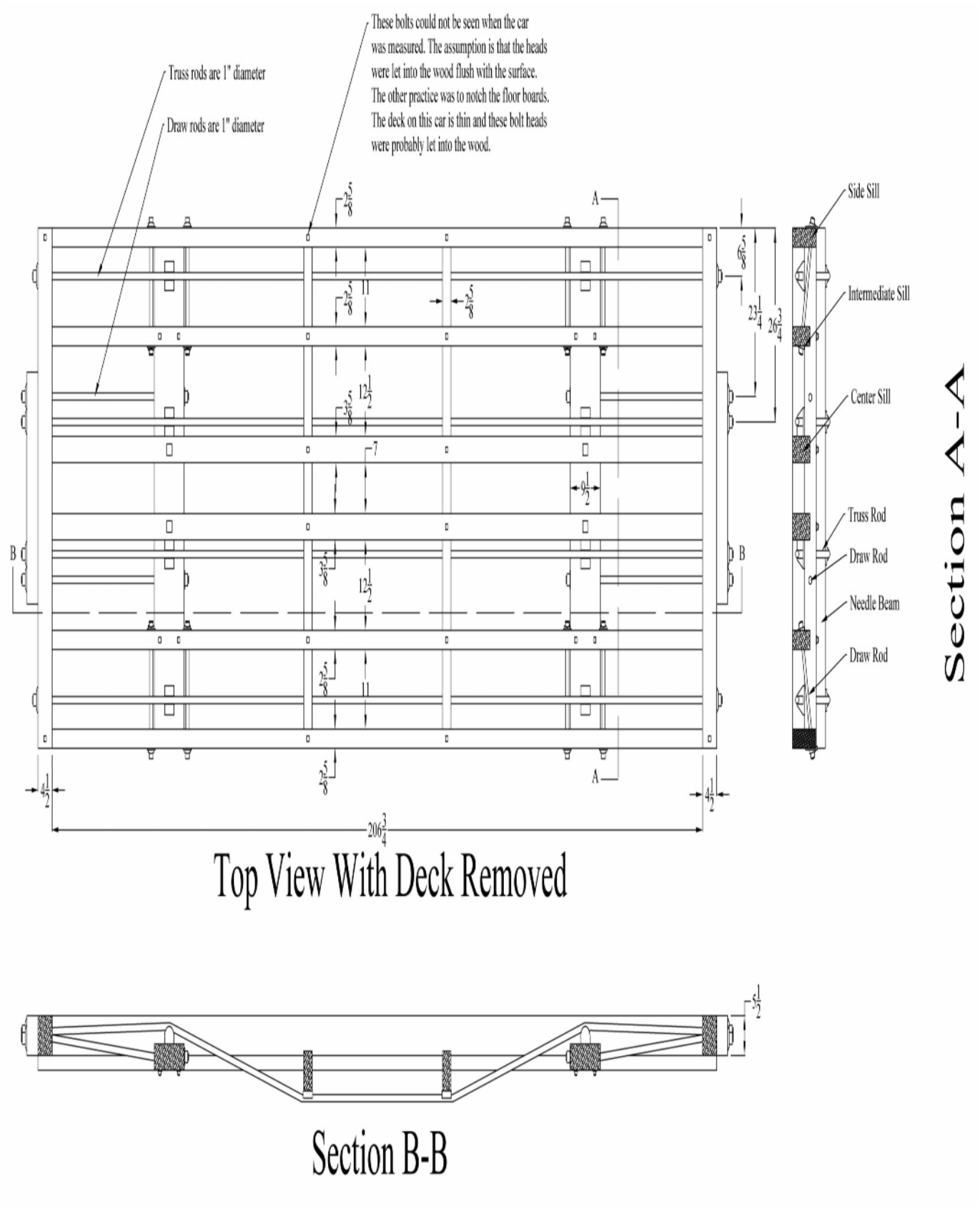
LARGE CAR TENONING AND GAINING MACHINE.

The illustration of the tenoning machine shows some of the parts that can be made. These types of machines are still used in the wood working industry today. The wood part is sitting in a frame on the machine that is fed into the cutters. It takes more time to put the wood in the machine than it takes to make the joinery.



AUTOMATIC HOLLOW CHISEL CAR MORTISING MACHINE.
Made by MESSRS. GREENLEE BROTHERS & CO., *Chicago, Ill.*

The hollow chisel mortising machines came in horizontal format, like this one, and vertical format. This illustration shows some of the different cuts that can be made with the machine and some of the tool bits.



These drawings are my estimate of what the joinery is on the Yosemite Short Line flat car. This joinery would not be possible on a small scale model, but I thought you would like to see how I think the car is made. On your layout you may want to put a shop scene someplace. Car repairs were done out doors quite often and some of these parts laying around may look interesting.

This photo shows the bolster and center sill. The rod with the nut is the draw rod that goes from the bolster to the end sill of the car and through the buffer block. The truss rod is the rod next to the center sill. This rod also goes over the top of the bolster and through the end sill and buffer block. The other rod is the draw rod that goes from the side sill over the top of the center sills and to the other side sill. This rod is the tension member of the bolster. By having these rods, the wood for the bolster is put in compression which works well for wood. Note also that the center sill is notched for the bolster. In addition, notice that the rod has been flattened out where it goes over the top of the center sills. Rob Buchanan, one of the museum employees at Jamestown, took the photo.

This view of the end of the car shows the buffer block well.

This view under the car between the needle beams shows what appear to have been mounting blocks for a brake system.

This photo under the car shows the draft sills. They are the two short blocks bolted through the center sill. The iron parts of the draft gear were removed for scrap when the car was placed on the ground as a shed. The rod in the foreground is the draw rod from the bolster to the end of the car. The rod behind it is the truss rod. The photo was taken by Rob Buchanan who works for the museum at the Jamestown site.

Some Thoughts On Working From Prototype Plans

By Glenn Guerra

When working from prototype drawings, we need to convert them to the scale we are modeling in. Besides the conversion, we need to make compromises for materials we will be using. To illustrate some of this let's use some of the dimensions from the Yosemite Short Line flat car. We will use O Scale as our modeling choice which is 1/4" on the model equals 12" on the prototype. Another way to look at this, and the better one for this instance, is our model is 1/48th the actual size. We will divide all the prototype dimensions by 48 to get the model dimensions. A sample calculation is shown for a side sill on the Yosemite Short Line flat car. Notice that we need something that is .055" X .156". If we are working in plastic, we could use .060" and that would work fine. Since this is the width we will be using, we need to adjust the distance between the sills accordingly. If we are working with wood, we will need to use 1/16" strip which is .062". The .156" dimension is 5/32", and strip wood and plastic may be available in that dimension. We need to convert all the dimensions to the actual size of our model first. Then, we need to decide what materials are available, and what we will be using to build our model. As you can see, there are some compromises that need to be made. This is part of modeling. For this project, we would probably want to keep the overall length and width correct, but modify the distance between the sills to suit the material we are using. The last step is to make some sketches to use during construction of our model.

Side Sill Calculations

The actual side sill is 2-5/8" wide X 7-1/2" tall

2-5/8" = 2.625"
2.625"/48 = .055"

7-1/2" = 7.5"
7.5"/ 48 = .156"

So, we need some strip wood or plastic that is .055" X .156".

The John Hammond Car Company

By Kyle Wyatt

Curator, California State Railroad Museum

John Hammond was a millwright and engineer in San Francisco in the 1870s, expanding into car construction in 1883 using the name California Car Works, and shortly after also became an agent for Otis Elevators. He held several patents, including one for the double open ended cable car and street car design known as the "California Car." John Hammond and Company was incorporated July 16, 1895. John Hammond died October 31, 1900, but the business was continued by his son, Manton Hammond. The company escaped the 1906 San Francisco earthquake and fire, and finally closed down in 1910.

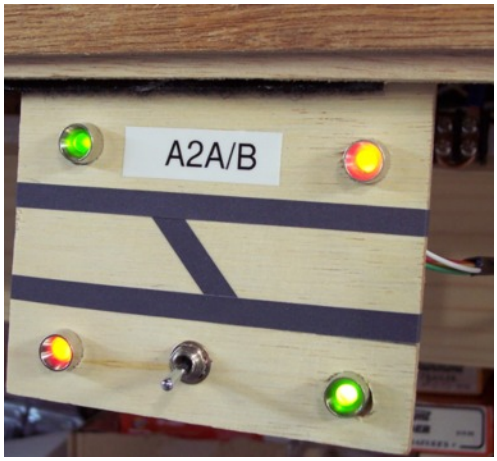
Hammond produced passenger and freight cars for both standard and narrow gauge railroads, as well as cable cars and street cars. Among their products were flat cars and dump cars for the 30 inch gauge Yosemite Short Line; flat cars for West Side Lumber Company; freight cars for the Pajaro Valley Consolidated Railroad, the Tonopah Railroad, and the Lake Tahoe Railway & Transportation; passenger cars for the Colusa & Lake Railroad, Pajaro Valley Consolidated Railroad and the Pacific Coast Railway; both narrow and standard gauge flat cars for the Sierra Nevada Wood & Lumber Company; and freight cars for the standard gauge San Francisco & San Joaquin Valley Railroad and the Sierra Railway.

Surviving cars (mostly without trucks) include Yosemite Short Line flat car #1, rebuilt as a box car by the Sierra Ry; Colusa & Lake coach #2 and baggage car #4, later Eureka-Nevada combine #2 and baggage #10; four standard gauge Sierra Nevada Wood & Lumber flat cars; Pacific Coast Ry coaches #102, 103, 105 and 201, now as White Pass & Yukon #258, 260, 262, and 207; Oakland horsecar #12; and several San Francisco cable cars and street cars.

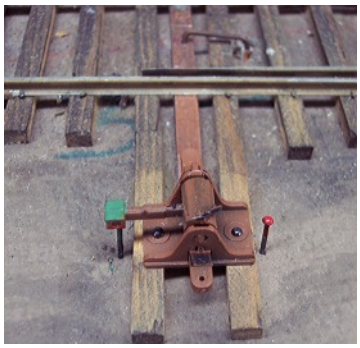
Looking at Layout Automation

By Dan Dawdy

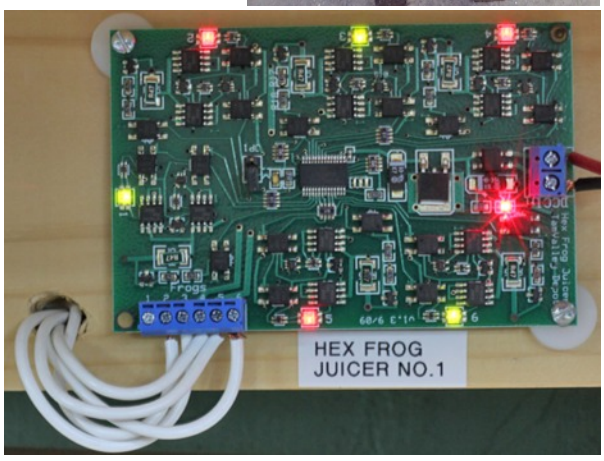
Back when I started my DCC layout, I used the conventional wisdom that I had seen others use in regards to turnouts. (In this article I'll use the term turnout as opposed to switch to help the reader discern the track switch vs. the electrical switch.) That is, if a turnout is out of reach for whatever reason, i.e. upper deck, behind buildings or totally inaccessible, use a switch machine. For any turnout in the foreground with easy access, go with a hand throw. That was how I proceeded. I settled on the Tortoise machines, but there are many others out there, so you don't have to limit yourself. The Tortoise has two SPDT (Single Pole Double Throw) switches built in. I wired one switch to power route the frogs since I wanted all powered frogs. I then added a DPDT (Double Pole Double Throw) switch to the 12 volt lines feeding the Tortoise, along with a bi-color LED so the operator could quickly see if the turnout was set straight or diverging. This worked well, and after making my own template for the Tortoise installation as shown in the instructions, things went fairly well. However, in O Scale, a stiffer spring wire than what is supplied is needed. I ended up using .45 wire (also called piano wire), and shaping it as per the drawing on the instructions. For crossovers, I wired two Tortoise machines with a single DPDT switch and four LEDs. Throw the switch one way, and the tracks are aligned straight through; throw the switch the other way, and both turnouts were set for diverging. All of this is pretty much standard, and worked well.



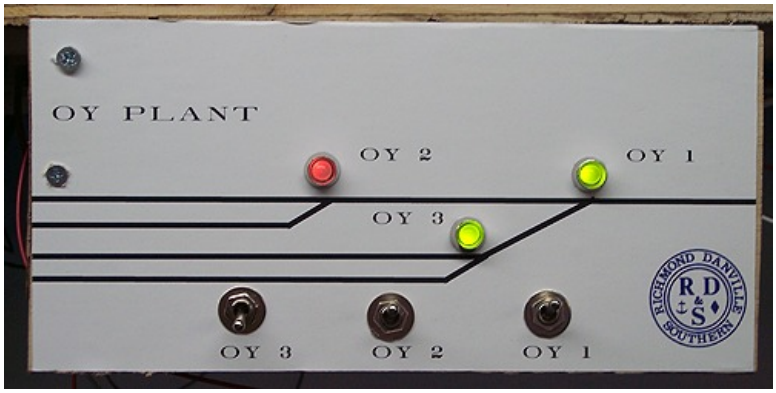
The picture above shows a crossover. The DPDT controls two Tortoise machines, and the bi-color LEDS have current limiting resisters since power comes from the 12 volt line. As you can see, I got a little carried away with the LEDs, but I wanted to show which tracks were safe to proceed on. In the case above, the the turnouts are both set for diverging so the bottom left and upper right tracks are red. If the turnouts were not diverging, all LEDs would be green.



For ground throws, I used the ever reliable Caboose Industries 208S. This saved some money, and made sense at the time. One problem with the manual ground throws was how to change the frog polarity. I had seen that most people used a small micro switch installed under the layout and a mechanical connection from the throw rod of the turnout. I tried that for one, but it was a pain to install under the layout; and I was always fiddling with it. OK, so maybe I did not take the time to install the micro switch correctly, but I wanted



The Hex Frog Juicer is very simple to install. DCC track power comes in on the far right, and each white wire goes to a frog. That's all there is to it. If a train hits a frog with the wrong polarity, it switches so fast (less then 300 microseconds if you are counting) that there is no effect on the train.



I thought this was easy to follow, but new people to the layout got confused. OY 1 is green so it continues to OY 2 which is red, so it diverges to the inner loop. Coming back around on the inner loop, OY 3 is green meaning it is set against the inner loop and must be changed. OY 3 and OY 1 would both need to be red to come out of the inner loop and back to the main.

something reliable. Enter the Hex Frog Juicer from Tam Valley Depot. With this DCC only product, I could control six turnouts with a single wire to each frog and the two DCC wires. The cost was higher, at about $10.00 a turnout, but there were no under the bench gymnastics to install it, and it was rock solid. Now I was ready to move on. The turnouts worked and I was happy, or so I thought. A few Christmases back my wife, Amy, asked what I wanted. We have been married for so long that it's hard to buy for each other as we normally purchase items throughout the year. I had a whole list of "stuff" saved in my Walthers "Wish List", I told her to go look there and pick some things. One of the items I had looked at which I thought was interesting was an NCE Switch 8. It would allow the operator to select and throw a turnout on the fly from the DCC handset as they ran their train. OK, a little automation won't hurt me. Well, that was one of the items she gave me, so I had to try it. The upper level loop was apparently the most completed part of the layout when it came to knowing which turnout was which. It may have been my "labeling" that caused confusion, but many operators jumped on the stool to make sure which way the turnouts were going. The small panel made sense when I built it, but as time passed, I even got confused (which, by the way, does not take much these days).

So, it was time to convert the first three turnouts to the Switch 8 and see how that went. Since all the upper turnouts were already using a Tortoise, the cut over was very easy. The Tortoises were already controlling the frogs, so I left those connections alone. The 12 volt supply to the Tortoise that went through the old panel with its DPDT switch and LEDs with current resistors was simply removed. This was replaced by the output of the Switch 8 which has 16 outputs, with two needed for each Tortoise. Output 1 from the Switch 8 went directly to input 1 of the Tortoise; while output 2 of the Switch 8 went to one lead of a bi-color LED on the panel and the other LED lead was sent to the Tortoise pin 8. (Tortoise pins 1 and 8 are the power inputs) Since the Tortoise has such a low current draw, the LEDs can be wired in series eliminating the need for a current limiting resister.

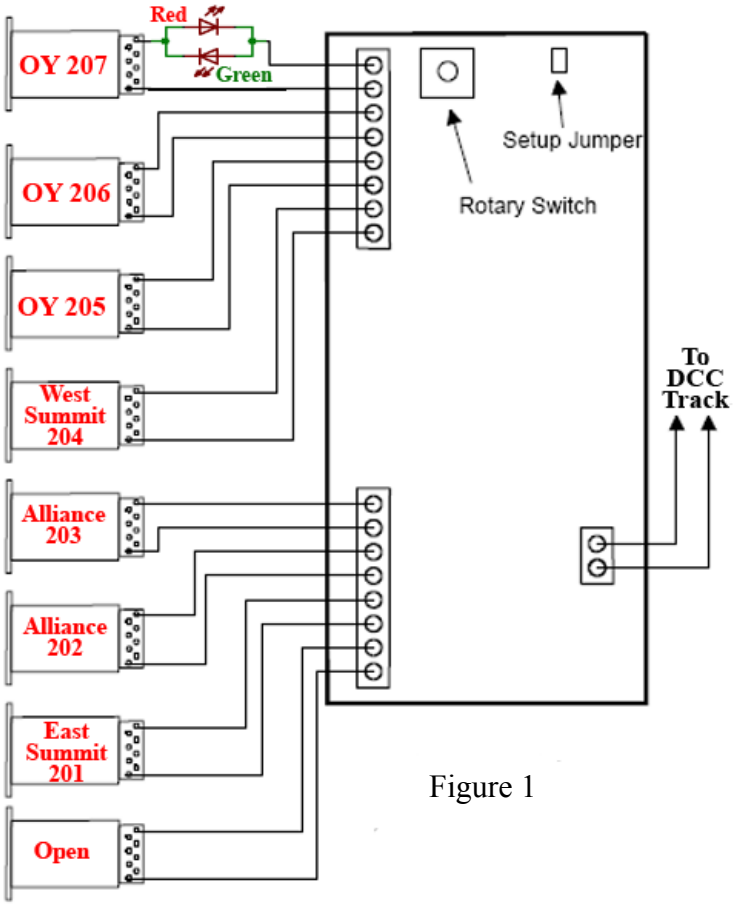
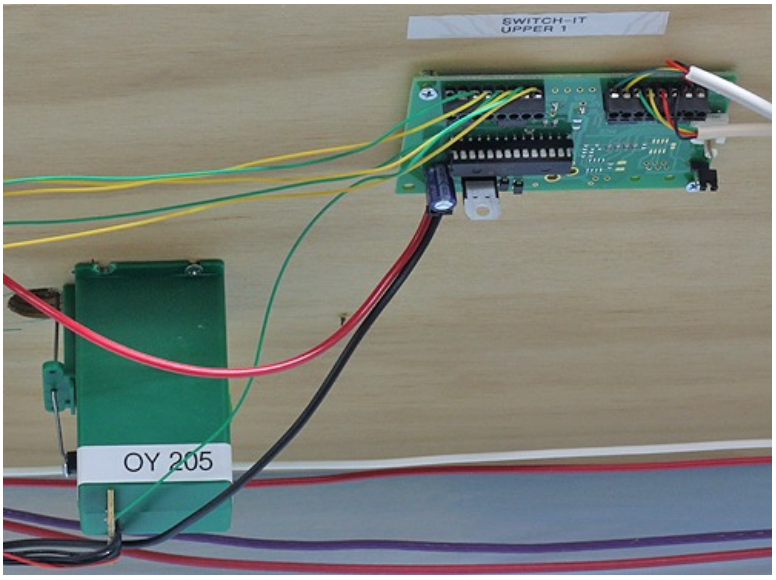
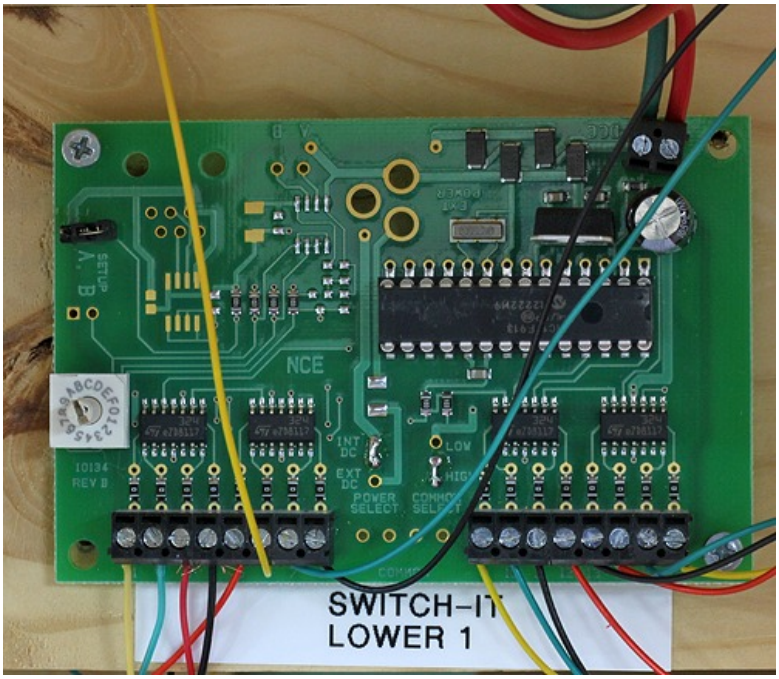


Figure 1

As shown in Figure 1, the outputs are grouped in twos. The bi-color LED shown on OY 207 is repeated all the way through for each Tortoise. The programming instructions should be read, but in a nutshell, you connect the jumper and set the rotary switch to 0 for the first Tortoise. (Us geeks always begin at 0 and not 1.) Push the accessory key on your DCC throttle and punch in the number you



The Upper Switch It only needed to control 7 turnouts so the set of outputs on the far left are empty. The green wire running down to OY 205 is connected to one of the power pins of the Tortoise. It hard to see, but the corresponding yellow wire runs to one bi-color LED lead on the panel and the other LED lead runs back to the other Tortoise's power pin making the LED in series. I used old phone wire on the right side set of outputs. It was cleaner as each cable had four wires for two Tortoises. Because there is so little current, this wire works well even on a 45 foot run from the Switch It.



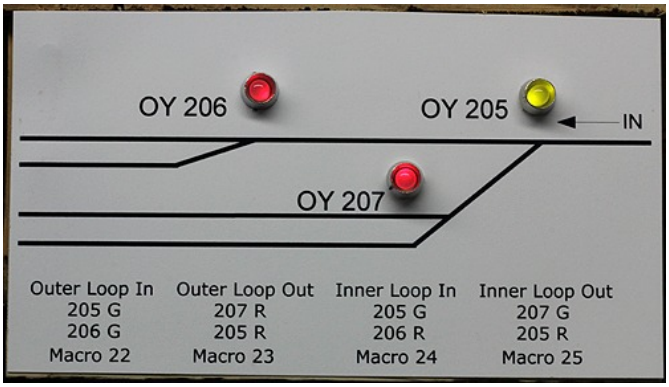
This is a better picture of a Switch-It. You can see the rotary switch. Being an off the shelf part that NCE used, it has many more settings then we need. Again, 0 is your first Tortoise, 1 is your second, and on down to position 7 being the eighth Tortoise.

want that Tortoise to respond to. I pushed 207, and that was it. Next, move the rotary switch to 1 and go through the same process for the second Tortoise. Continue this for as many Tortoises as you have connected. When finished, remove the jumper. Please read the instruction sheet, but that's all there is to it. OK, everything is all wired in; so now what? Well, as your crews move towards the

turnout, they will have a visual of its position by the LED. West Summit 204 above is green, so the turnout is set for the through track. If the crew needs to take the siding, they push the accessory

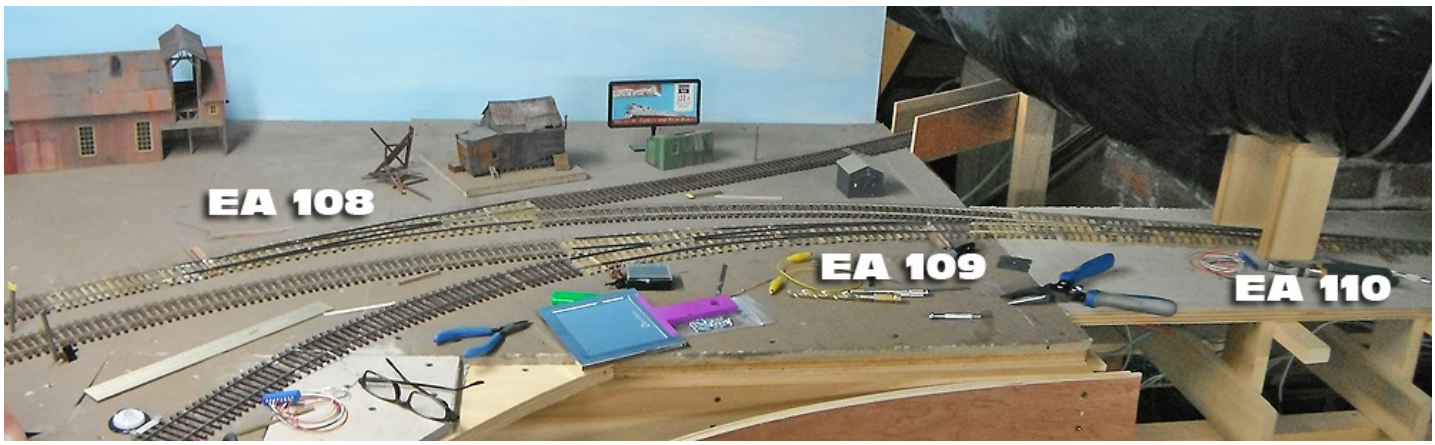
key on their controller, type in 204 and select 1=N (normal or through) or 2=R (reverse or diverging). I use NCE DCC equipment, but this works with all other systems that allow for accessory control. All the while you are doing this your train continues, and after your selection, you regain full control just where you left off. So, if you are tied to a tethered throttle, you no longer have to run ahead to manually use a fascia mounted toggle switch. (NOTE: The Switch It does allow for pushbutton control as well if wanted.) The first picture at the top of the next page is a new fancy crossover panel using a blank light switch cover. As can see, a crossover would need two turnouts to be thrown at

once. The Switch It book says it "may" and "should" be able to control two Tortoise machines from the same output, but I did not try that. On the NCE system, we have something called macros. This saves us key strokes. Normally, I would need to hit Accessory, enter the number and select the route. I would then need to do this again for the other turnout in the crossover. Using a macro, I can program the throttle to assign a number to do both turnouts at the same time. I simply select macro 16, and both turnouts are set for through. If I select macro 17, both are set to diverging and the LED goes red. This makes it very easy to understand and follow.

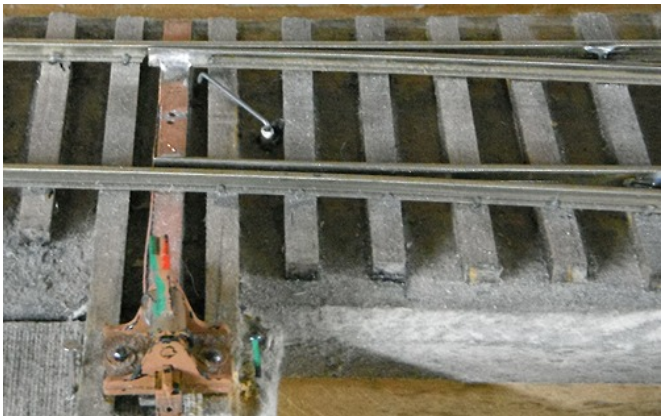


Now, let's look back at my upper loop panel that some operators found so confusing. Although you can throw each turnout individually, that would take more time and there would be more chance for mistakes. Macros to the rescue! The inner loop is macro 22. Once your train clears all the turnouts, you do a macro 25 and you're all set to exit the loop and head back to the main. There is no more confusion – it's done, over, kaput. In my case, this has made running more enjoyable. Sometimes, my grandchildren will want to run. I can sit nearby with another throttle and simply set the turnouts as they go so they don't have to worry about it. The same goes for guests who are unsure of how turnouts even work. I can protect them!

OK, so adding a Switch It to already Tortoise controlled turnouts is not hard. But, what if I had a brain cramp, and decided that ground throws were just fine on another part of the mainline? That meant I needed to put down my beverage, get up off my chair and actually walk over to throw a turnout every time the trains came through a junction. My aim now was to have all mainline turnouts DCC controlled. That meant going back to six turnouts with ground throws, and installing machines. Not a fun proposition.



The worst area was East Avalon as pictured above. EA 108 connects the mainline on the diverging side to the locomotive facility/roundhouse, lower staging and the large loop where it will service the new coal mine and return back to EA 108 through routing. EA 109 connects the main passing track from Avalon to the spur leading back into the yards and then to the mainline from EA 108. EA 110 connects both the mainline and passing main together. EA 111, which is farther to the right and not shown, connects the mainline to the lower staging. All of these are within easy reach, so at the time of installation were not motorized. Since all of these turnouts would be under dispatcher control, I wanted them to be remotely operated. Since the NCE Switch 8



The throw bar needs to be unsoldered and the ground throw removed. The wire you see coming up was attached to the throw bar with a micro switch on the bottom end. Although I do use Hex Frog Juicers, the wire was never removed.

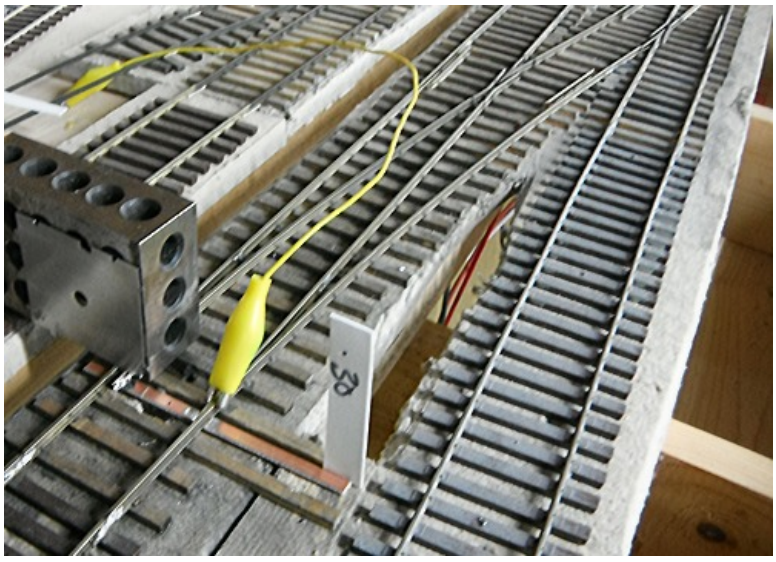
I drilled the largest hole I could between the rails. Because of drilling through the Homasote, there was some clean up to do with a file.

The hole was cleaned up using files to remove the excess shredded Homasote.

supports eight Tortoises it would be a waste, but they also make a Switch It that controls two Tortoises, so I used two of those.

All of these turnouts were built in place using a copper throw bar that needed to be unsoldered and the ground throw removed. Next, I drilled the largest hole I could between the head ties and between the rails.

Once the hole was cleaned up, a new throw bar was installed using an NMRA gauge for proper point distance. A hole was drilled in the center of the throw bar for the new .45 wire coming from the Tortoise. I needed the stiffer wire, not only for a more positive throw, but because I am going through the ½ inch Homasote and then ¾ inch plywood. Now comes the fun part. There may be other easier ways to mount the Tortoise in cases like these, but here is how I did it. With the spring wire attached, I was able to hold the Tortoise under the layout and still see the point rails. Pushing the spring wire through the hole in the throw bar and aligning the Tortoise in the correct orientation, I slowly pushed the arm of the Tortoise back and forth watching the point rails making sure they hit the stock rails as they should. (Yes, I know that Tortoise says not to do that, but slowly is fine.) Once I was happy with the alignment, I marked the mounting holes of the Tortoise with a pencil and screwed it in place. It's a one man job if the turnout is close to the edge of the layout and takes less than five minutes. However, for the turnouts farther back on the layout, it became a one man and a wife job, and the time was more like 30 minutes between the talking, yelling and others things which always seem to happen when two people get involved. All in all, it took two nights to modify and wire all six



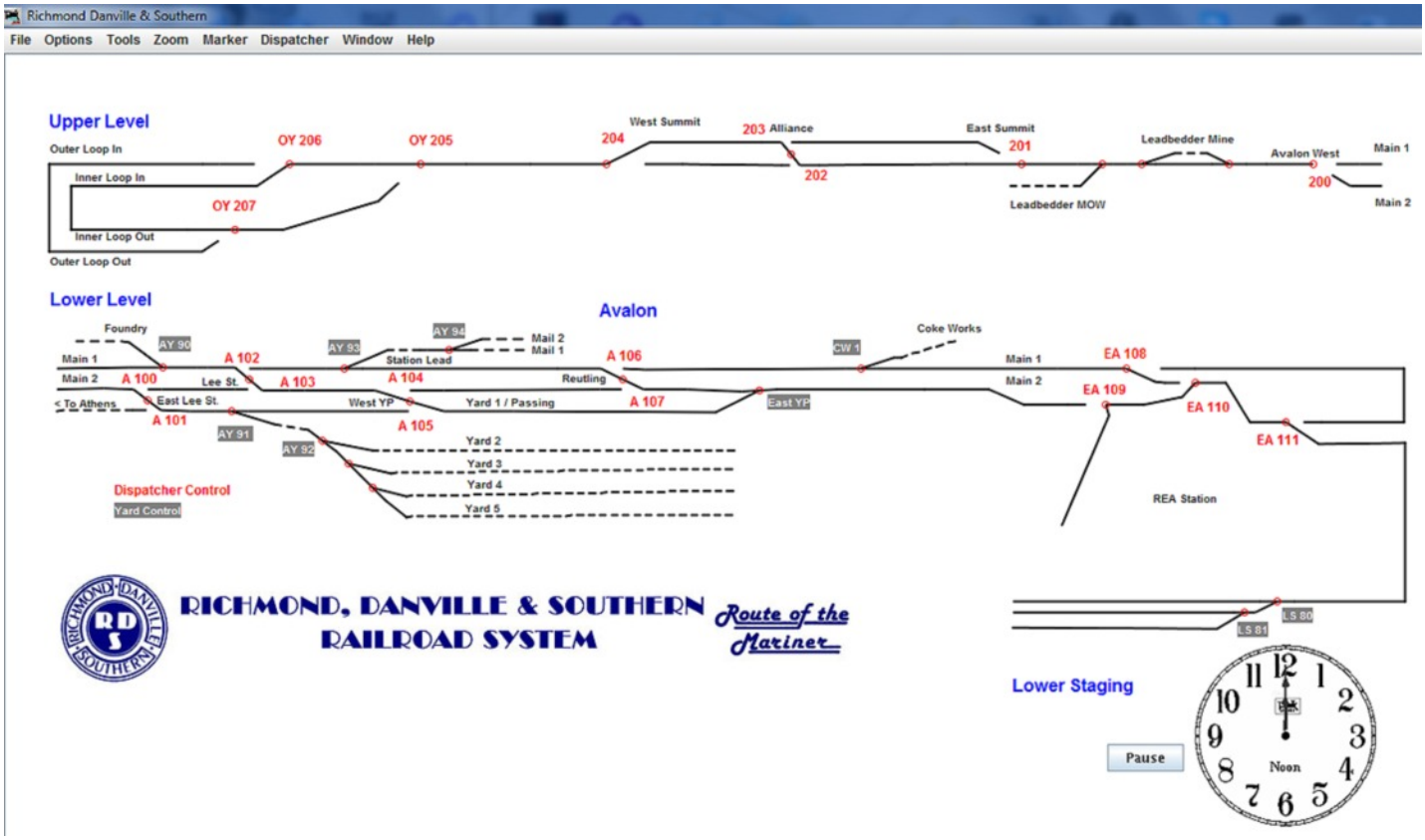
The New throw bar is being installed using the NMRA gauge for the proper distance. It would be easier with two people, but this worked. The picture above shows a crossover, along with the other two turnouts that needed to be modified for Switch Its.

turnouts. Turnout numbers were assigned, addresses were set, and in the case of the one crossover, a new macro was assigned. This was done so that all turnouts that would normally be under dispatcher control could be thrown by the crews. All the yard tracks and spurs remained with a ground throw, or Tortoise and fascia mounted DPDT switch if they were not within easy reach.

So that's it – a fairly easy install of Switch It machines to already installed Tortoises, and retrofitting manual turnouts with new Tortoises. What else could we want?

How about a dispatcher's panel that we could use to visually see the layout and its turnouts, along with having the ability to control them from the handheld by the crews or by a dispatcher sitting at the panel? Sounds complicated! If you are using JMRI (Java Model Railroad Interface) to program your DCC decoders, you already have everything you need, and it won't cost you any more money.

JMRI, in its Panel Pro application, has the ability to allow you to create a panel such as a US&S style CTC



Panel. It also has a layout editor to produce a modern dispatcher's panel, or in my case, a logical description of the layout. I chose the layout editor mainly for ease of use by visitors and other non-railroad friends to be able to use it more intuitively. It's still a work in progress, but it's very functional. All the turnouts that the dispatcher controls, or that the crew can operate, are assigned numbers in red. The upper level starting on the top right is turnout number 200, or the first turnout on the upper deck. You may assign any label you want, but I wanted to make this easy, so upper deck turnouts are in the 200 series and numbered consecutively. Main level turnouts starting on the left are A 100 for Avalon (town name) and then again numbered consecutively. Turnouts with a gray background are Yard Controlled (i.e.: the dispatcher has no control of these, but they are powered with a fascia DPDT switch). Unlabeled turnouts are ground throws.

This allows for some options in running. If the panel is running, I can simply move my mouse to a desired turnout, and by clicking, throw the desired turnout. The track representation will then move showing the route through the turnout. If a crew changes a turnout from their handheld, the panel also changes and updates. Since I don't use this as a full time dispatcher's desk, it's not too important. But, if I did, I could lock out any turnout

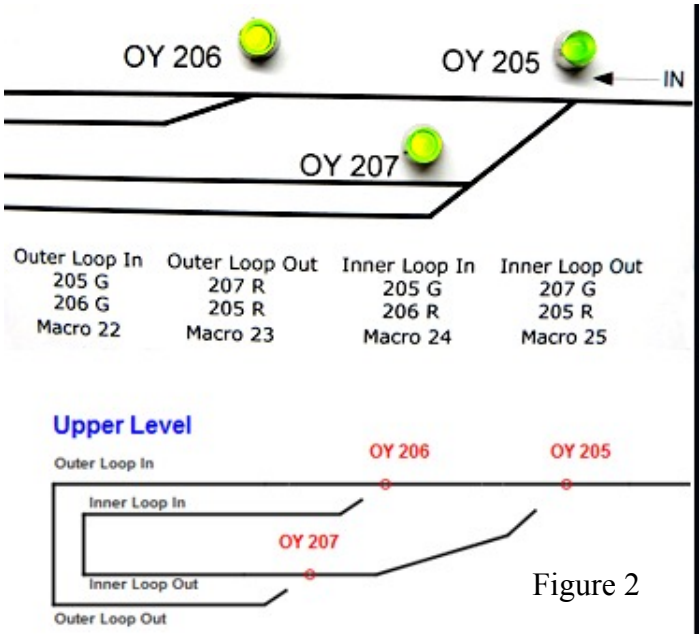


Figure 2

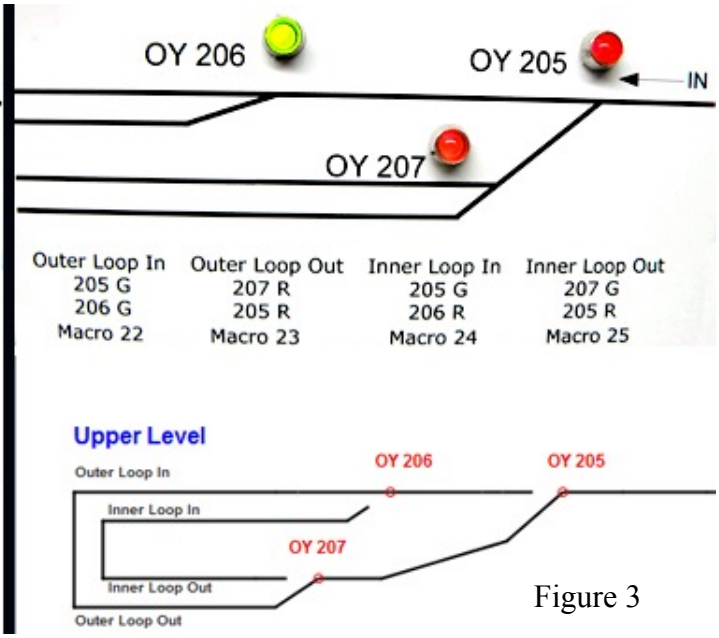


Figure 3

In Figure 2, you can see the panel lights are all green or straight through. Below that is what shows on the panel. OY 205, 206 and 207 are all set for through running. We enter the outer loop at OY 205 and continue on through OY 206. Once our train passes OY 206, we can set up the routing to leave the outer loop and reenter the main.

Figure 3 shows that the lights for OY 205 and OY 207 are set for the diverging routes, and the panel below also shows this. All the crew needed to do was select macro 25 and both OY 205 and OY 207 changed. If I were using the panel, I would just do a mouse click on each turnout.

from being thrown by the crews. The next logical step in this would be signaling and train tracking. I don't know if I'll go that far; however, if I want to, some of the foundation has been laid.

I hope this gives you an idea of what is possible with just a little effort. You may not want or need this; however, if you want to try it out with or without JMRI, it's very easy to install. The building of the panel in JMRI is out of the scope of this article, so I have included some links to give you access to the many on-line tutorials that are available to get you started.

Postscript:

There are many other manufacturers of accessory (turnout) decoders that will do what the NCE products do. This is just what I used on my layout. Do a Web search and see what all is available and the different features.

Below are some links to tutorials and videos from others to help in setting up the Switch 8 and Switch It, as well as, starting to build a JMRI panel.

Switch 8 / Switch It https://www.youtube.com/watch?v=zOrnX4eIo8k (Part 1)
https://www.youtube.com/watch?v=CwvEavfMaHA (Part 2)
https://www.youtube.com/watch?v=CaYYFaqvo1M (Quicker Overview)

Panel Pro https://www.youtube.com/watch?v=B_A4xiEMU6Q (Part 1)
https://www.youtube.com/watch?v=59oD7r1Xg6M (Part 2)

JMRI: PanelPro, An Application For Making Control Panels
http://jmri.sourceforge.net/help/en/html/apps/PanelPro/PanelPro.shtml JMRI page with many linked tutorials.

John Houlihan and Friends

Build A Layout

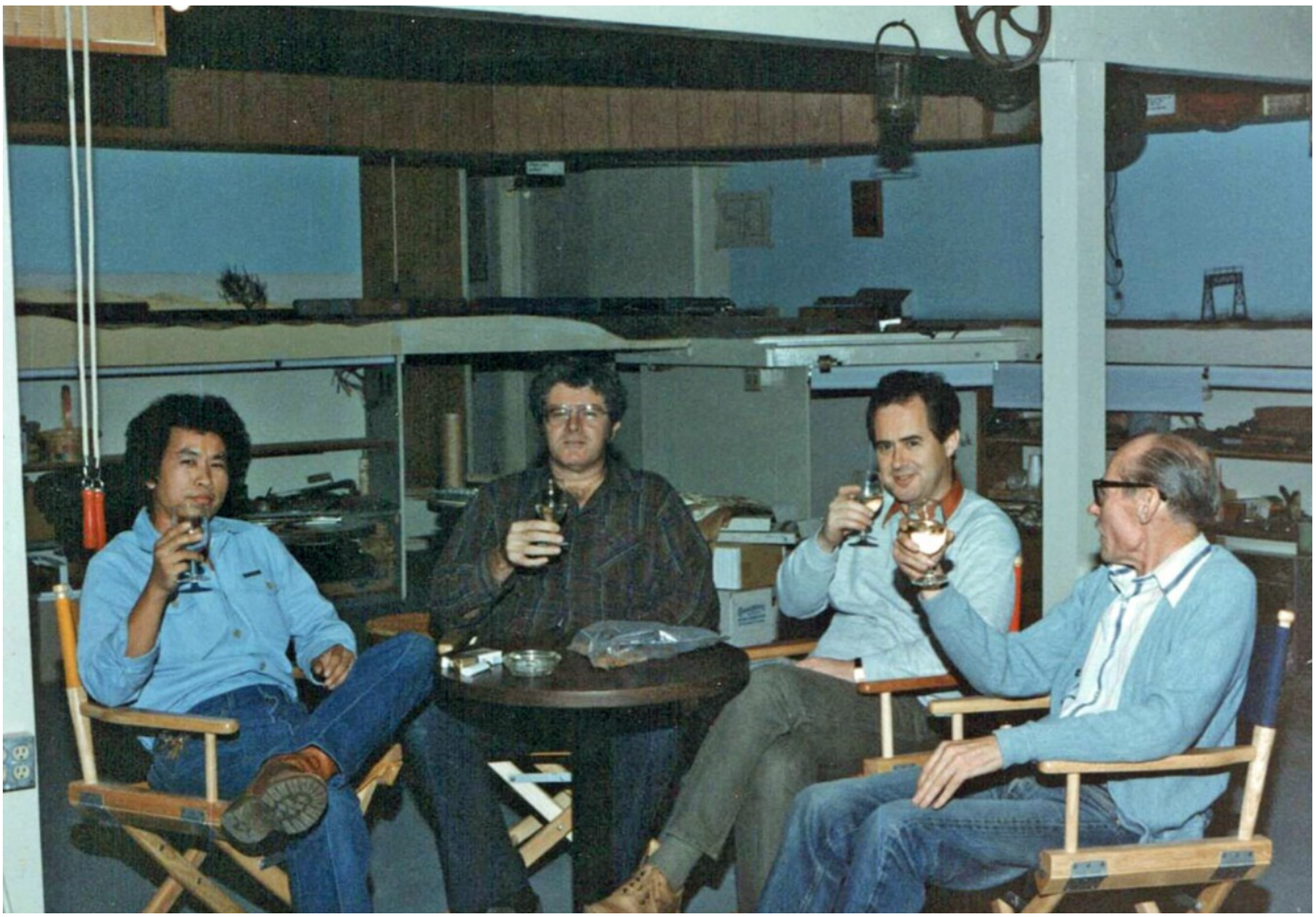
By Glenn Guerra

Photos supplied by John Houlihan

John Houlihan grew up in Fresno, California and still lives there today. As a teenager, John palled around with some of the people who worked at Kemtron. A lot of information in the Kemtron article in the May/June 2014 issue of *The O Scale Resource* came from him. In addition to the information John had, he sent me some photos of some Kemtron models on his layout. I was impressed with the layout. California is a big state with a tremendous variety of scenery. Many layouts that are based on California railroads focus on the mountains and pine forests. John has modeled the area of the central valley just starting to go into the mountains at Tehachapi Pass. I asked John if we could do an article about the layout, so he went to work and found some old photos of the layout under construction, along with taking some additional photos for us. What follows is a photo journey through 33 years of continual working on the layout.

The humble beginnings of the empire. This bit of shelf work was the start of John's layout in 1981.

The layout was started around 1981 in John's basement. There was a regular group who came to help and they got into a routine of working on the layout every Friday night. One of the regulars was Oscar Neubert. Oscar made many patterns for Kemtron and later Cal Scale. While never employed by Kemtron, he was closely tied to them through his pattern work. Other modelers that came and helped were Jimmy Gee, Dick Emerson, and Don DeVere. The progress on the layout was good and a lot of fun was had by all. Jimmy Gee moved farther to the east of Fresno, and his kids got into boat and airplane models. Oscar died on October 27, 1991 and the loss slowed the progress on the railroad for almost 10 years. By this time, John was getting ready to retire and work picked up again with some new help.



It wasn't all work an no play. Seated from left to right are: Jimmy Gee, John Houlihan, John McWilliam, and Oscar Neubert. The occasion for the toast was John McWilliam visiting from England in November, 1984. Behind John is the original lift out section of the layout to allow access. This was replaced by a swing out section shown later in this article.

One of the things I found most impressive about John's layout was the backdrop. As I mentioned, many people model the rugged Sierra mountains when modeling the Southern Pacific and I was wondering why John chose Tehachapi Pass. The answer was that John is interested in the Santa Fe, which also runs through Fresno, but Oscar wanted to model the Southern Pacific. Well, they both got their way. The line from Bakersfield, California to Mohave, California over Tehachapi Pass is a joint Santa Fe Southern Pacific line. Now that they had a locale selected, it was time to work out the details. A backdrop would be nice. Don DeVere painted the backdrop for John. Don was a local modeler and worked for the planning department for the city of Fresno. His artistic skills are evident in the painting he did on John's walls. Oscar built the bridges and the tunnel portholes for the layout. The layout runs on an 18" shelf around this part of the room. The backdrop makes the railroad seem like it goes on forever. In addition, the colors of the foreground blend in very well with the backdrop.

Oscar Neubert works on some ballast while Dick Emerson looks on in this February, 1984 photo.

Oscar Neubert working on the roundhouse area in March of 1982. Oscar was a regular on Friday night work parties. He was a close friend of John, and when he passed away in 1991, the work on the layout ground to a halt for a few years.

This photo is the same location as the previous photo of Oscar working near the roundhouse area.

These two views show the same area on the layout. The top view was taken in April, 1981 while the backdrop was being worked on. The lower photo shows the completed scene with Don DeVere, the painter of the backdrop, looking on. The girder bridge was made by Oscar Neubert out of some gondola sides. They make a convincing bridge.

This view of part of the layout shows how it hugs the wall. This section of the layout is modeled after the joint Santa Fe and Southern Pacific line from Bakersfield, California up into the Tehachapi mountains.

This view shows how well the backdrop blends in with the foreground. The fence line is at the backdrop. The contour of the land is very convincing.

Another view of the Tehachapi mountain section of John's layout. Notice how the right of way is built up and straight, while the surrounding ground is varied. The build out for the signal is very convincing. These are nice touches that add interest to a scene. The cow is right up against the backdrop, and you need to look close to see where the backdrop starts.

This photo was taken at the same location as the previous photo. The backdrop starts right at the cow above the express car. The layout is only about 18" deep here, yet it looks like miles.

I was impressed with the Tehachapi section of John's layout, but he also models some other areas of California. The Western Pacific was a late comer to California, and to acquire branch lines, they bought some of the electric railways. One of them was the Northern Electric which ran north of Sacramento. In the Marysville area, the Western Pacific ran under some of the electric overhead and John has modeled a section of that.

The passenger station was inspired by the Santa Fe facilities in Los Angeles, California. Notice how John uses cardboard mockups of buildings to develop the scene.

Getting into the layout room is always a challenge. John has a swing section on his layout. The swing section has this river crossing scene on it.

This photo shows the swing section in the open position. Notice how the track has been realigned when they made the new bridge and the old trestle head is still where the old alignment was.

John keeps improving the electrics on his layout. Here Dave MacFiggen is working on some wiring in the control cabinet.

In this view, you are standing next to the passenger station. There is an industrial area on the back wall, and you can see some of the building mock ups. The main line runs behind these buildings and disappears from the scene.

This view of the industrial area shows how John uses simple mock ups to see how the scene will work. Notice the mirror for the illusion of depth in the scene. In the background of the photo, you can see the Tehachapi section of the layout. The train enters a tunnel and comes out behind the industrial buildings.

Notice also how the right of way has scenery that goes below it, as well as, above it. The cuts and fills make the scenes interesting.

The layout is 48" above the floor. This gives some nice viewing and make reaching over the 48" wide yard easier. Around areas like the yard, there is a shelf to lean on to keep you off the scenery. The track is hand laid code 148 rail with code 125 sidings and some code 100 industrial track. The switches are all hand built and

When the train enters this tunnel on the Tehachapi section of the layout it comes out behind the industrial area and into the Los Angeles passenger station area of the layout. This is a good way to model great distance on your layout. Have the train leave the scene and reappear in a completely different scene. No problems with trying to blend the scenery together.

the main line switches are #8 frog, while the yard switches are #6 frog. There are some single, as well as, double slip switches on the layout. The diesel shop near the passenger station will take a four unit lash up. John said the primary function of the diesel house is to keep the dust off of them. The roof is removable for access to the interior. The yard panel boards use a single push button to select a route. The route is programed into the Digitrax DS64 control module.

John has rewired the layout and made changes over the years. One of the changes was to Digitrax DCC and computer controlled signaling. All the turnouts were converted from manual to stall motor switch machines. The purpose of this arrangement is that Dave MacFiggen, who was doing a lot of the DCC wiring, wanted to play with computer operated trains. The wiring and block gaps were upgraded to allow for prototypical CTC signal control. Two areas on the layout can be turned off to give non DCC locomotives a place to park.

Work on a model train layout is a never ending process. In addition, having your freinds helping adds a lifetime of memories. Every time you view the layout, you are reminded of the good times had in building it.. Thanks for digging out all the old photos for us John.

LOCOMOTIVE LIGHTING

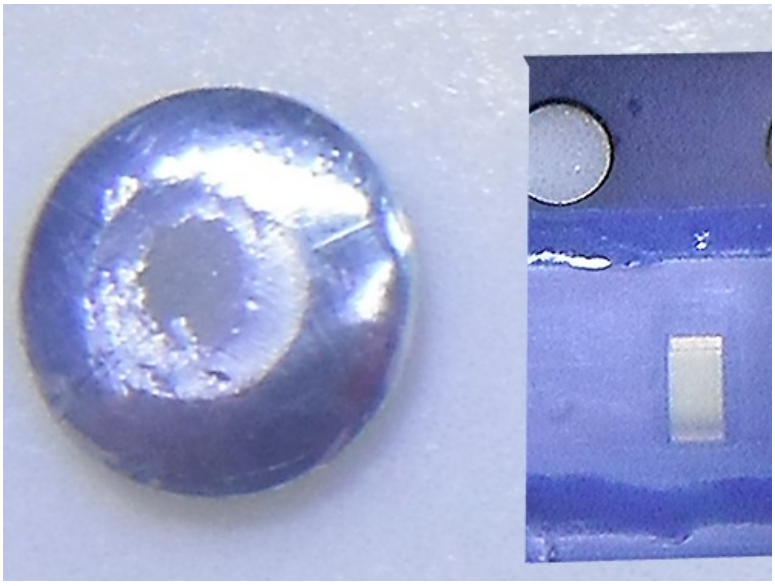
By Dan Dawdy

I wanted to just touch on locomotive lighting here, and go into this further in an upcoming issue. I have been using the small 6603 LEDs for lighting along with MV lenses. MV Products have been around for many years. They are available in many sizes and colors for model railroad use, as well as, many other areas of modeling. (See chart at end of article.) It's an extremely thin parabolic mirror and an outer lens made from a polymer. The effect is that of a sealed beam light, and effective it is! They are not always easy to find, but our advertiser, Des Plaines Hobbies, carries and can order them, as well as, Walthers and others.

A few different MV Products Lenses in my stash. The ruler is in inches.

I acquired a small "critter" from Ed Reutling a few years back. I thought it would make a good switcher for the yet to be built coal mine. A brass kit of Thousand Islands Railway No. 500 was an unusual unit, but it

would work for me. After tearing it down, and replacing many castings, including new Precision Scale headlight castings, I needed new lenses.

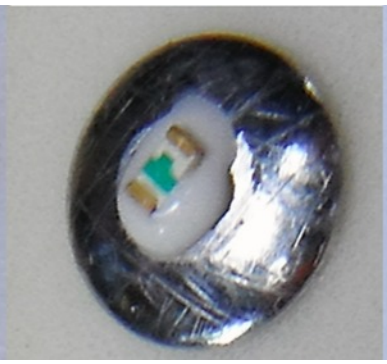


MV Products Lens is a number 248, ¼ inch shown next to a 0630 LED. You can see the small circle I filed off the back of the lens.

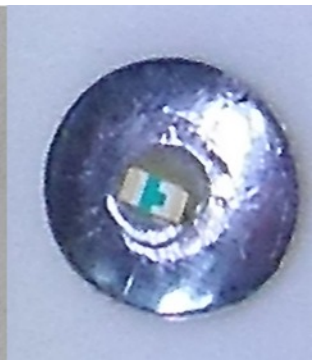
I start by measuring the opening of the casting and finding a lens that will fit. Most of the time, you can get one close enough. On the back of the lens, carefully file a round opening through the reflective substance. If you were using a small bulb, you could begin by drilling a very small hole for the bulb in fit into. If you are using smaller lenses, you may need to drop to the smaller 0402 LEDs.

I place the lens face down on a piece of double sided tape. You may want to place the tape on some glass or your bench a few times to make it less sticky. The LED is placed on the lens where I filed or drilled a round hole. A clear drying, flexible glue, such as Pacer Technology Formula 560 Canopy Glue, is then dabbed on with a toothpick and allowed to dry. Next, remove the lens from the tape to avoid marring the lens side. After soldering the wires you can go back with a little more glue if you want, although the solder should hold. Depending on the decoder you are using, a current limited resistor may be needed as well. Glue this assembly into the headlight casting and wire it up.

This is MV Products lens after filing with the 603 LED set in place.



Next, using a toothpick I take a dab of Pacer Technology Formula 560 Canopy Glue and dab the LED with it. There are other glues out there which dry clear, but I use this as it never really hardens, maintaining some flexibility.



The finished assembly ready for soldering. I won't cover soldering these LEDs as we did that in the March/April issue of The O Scale Resource available here as well as a video which may be seen here.

Here is the MV lens installed in the Precision Casting headlight. If you look closely, it almost looks like a bulb in there.

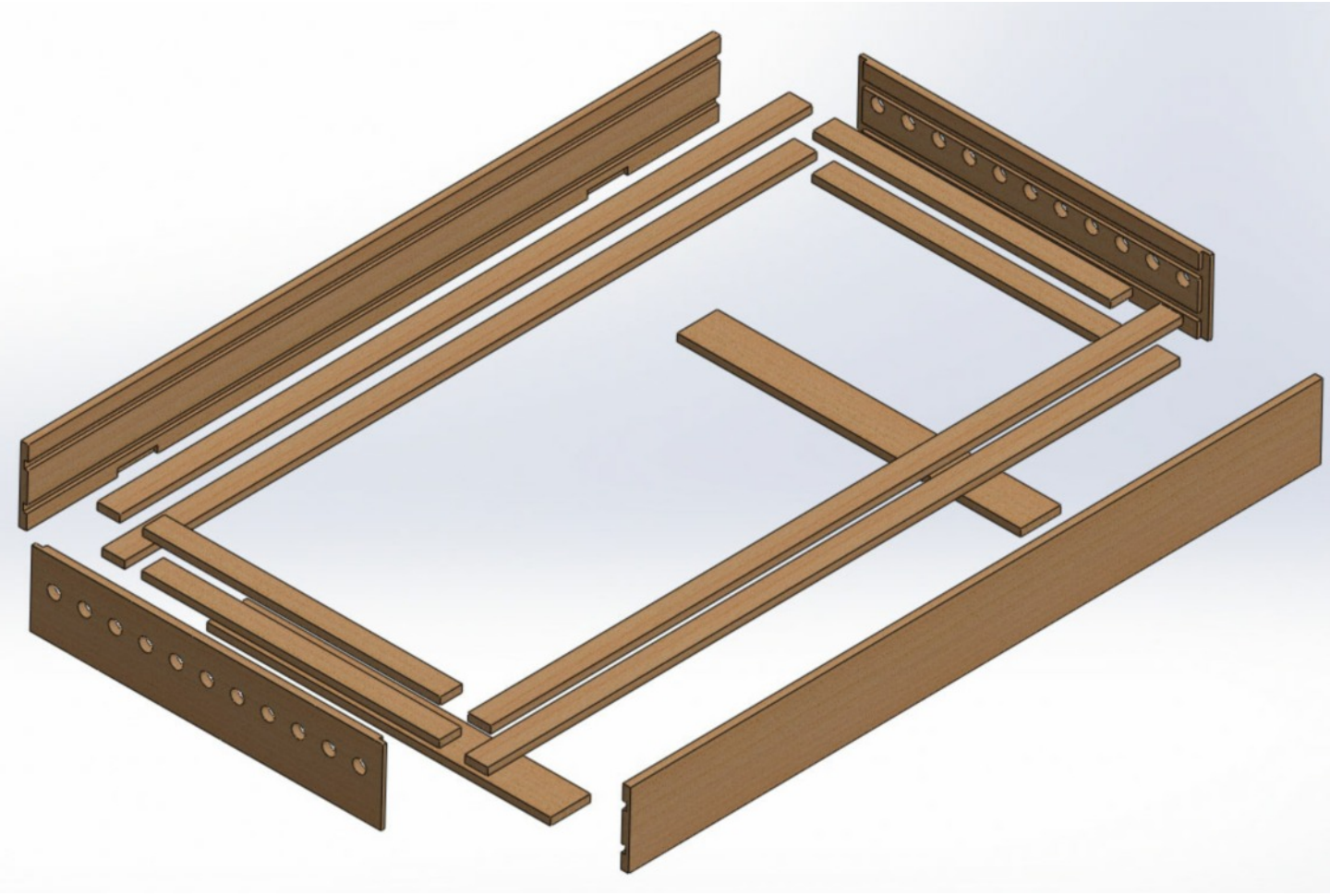
Lights on and by using a warm LED, we get an older incandescent type light.

Neville Mines No. 900 doing switching chores in Avalon yards.

In the next issue, I'll get into more detail on locomotive lighting, both steam and diesel as well as class lighting.

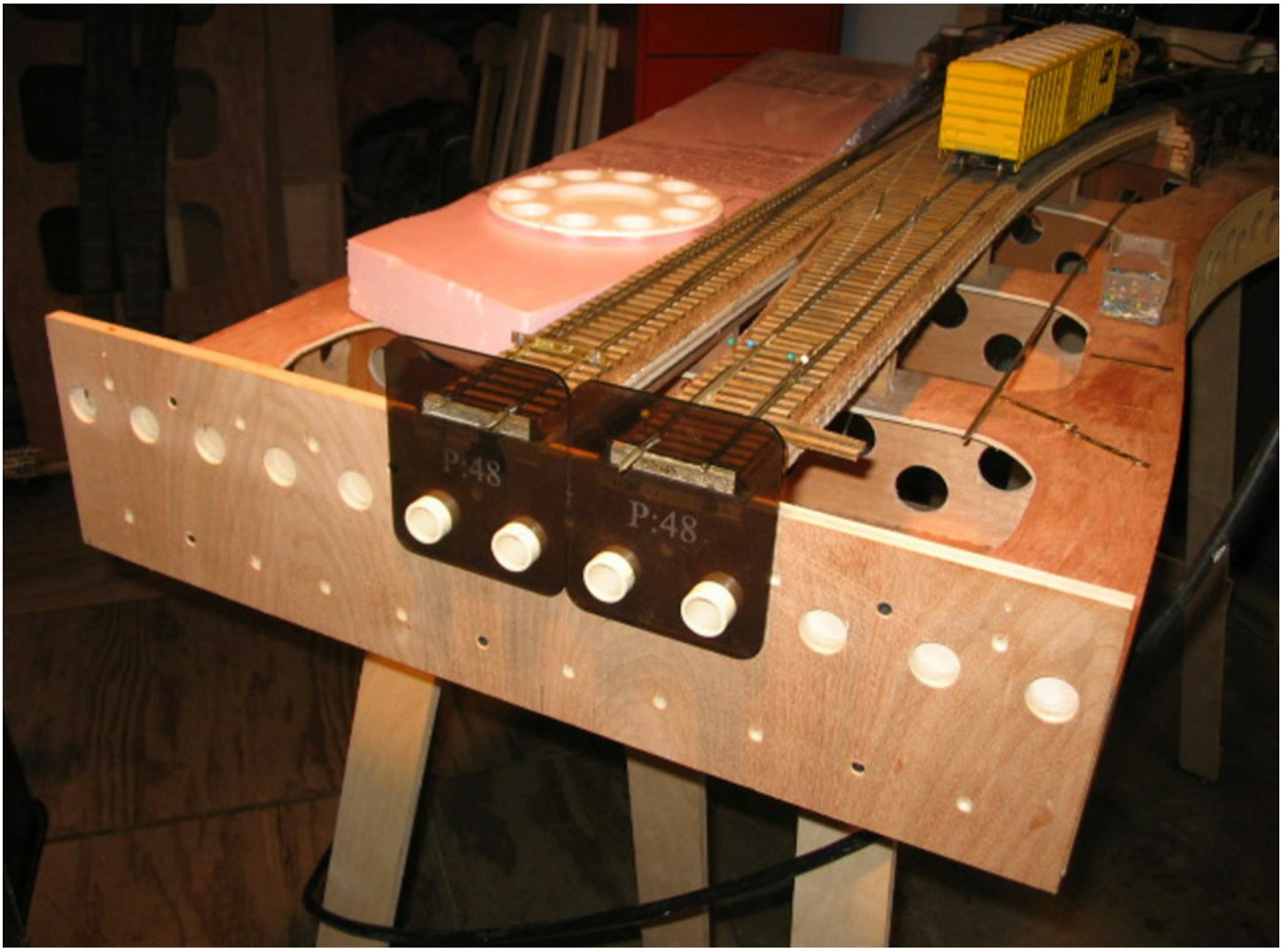
Drill Size	LD IN	LD MM	MV Part Number
54	046"	1.17mm	700,701,703, 702
55	052"	1.32mm	300, 301, 303, 304
52	063"	1.6mm:	22, 220, 221, 222, 223, 501
50	070"	1.78mm	600, 601, 602, 603
49	073"	1.85mm	26, 18, 103
47	078"	1.98mm	25, 24, 19, 23
45	082"	2.08mm	280, 281, 28
44	086"	2.18mm	20, 27, 200, 201, 202, 203
41	096"	2.44mm	409, 410, 411, 412
38	101"	2.29mm	29, 30, 31, 32
35	110"	2.79mm	109, 110
32	115"	2.95mm	116, 117, 118
1/8	.125"	3.18mm	800
30	.128"	3.25mm	128, 129, 130, 131, 132
29	.136"	3.45mm	136, 21, 137, 138, 139
25	.147"	3.79mm	149, 150
21	.159"	4.04mm	159, 160
19	.166"	4.22mm	166, 167, 168, 169
17	.173”	4.39mm	173, 174
15	.180"	4.57mm	180, 181, 182, 183
13	.185"	4.7mm	85
10	.193"	4.92mm	193
8	.199"	5.08mm	199, 11, 111
6	.204"	5.18mm	204, 2
4	.209"	5.31mm	209, 210, 211, 212
2	.221"	5.61mm	218, 216, 217
1	.228”	5.79mm	228, 229, 230, 231
15/64	.234"	5.94MM	401
¼	.250"	6.36mm	248
17/64	.265"	6.73mm	402
9/32	.281”	7.14mm	403, 414, 415
19/64	.296"	7.52mm	404
5/16	.312"	7.93mm	400
21/64	.328"	8.33mm	405
11/32	.343"	8.71mm	406
23/64	.359"	9.12mm	407
3/8	.375"	9.53mm	408
½	.500"	12.7mm	413

Some Thoughts On Modules

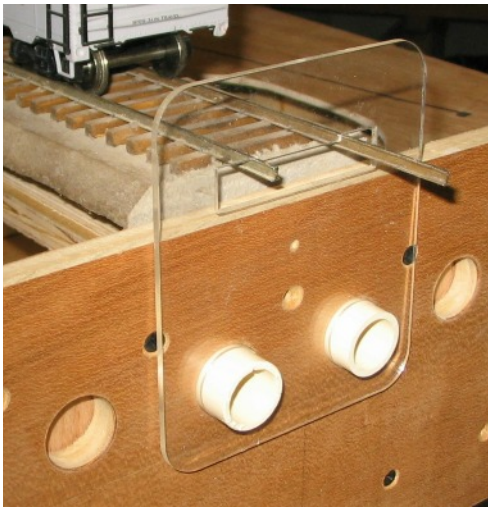


By Glenn Guerra

About 8 years ago Jerry Huth from Rippon, Wisconsin came to discuss module standards with me. Jerry builds furniture and custom cabinets and is inclined to think "out of the box" as they say. His concern was that all module standards are based on the over all dimensions of the module. Along with this the track is located with reference to the edge or center line of the module. Jerry had been looking into the Free-Mo concept of module layouts at the time also. The Free-Mo concept allows any shape or form to your module but the ends must be a set dimension and the track is located relative to the center line of the ends. You can learn more about Free-Mo at http://www.free-mo.org/ . This to Jerry was still to confining. What he wanted was some way of indexing the end of the module relative to the where the track is and not the other way around. For instance what if you wanted the track for your module to be at the back of the module. Your option was to build two transition modules and then your normal module with your track at the rear. There was another item that Jerry wanted to get away from and that was the short section of track you usually put between the module for final alignment. So we started going around about it. The first thing we came up with was to align the modules with pins. The pins would be positive alignment and that would keep the track aligned. We saw this idea in Bill Pistellos' module switching layout in the March April issue of the O Scale Resource. The idea here is, all that really matters is if the rails line up. So we had that problem solved but what about making the different modules mate? Jerry wanted complete freedom of module end and track location. As we talked the idea came up that we should index the track to some known mounting pins. We thought that most O Scale people use 4" track center

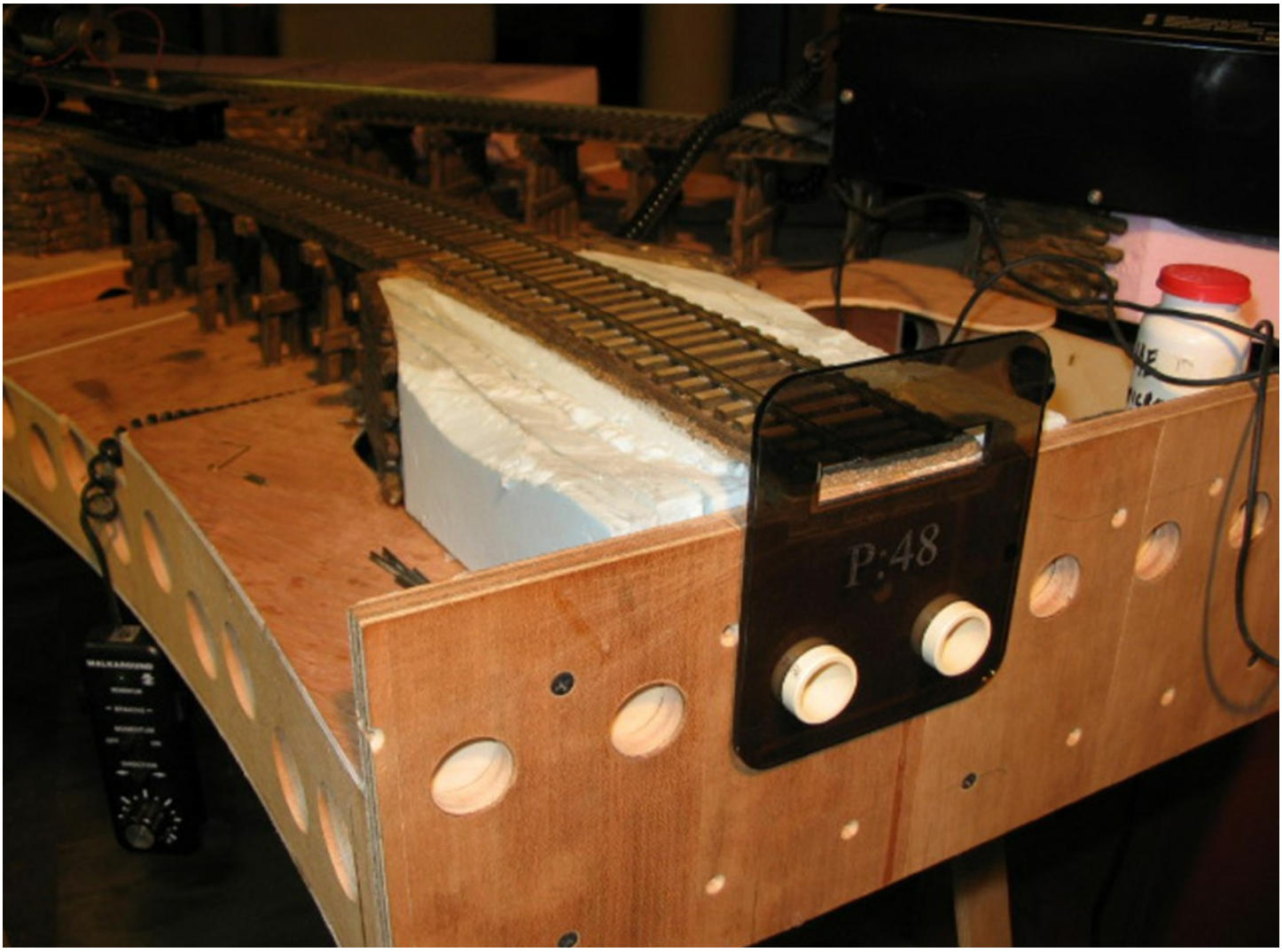


This was the first trial of the end plate and pin mating system. Jerry built some modules using the end plate and templates. You can see how the templates work. Also at this time Jerry was experimenting with making the module as light as possible. This type of construction is called a torsion box. The top and bottom skins are 1/8" door skins that Jerry cut holes in to lighten them even more. Then he made 1/4" ribs and drilled holes in them to lighten them more. Notice also that the edge of the module is not straight but has a free flowing form like a home layout would. This came from the Free-Mo ideas that Jerry was looking at. Three modules were built and they were strong enough for Jerry to sit on. Life and all it's obligations got in the way of progress on this layout, as it so often does, and Jerry had to disassemble the modules.



so we would go with some multiple of 4 for pin locations. Then we started talking about some form of a template that could be used. What we came up with was a row of holes on 2" centers. Our template would locate on any two adjacent holes. The template would then locate where the track was relative to any two holes. As long as you did this any other module built the same way would mate to yours and the tracks would line up. What we were doing was using the pins to line up the track and not rail joiners. The effect is the same. As long as the rails line up the

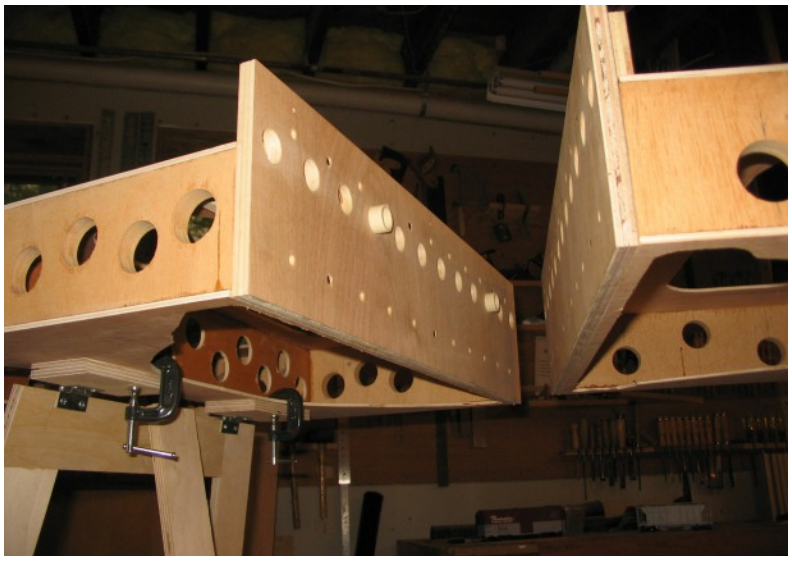
This was the very first template we made. You can see how it works in this photo. Jerry has placed the template on the pins and is shimming the track to fit the template.



This photo is of another module that Jerry built using the first version of the end plate, pin, and template joining method. Notice that the module construction is a torsion box type of construction with many holes for lightening it. This was to be the start of a branch line and the layout would take off in another direction from here.

trains will run. The only restriction was that the tracks must meet the end of the module at a right angle. Now we went back to the alignment problem. We wanted this to be as cheap and simple as possible. Jerry did some checking and found that one size of PVC water pipe was 7/8" diameter on the outside. We drilled some 1/8" diameter holes in some wood and checked the fit. It was a good snug fit. So for less than $10 you could have about 100 locating pins. Now we went back to the template. We used my laser machine and cut some templates to try. When you cut these templates the dimensions I give in this article are what you want the final size of the template to be. The laser machine

This photo shows two of the modules Jerry was building in the early stages of construction. Note the torsion box construction and all the lightening holes. The scenery was to be made with light insulation foam to keep the weight down. The legs are Jerry's idea also. They are very simple to build and fold very flat for easy transporting.



will cut a slot of some width. This width must be taken into account. We did some trial cuts until we got the final product right on the dimensions.

Jerry went home and started constructing some modules. The first attempt looked real good to me but Jerry thought it still needed work. The pin

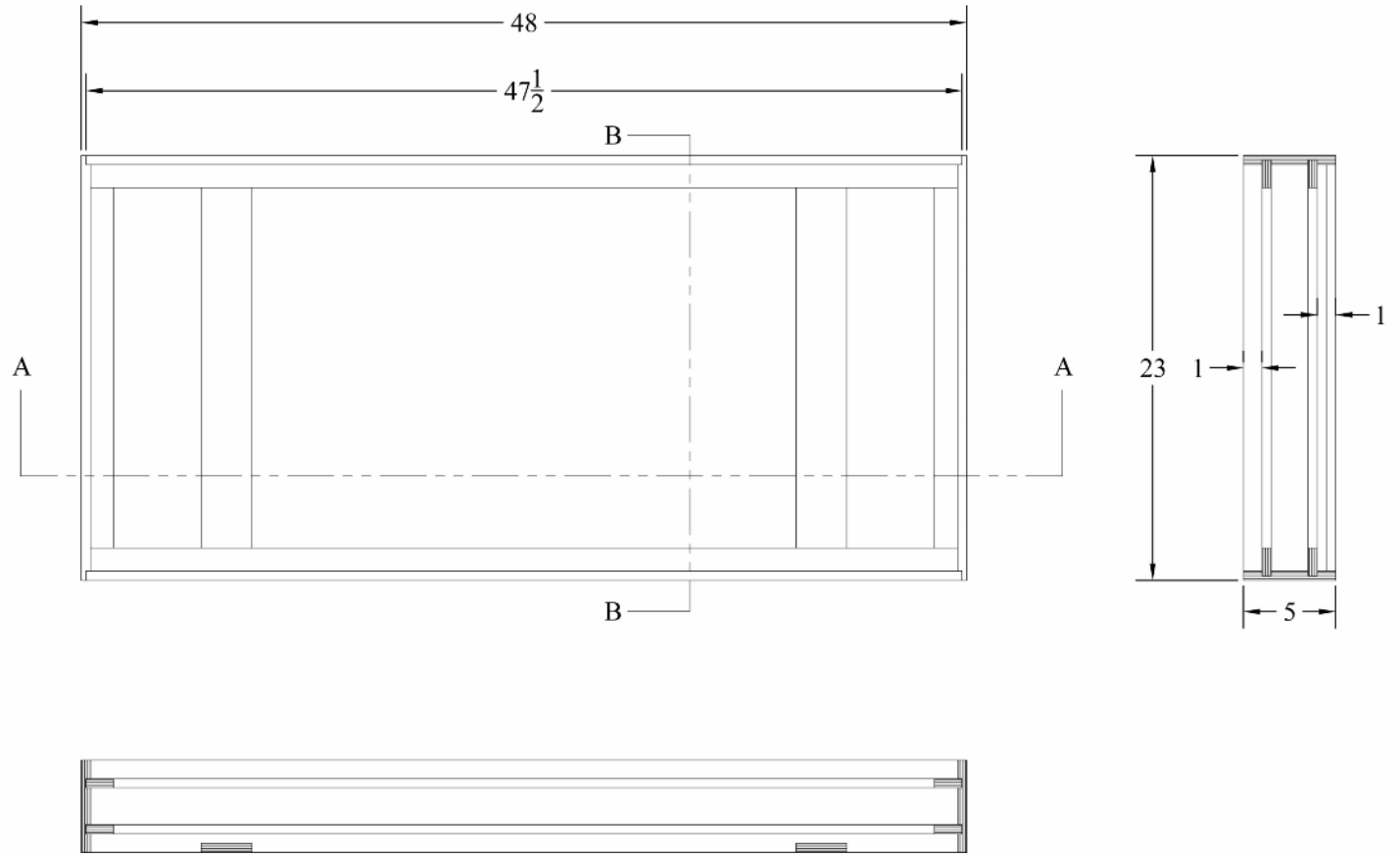
This view from under the modules shows how the legs are held on and how the pins work when the modules are separated. There only needs to be two pins and they can be in any two holes.

This is the latest design from Jerry. The idea was to keep it simple with as few parts as possible. Jerry built this one and brought it over to me. I modified some of the dimension to optimize the number of parts we could get from a 4' X 8' piece of plywood.

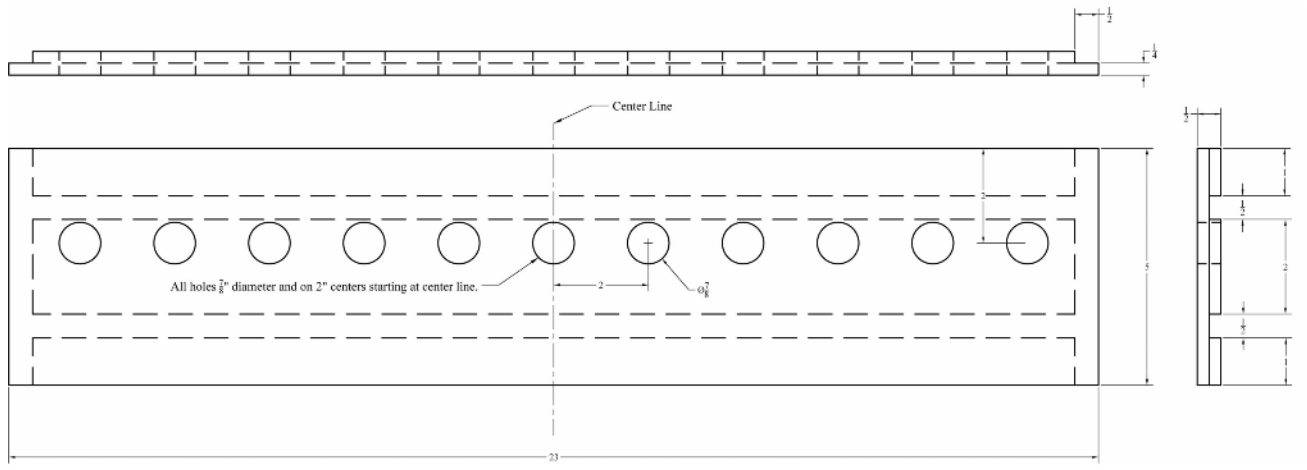
and template idea worked great but the modules still seemed heavy to Jerry.
These original modules were taken apart and Jerry got busy with work. About 4 years ago we were asked for some data on the idea and took a second look. Jerry, always the perfectionist, wanted a simple and very light module. This time we were looking at the idea of a standard size that could be used in a conventional module layout and be easily brought to the location. What we came up with was a 4' module length and 23" width. The 4' length would fit in most any automobile. Jerry went back to the shop and built one. He brought it to me to see. I sized it up and pushed the idea a little farther altering the dimensions so we could get four modules from on sheet of 1/2" MDO plywood. We would recommend using the MDO plywood because it has more plies than normal and the paper coating minimizes tear out when cutting as well as providing a good surface to paint. You can get MDO plywood at a lot of locations. Now we think it looks good.

What you have here is a module concept where any size or shape of module will mate with any other module. Your track can be anywhere on the module as long as it lines up with the pin holes. Lastly your module can be built to fit your layout in size or shape. If you want to take your module to a meet just pull the pins and remove your section to take to the meet. If you are part of a group and want some conformity in over all dimensions I would recommend the 4' module length. This will allow more people with smaller cars to participate. The people with vans that can handle 6' or 8' sections will still be able to participate. For example two 6' sections makes 12' which is three 4' sections. The sides of the oval are still the same length. One 8' section is two 4' sections. If there is a group getting together that just wants to assemble some modules and run you can participate in that. You may not be able to make a loop but you could still assemble a point to point layout.

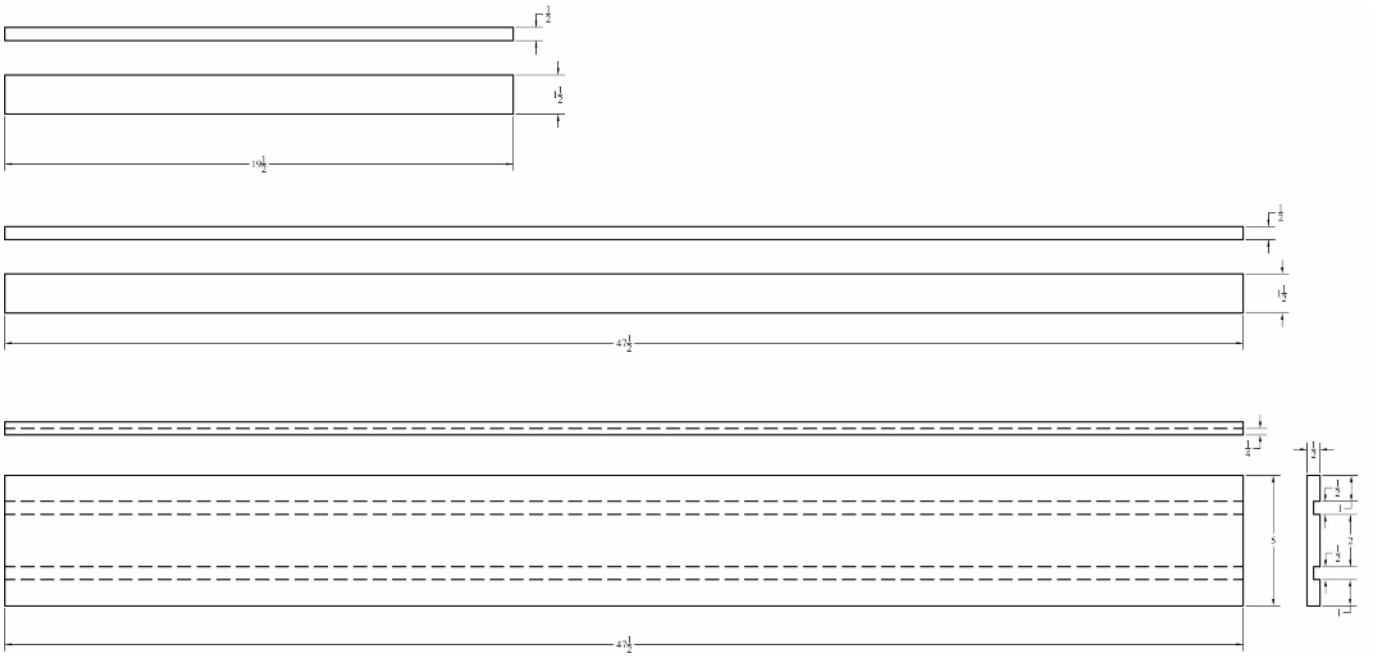
So take a look and see what you think. The drawings are free to use so help your self. Just remember that the critical part is drilling the 7/8" holes on exactly 2" center and they must be horizontal. Lastly the track must meet the end of the module at a right angle and be located on any two adjacent pins.



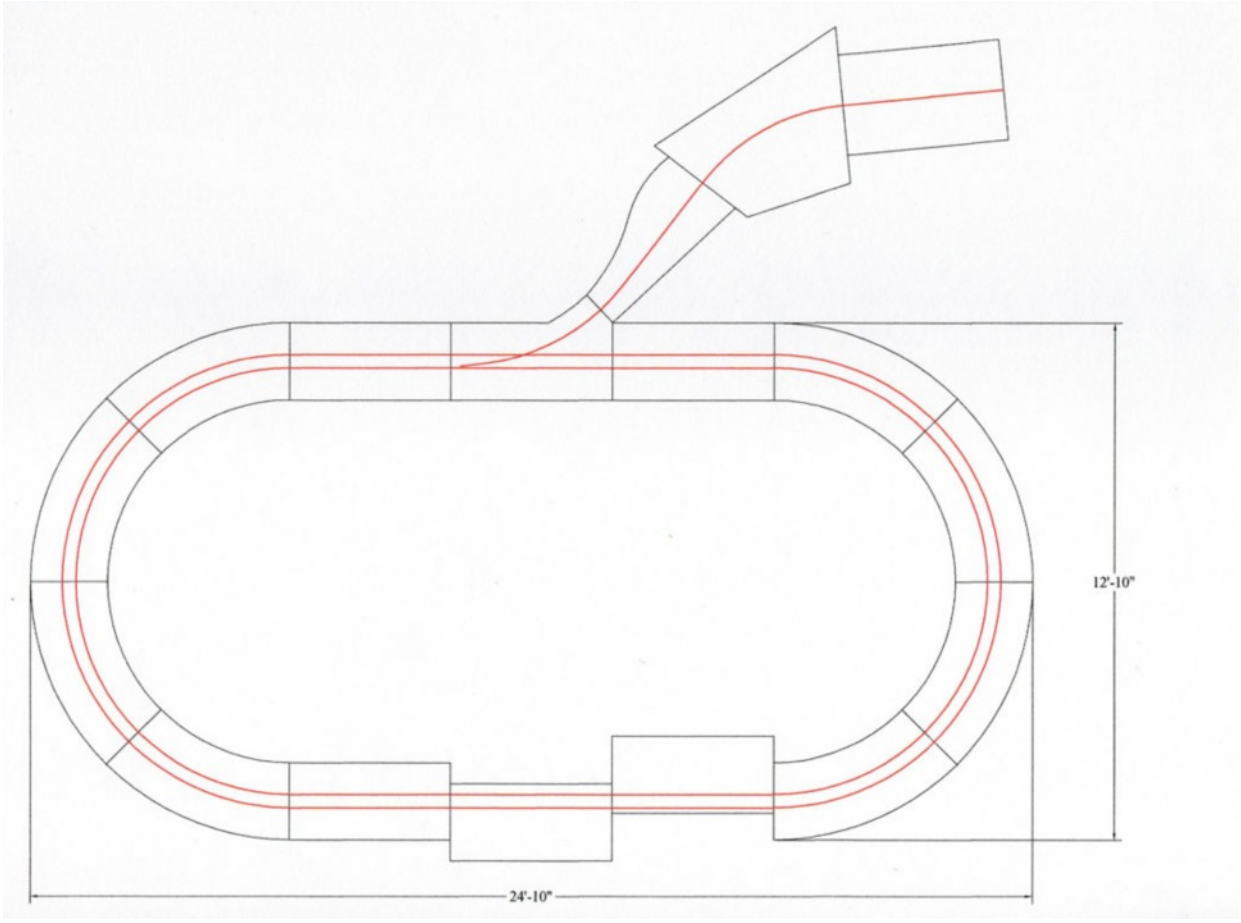
This was the basic module that Jerry came up with. It's simple to build and very light. The sections show the dados in the wood which make stronger joints.



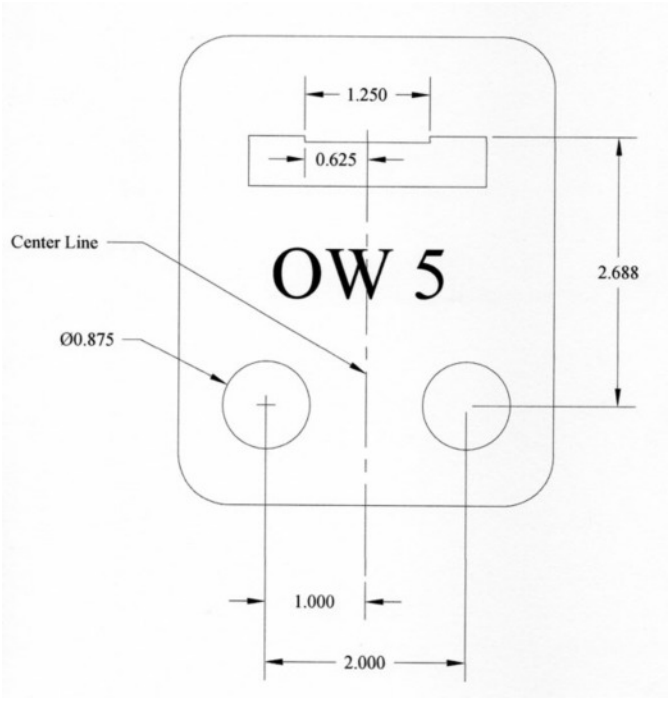
This is the end plate for the standard module that Jerry came up with. This end plate can be used on any module, even an existing one. The only critical items are that the pin holes must be horizontal and on 2" centers. All other dimensions and shape are free to change. As long as your track is located with the template and any two pins you will be able to join any other module built to the same standard.

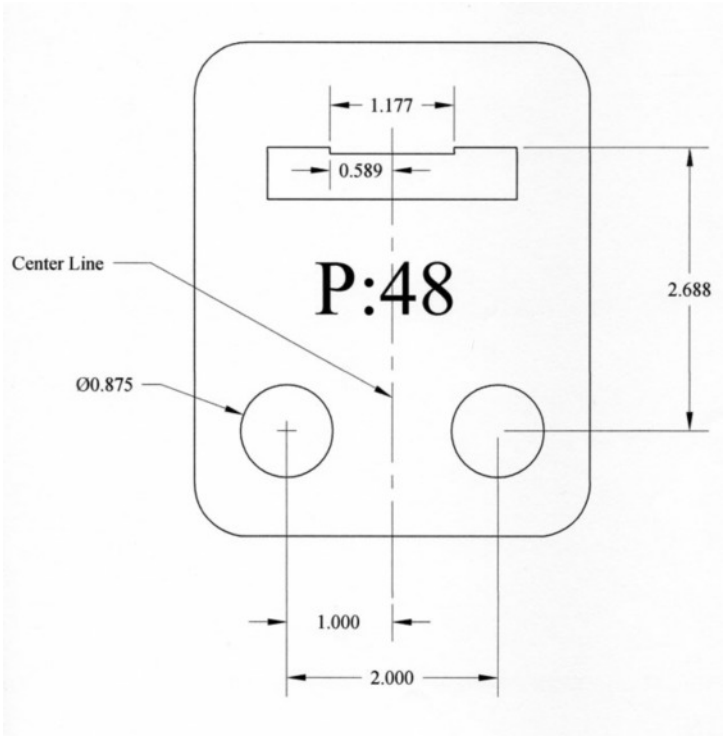


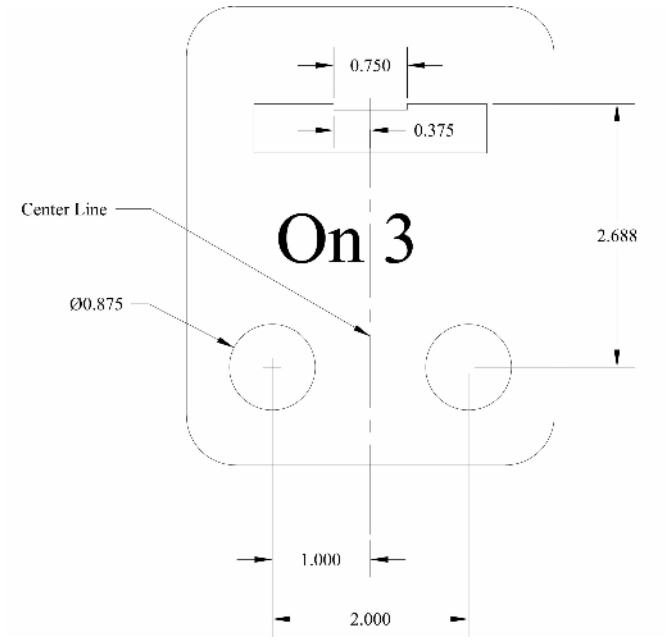
This drawing has the sides and stringers for the module. The stringers are glued into dados and add strength to the module as well as a shelf to place the foam scenery on. All these joints can be cut with a table saw.

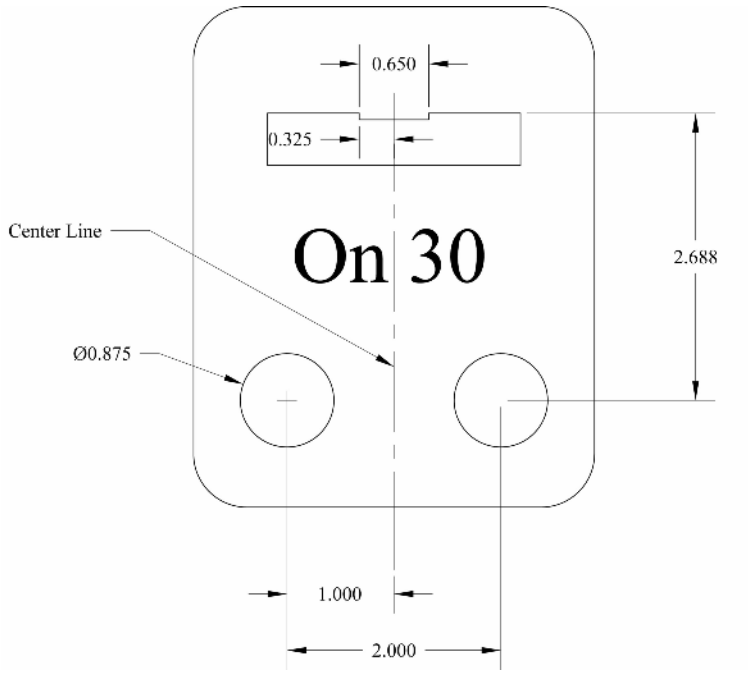


This drawing shows a possible layout that could be set up. The branch like module follow the free form approach and could be parts of a home layout. At the bottom you can see some modules with the tracks at the front or rear of the standard module. Another benefit to the pin location idea is the whole layout

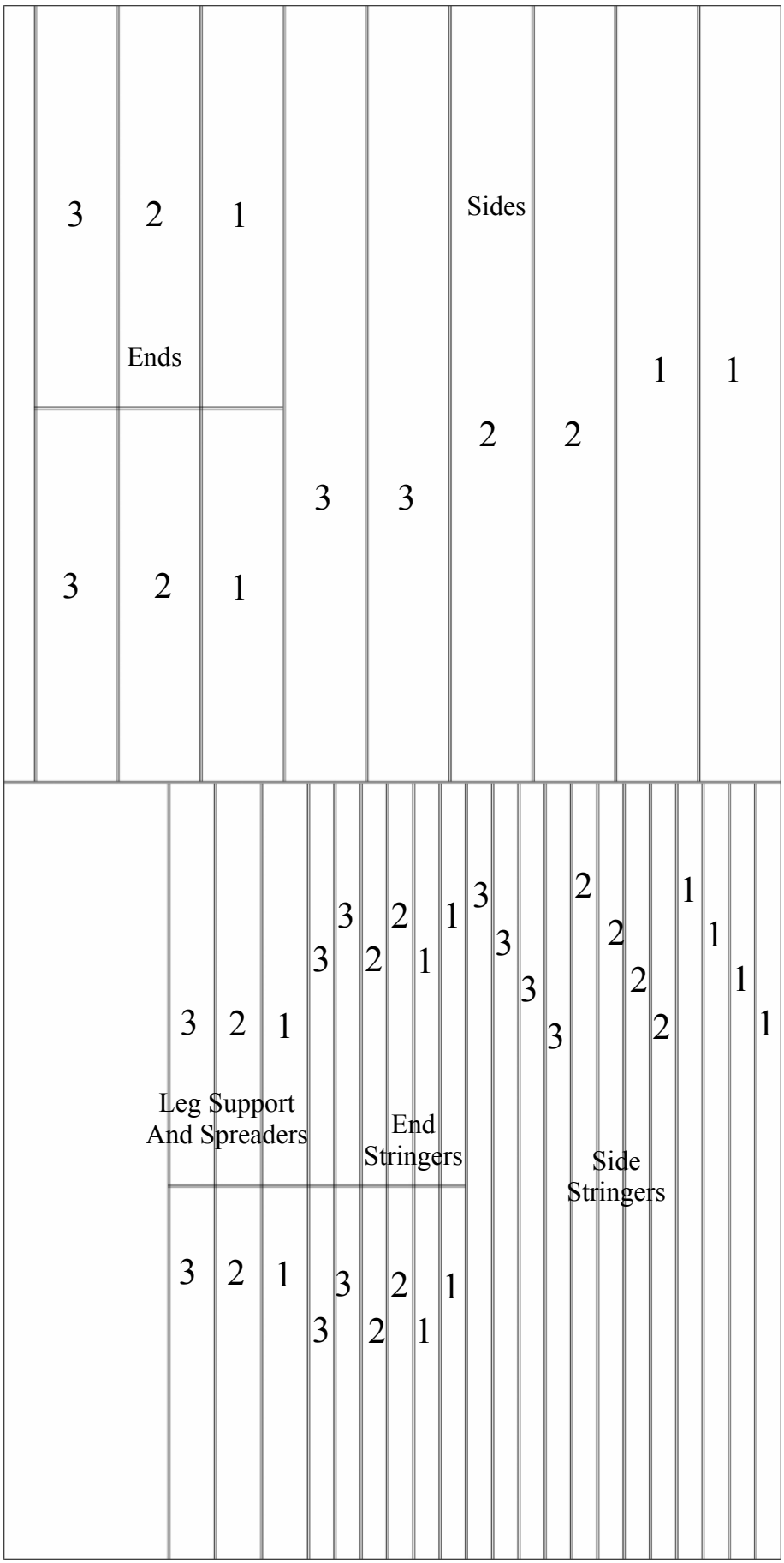








Here are some dimensions for some common templates. The dimensions not shown are not critical and can be what ever you want to make.



This cutting diagram will yield 3 modules from a 4' X 8' sheet of plywood. The parts are numbered with #1 for the first module, #2 for the second module, and #3 for the third module. The areas not numbered are extra wood for other use.

Make this cut first and cut the 4' X 8' Sheet into two 4' X 4' pieces. They will now be easier to handle.

O Scale Shows & Meets

The O Scale Resource Magazine will now be providing a free listing of upcoming events. This small, text only listing will include the Event, Date, Location, Type of Event, and Contact Information. Click here to go to the sign up form. This form will take your information, and we will publish it in our next issue. If it is an annual event, you will need to submit your information every year.

Eastern Pennsylvania O Scale Show
August 9th,2014
November 15th, 2014
Strasburg Fire Department
Strasburg, Pennsylvania
Email: jdunn8888@hotmail.com
Web Address: www.scaletworail.com

Western Pennsylvania Trolley Meet
Month: September 12 & 13, 2014
Pennsylvania Trolley Museum 1 Museum Road, Washington, PA 15301
Email: vsm@pa-trolley.org
Web Address: http://www.patrolley.org

2014 National 'O' Scale Convention
September 19th thru 20th, 2014
Wyndham Indianapolis-West
2 Rail, 3 Rail, Proto48, On3, On30 Convention
Email: oscaleindy@att.net
Web Address: www.indyoscalenational.com

Iron Rails Model Train Show
September 20, 2014
Barry Expo Center, 1350 N M37 Highway, Hastings MI
Email: magichb@aol.com

The North Shore Train Show
Month: October 4 & 5, 2014
Complexe multi sports 995 Bois-de-Boulogne Laval, Québec Canada
info@salondutrainrivenord.org
salondutrainrivenord.org

The Southern New England "O" Scale Train Show
October 4th, 2014
Chestnut Street United Methodist Church, 161 Chestnut Street
Gardner, MA.
Dealers, Displays, 2 rail, P:48..
Email: sneshowchair@snemrr.org
Web Address: www.snemrr.org

Sunshine Region 2014 Convention
10/17/2014 9:00 AM - 10/19/2014 12:00 PM
Melbourne Hilton Rialto Place
Barrett Johnson

The 2014 Southwest O Scale Meet
Oct 24th and 25th, 2014
Fort Worth Academy, 7301 Durch Branch Road
Fort Worth TX 76132
Email: swoscalemeet@gmail.com
Web Address: www.oscalesw.com/

Cleveland 2-Rail O Scale Train Meet
November 1, 2014
Lakeland Community College 7700 Clocktower Dr.
Kirtland,Ohio 44094
9:00AM-2:00PM
Email: j1d464@yahoo.com
Web Address: www.cleveshows.com

Gadsden Pacific Division Toy Train Museum - Toy Train Show
November 14th and 15th, 2014
January 9th and 10th, 2015
Tucson Expo Center - 3750 E Irvington Road
Tucson Arizona
Email: TrainShow@gpdToyTrainMuseum.com
Web Address: www.gpdToyTrainMuseum.com

Slim Rail Model Railroad Exhibition
Month: November 15 & 16, 2014
Ute Pass Cultural Center, Woodland Park, CO
Train show with clinics, model layouts and clinics
donlbailey@comcast.net

Chicago March Meet
March 13,14 & 15, 2015
Weston Lombard Hotel
Lombard, Illinois
9:00 AM-2:00 PM each day
Email : info@marchmeet.net
Web Address: marchmeet.net

O Scale West
February 5-7. 2015
Hyatt Regency
Santa Clara, California
9:00 AM to 5:00 PM each day
Email: info@oscalewest.com
Web Address: www.oscalewest.com

The O Scale Resource — Classified Listings

Manufacturers

Proto 48

Dealers

Pre Owned

Shows & Meets

Custom Builders


CARLON
Pepsi-Cola
I LOVE IT'S FLAVOR