

THE

# O SCALE

# RESOURCE

NEWS, REVIEWS, INFORMATION TO USE

Vol. 1 No. 1

September/October 2013

Joe Fischer Passenger Cars

Making Rocks

Painting Railroad Cars

Prototype Operations



See how to install a Tsunami decoder  
in these Atlas RS-1 locomotives.

# Bill Of Lading

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## Published Bi Monthly

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The Model Railroad Resource LLC  
Plymouth, Wisconsin

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## September/October

Vol. 1 No. 1

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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 forward or back, searching for a specific page, enlarging pages, printing pages, enlarging the view to full screen, and downloading a copy to your computer.

### Front Cover Photo by Dan Dawdy

The cover of this issue has a pair of ALCO RS-1 road switchers trundling through the yard at Avalon on the Richmond, Danville and Southern. Dan Dawdy uses 1 amp Tsunami decoders in these units, and he will tell us how he does it starting in this issue.

### Rear Cover Photo by Dan Dawdy

A tranquil scene on Gary Engle's layout. In this issue, we talk to Gary about how he did the nice rock work.

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# EDITORIAL COMMENT



Welcome to the first issue of The O Scale Resource online magazine. The O Scale Resource has been in existence for four years now as a classified listing of suppliers to the O Scale hobby. About two years ago, we started to post photos of some of the O Scale shows, as well as, some useful information to modelers. With this change, we will now become an online magazine offering more news and information about the hobby. The magazine will be published six times per year. Each issue will have information about coming products, in addition to, looking at existing products. Another feature will be visits and interviews with other modelers. In these visits, we will learn some of the history of our hobby, along with providing some insight into how others view their activity in the hobby. We will have an article relating to rolling stock each month which will include cars and locomotives. These articles will be primarily focused on the techniques of the modeler who built or converted the model. An article on prototype practices each issue will look at some prototype practices, and how we could possibly model them. In these articles, we will look at things like operation, facilities, practices, and standards. Another article will cover some form of construction. This article will cover hands on techniques, and will look at the work of other modelers. Lastly, we will have the classified listing section that will have information about suppliers to the hobby. As a result, we should have something of interest to everyone in each issue.

In this first issue, we visit with Mike Hill to learn a little about Joe Fischer, and see some of the models Joe Fischer made. It was an enjoyable visit, and I think you will find the article interesting. Next, we will hear from Dan Dawdy on how he converted his Atlas RS-1 to run using a 1 amp Tsunami sound decoder. There are two parts to this article. In part one, Dan shows how to determine the amperage draw so you know what size decoder is needed. Then, Dan does the installation on his Atlas RS-1. This was a simple conversion that gave Dan all the performance he wanted. Our next article is about operation, and in particular, how the railroad knows where to send a car. When sending a letter via the Post Office, we use street addresses. The railroads have their own addresses, as we shall see. We first talk to Fred Steffen who was a railroad station agent for many years. Fred will give us some insight about how the railroads direct the movement of cars. In the next part of this discussion, we will visit with Ted Schnepf. Ted has a large O Scale layout that features operation, and we will see how Ted models the prototype car movements. After that, we go to Indiana to see Gary Engle. Gary has a layout with some nice scenery touches. We will do two articles on this subject. In this issue, we talk to Gary about his techniques, and see some of the results. In the next issue, we will get some hands on help from Gary showing Dan how to do some rock molding on Dan's layout. Lastly, we look into paint. This will be the first of a three part article about paint. In this first article, we will be looking into what paint is, what pigments were commonly used by the railroads, and how the paint was applied.

With that said, we invite you to read on and enjoy this issue.


Glenn Guerra






# NEWS AND REVIEWS


Ted Schnepf of Rails Unlimited tells us that his Lehigh Valley box car is available and shipping. These cars started life as door and a half auto cars. In 1934 and 1935, they were rebuilt into single door cars. The car is unusual in that the door opens to the left. This should be an interesting addition to your car roster. The cars had Dyrea cushion under frames, and the model captures that. The kits come as flat kits or built up bodies. In addition, you can purchase a custom built up model from Ted. Lee Turner did the masters for these kits. <http://railsunlimited.ribbonrail.com>




Pat at P&D Hobby informs us that he still has some EMD F unit kits available. Pat sold the molds for these kits to Atlas, and they do not offer the variety of versions that the original kits offered. If you would like one of these, give Pat a call while there are still some left. <http://pdhobbyshop.com/>



Bob Stevenson at Stevenson Presentation lines tells us that his C&NW R-1 4-6-0 kits are shipping. Currently, he is working on a NYC 0-6-0 kit. On the way home from the O Scale National, Bob stopped in Utica, New York, to photograph and measure a prototype engine that is on display there. Lastly, Bob has purchased the equipment and patterns from K&D Castings. <http://stevensonpreservationlines.com/>



Archer Fine Transfers has added weld lines and louvers to their line of three dimensional transfers. <http://www.archertransfers.com/>

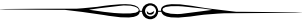


Dave Thompson at Harbor Belt Lines tells us he is busy working on some new building kits. One has just been released. Check his website for more details. <http://harborbeltlines.com>

Rich Yoder Models has announced that a second run of the popular Santa Fe panel side box cars has been done. In addition, Rich is taking reservations on future products. He has made arrangements with new manufacturers, and will be able to keep supplying his popular trucks. <http://www.richyodermodels.com>




Bill Wade at B.T.S. told us that the 90 ton depressed center flatcar #19209 sold out of the first run, and a new run is being produced. They should be ready in September. <http://www.btsrr.com/bts9201.htm> B.T.S. also has a replacement deck ready for the Atlas Trainman 52'-6" Flatcar. Bill told us Atlas created the car with the unusual deck following a Canadian Pacific prototype where this "checkerboard" deck was applied to 100 of the 1,000 cars the CP owned, and a more-standard wood deck was applied to the rest of the cars. #12614 Wood Deck for the Atlas Trainman 52'-6" Flatcar \$14.95 <http://www.btsrr.com/pix/12614-all.jpg>



Leo and Randi at Crow River Products have a new Trestle Tower Unloader kit. The kit comes as two parts. The trestle, kit #328 in narrow gauge, and #329 in standard gage. The traveling derrick that rode on the trestle is sold separately as kit #327. This allows the modeler to add trestle length should they choose. You can see the kits on their website. [http://www.crowriverproducts.com/A\\_327\\_DerrickHo use\\_andTower.htm](http://www.crowriverproducts.com/A_327_DerrickHo use_andTower.htm)

A kit for the barge is also offered – looks like a nice waterfront addition.



Tom Dempsey, the new owner at Clover House, reports that the original Clover House items are back. He continues to add new items to the line. See them online at: <http://cloverhouse.com/Store/>



Norm Buckhart at Protocraft dropped us a line to inform us that he has added some new detail parts in the Fine Scale Parts area on his website.

<http://www.protocraft.com/> There are running boards in the Morton style and US Gypsum style. Roping Staples have also been added. Norm's decal line now includes 25 new sets. Proto:48 switches are available in a few sizes. Contact Norm for details.



Rick Galazzo of Tru-Color Paint tells us that he is adding new colors every month. Extensive research goes into each color for a match to railroad standards. Recent releases include a Pennsylvania box car red from the 1950's and Southern Pacific depot colors, yellow, green and brown. You can see them at: <http://www.trucolorpaint.com/>



Don Tichy at Tichy Train Group informs us that they are adding new architectural details to the O Scale line, and are offering a 200 piece assortment. This should keep you at the workbench for a while. Go to: <http://www.tichytraingroup.com/>



Sierra West Models has announced that they will be doing an O Scale sawmill to go with their other logging structures and details. For more information go to: <http://www.sierrawestscalemodels.com>



Des Plaines Hobbies reminded us that they have brass detail items for Alco and EMD road switchers. They are listed under the O Scale America line. <http://www.desplaineshobbies.com/store/>



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The Chicago March Meet <http://marchmeet.net/> was an enjoyable time again this year. The meet draws people from all over the world, and it is always good to see everyone. Attendance was good, and the tables were full. Many of the manufacturers had new things to show. Mike Hill, the show promoter, always has a table with some of the custom built models he owns. In this issue, we talk to Mike about the custom builder, Joe Fischer.



Jim Cantor tells us that the September Indianapolis O Scale show is filling up. Sounds like it will be a good show. Look for the ad in this issue.



Mike Walter with the Southwest O Scale meet <http://www.swoscale.com/> in Ft. Worth, Texas, tells us that there is a big college sporting event in town on the weekend of the show (October 11-12, 2013), so make reservations early.



Rod Miller, the driving force behind O Scale West, <http://www.oscalewest.com/> tells us that the show will be February 6-8, 2014 at the Santa Clara Hyatt Regency again this year. Rod said they already have 30 layouts on the layout tour. See the website for more details.



Keith Wiseman at Wiseman Model Services continues to acquire more product lines. A recent acquisition is the old Gloor Craft line. Keith is retooling and redesigning the kits. He has just released a kit for a Pennsylvania interlocking tower made by laser cutting instead of the old die cutting. Coming soon. is a reissue of the 61' well hole flatcar. The new kit will have cast urethane parts to replace the wood, and will use the cast white metal parts of the original. See their products at: <http://www.locopainter.com/>



Miniatures by Eric has a line of O Scale lost wax brass parts. They have been in business for over 30 years. Congratulations. See them at: <http://www.miniaturesbyeric.com/index.htm>

# Joe Fischer Passenger Cars



## We visit with Mike Hill

By Glenn Guerra  
Photos by Dan Dawdy

The finest custom-built passenger cars in 1/4" scale, the only models which have that realistic prototype appearance. Send a dime for my well-illustrated folder "Miniatures of Realism."

**JOSEPH J. FISCHER**  
14 St. James Place      Lynbrook, L. I., N. Y.

*An ad for Joe Fischer in the September 1951 Model Railroader.*

In the summer of 1969, I was working on a delivery truck for Pepsi Cola in the near northwest suburbs of Chicago. One of our stops was a small hobby store in Park Ridge called Bill's Hobbies. There was a soda machine in the store which is why we stopped. Bill's Hobbies was a Lionel service station. In those days, Lionel was on their knees and just about finished, but Bill Sanchez was hanging on doing repair work and catering to collectors. I remember there being almost nothing new in the store. I was a modeler at



that time, and had built my first O Scale model by then, so I was interested in what was in the store. I knew that there was a collector market in old trains from the Collectors Corner column in Railroad Model Craftsman, but knew very little about it. Bill's store was a hub of that activity in the Chicago area. My only contact with the store was on the days we would deliver to the store. I think I went once or twice just to look after that. In 1968, Mike Hill joined the Train Collectors Association, and in 1972, started going into Bill's Hobbies. Mike was collecting O Scale 3 rail trains at the time, but the 2

**The finest CUSTOM-BUILT 1/4" scale models of conventional and streamlined passenger cars. May I have your inquiry?**

**JOSEPH J. FISCHER**  
**14 St. James Pl. Lynbrook, L. I., N. Y.**

*This ad appeared in the February 1948 Model Railroader.*

2 rail bug was getting him. Mike saw his first 2 rail Union Pacific Big Boy at the All Nation Hobby Shop in Chicago when he was a teenager, and said that some day he would own one. Anything O scale that came through Bill's store would catch Mike's attention. Being a member of the TCA allowed Mike into their shows, and he was able to meet many other people interested in O Scale trains. In 1975, Bill decided to sell the store to Mike, and it became Hill's Hobbies. Mike was attending the TCA shows and acquiring some knowledge of O Scale models, as well as, 3 rail models. Mike met Mack Lowery at the York, Pennsylvania show when Mack was there selling some of his trains. Mike initially was not impressed, but the closer he looked at the models, and the more he knew about Joe Fischer, the more interesting the models became. The scale trains were having much more appeal to Mike by then. Mike started buying some of Joe Fischer's models secondhand at these shows and through his connections with other collectors. I would stop into Hill's Hobbies occasionally, but never got to know Mike at that time. Actually, I knew very few people in the hobby – I was kind of a loner. In 1970, I was given a box of old Model Railroad magazines from the 1940's and 1950's. I still read them today, and find some of it very interesting. When I started manufacturing models, I spent

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**1/4" SCALE**

May I have your inquiry on the following built-up models?

- Passenger cars, \$26.50 to \$44.50 p.p.
- Freight refrigerators, \$15.50 p.p.
- Express refrigerators, \$18.50 p.p.

These offers expire Dec. 10, 1949.

*For views of some of the FINEST passenger car models, send a dime for your copy of "MINIATURES OF REALISM."*

**JOSEPH J. FISCHER**  
**14 St. James Pl. Lynbrook, L. I., N. Y.**

*An ad for Joe Fischer in the November 1949 Model Railroader. Note the prices of the cars.*



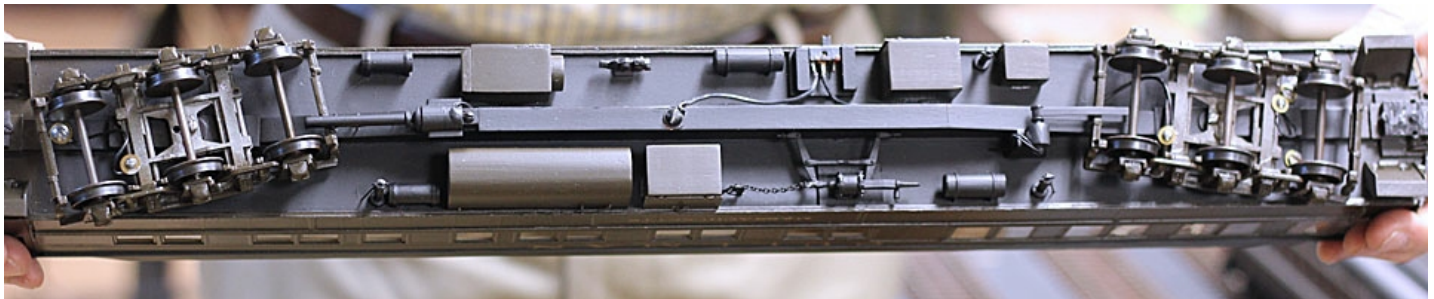
*As Joe's ads state, he made streamline cars as well as heavy weights. Mike pointed this train out to us, and in Particular, the fluting. Mike seemed to remember that it was some commercial trim that Joe found somewhere. Joe's cars had diaphragms on them which really set them off.*





*These two photos show the detail of the fluting on the streamline cars. The workmanship is impeccable, and it really shows in these photos. What's also remarkable is that many of these cars are over 50 years old.*

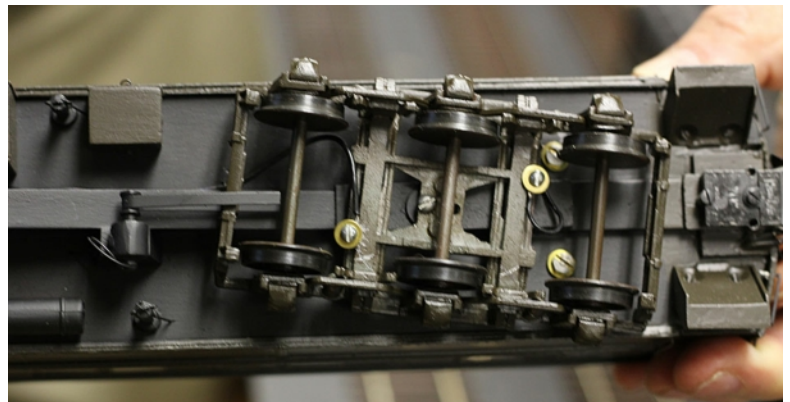
more time at the shows, and was finally meeting people. I met Mike through the Chicago O Scale show, and we found we had some common interests in the history of models and railroad history in general. Because I had these old Model Railroad magazines, I knew something about the history of our hobby, and I would ask Mike about some of this. One of the things I was interested in was Joe Fischer. I had seen the ads in Model Railroad



*Mike showed us the underside of the Pullman car Massachusetts. The detail is spartan by today's standards, but all the essential elements are there. Dan commented that Joe had still captured the essence of the car.*

by Joe, and had heard about his cars. Mike has some Joe Fischer models, and invited Dan and I to come for a visit to see them. After some pleasantries, we went down to the basement to talk trains. Mike had a coach yard full of Joe Fischer cars for us to look at. As we were talking, Mike related what he knew about Joe.

The first question was, did Mike ever meet Joe personally? Mike related that he had been purchasing secondhand cars made by Joe for some time before meeting him. In 1974, at the O Scale convention in Philadelphia, Pennsylvania, Mike was introduced to Joe through a mutual friend, Bill Truscot. Joe was still making cars, and Mike was able to have Joe build some cars for him in those years. Mike told us that Joe



*In this close up of the Pullman car Massachusetts, you can see the double layer sides of the car. By doing this layer effect, Joe was able to get some good depth into his models.*





was a very private person, and very seldom came to shows, so he was glad to be at the same show and get to meet Joe. After that, they corresponded by mail and phone, and Mike acquired more of Joe's models made specifically for him. This was getting late in Joe's life, and he passed away in 1996.

I then asked how Mike went about ordering cars. He said that Joe did not normally build cars for stock, and usually built cars on order. The New York Central and



*These photos show the depth that Joe was able to get on the car sides with the layered strathmore board. Note also that the cars have interiors which really sets them off.*





*These are all Joe Fischer cars and some of them are 50 years old. The workmanship is excellent and they hold up well. Mike said that one of the big attractions to Joe's cars were that many of the cars were not available by some other manufacturer.*

Pennsylvania were his favorite railroads, but he would make other cars. You could order a whole train or a single car. Usually the cars were delivered by Joe. Only a very few people ever got to see Joe's workshop Mike said. One person that Mike knows was able to see the basement after Joe had passed away, and commented that the basement was a "dungeon". I guess you don't need the latest and greatest shop to do nice work. When you ordered a car from Joe, you expected to wait your turn. Joe only worked in the winter months on models because he was an avid gardener in the summer. I was curious if building these models was his only profession. According to Mike, Joe also worked in a hobby shop in New York City. He was married, and had two daughters.

The conversation then got around to how the cars were built. Joe built his passenger cars using milled wood roof stock, wood floors, and Walthers cast ends. The sides were made with strathmore board using a layer process. Joe showed this technique in a two-part article in *Model Railroader*. This was, and still is, a common technique. Bill Clouser in Missouri, and Bill Hoffman in California, both used this technique. Mike showed us the bottom of one of his cars, and you could see the two layers of strathmore board. This layering gave the car side more depth than either the embossed paper sides made by JC Models at the time, or the stamped metal sides made by Walthers. The windows were all cut by hand with a razor blade. The rivet detail was done with clock gears mounted on a stick. Mike showed us a flute side streamline car that Joe built. Joe had found some commercial trim strips that looked just like O Scale fluting and used that. The streamline cars have round corner windows, and the windows in the outer layer are slightly larger than the inner layer, which makes the sash recessed. The workmanship is superb, and done on a material that does not sand or file very well. The detail is rather spartan by today's standards, but the cars look great. Mike showed us some later models made by Joe, and the detail work was increasing. Dan made the comment that the essence of the car was captured, so the lack of detail was not readily noticed. I guess you could also say that not all the details are there, but the right ones are. Another thing that sets the cars off is the interiors. The larger windows of the O Scale cars allow you to see the detail inside the cars. The paint jobs are superb, and they really make the model. Mike said they are all done with Scale Coat enamel paint. In spite of being made with Strathmore board, the models hold up well. Many of Mike's models are over 50 years old, and are in original condition.

According to Joe's ads, he worked from railroad prints. Mike also seemed to think Joe was very observant, and of course, the trains were all around him. He rode the train often, and in those days you could get



close to the cars. Mike said that Joe would make notes when he could get around the prototypes.

As we talked and looked at Mike's models, I wondered how many cars Joe had made in his lifetime. Mike said that Joe did not keep records like that, but Mike and other collectors have compared notes. They came up with around 3,000 cars made by Joe. Joe's biggest customer was Mack Lowery in Cleveland. Mack owned a clothing store, and had his layout in the store. It was featured in Model Railroader one year. Mike said Mack had around 700 Joe Fischer passenger cars. Mike owns some of those cars today. To put this in perspective, assume Joe worked 40 years, which would mean he made 75 cars per year. Take away 16 weeks of the year for gardening, and that leaves 36 weeks of the year left to make models. It appears he made about two cars per week, worked in a hobby store, had a family, raised two daughters, and slept sometime in there. What a remarkable accomplishment!

The last thing I wanted to know was how to identify a Joe Fischer car. Mike showed us many of them, and said that they were not marked by Joe. One tip-off is to look for the strathmore sides and the double layer. The Walthers cars have tin stamped sides, and you can see that when you look close at the underside. The workmanship is also very good. Mike has a few cars that were abused, and he had them touched up. He showed us one, and it was a very good job considering the damage to the car. This can be an iffy proposition, so look close before you buy. In addition, keep notes on when you purchased the car and from who.

Mike and his wife Judy ran the Chicago O Scale show for many years, and have turned it over to their son and daughter-in-law. The new face of the show is now Melissa Hill, who many of you have met at the show. Mike still brings some cars to the show for display, and is always willing to talk about them and other models. You can tell by talking to him that he really likes the models, and appreciates the work of the builders. Mike is a wealth of knowledge about part of this hobby that is not very visible. Dan and I would like to thank Mike for having us over, and talking with us about Joe Fischer.



*Joe custom built the Massachusetts for a customer in eastern Pennsylvania. He installed lights, and put a small switch under the car to turn them on. Mike purchased the model from the original owner. The prototype car was made by Pullman in 1929, and ran on the pre-streamlined 20<sup>th</sup> Century Limited.*

Well, we need to get going; the day is over and the sun is going down. We will be leaving by train, and as we walk down the platform to our train, we come to the Pullman car Massachusetts. This car is in our train tonight, and the lights are already on. The car has a lounge, drawing room, two state rooms, and six sections. We booked the two rooms for our trip home, and are looking forward to relaxing in the lounge and talking about the wonderful models we have just seen before going to bed. We say goodbye, and board our train. What a pleasant trip down memory lane it will be.

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# PAINTING

# RAILROAD

# CARS

By Glenn  
Guerra



*The master painters considered themselves to be artists, and that is shown in this proposed badge submitted by T.H. Soley of the Lehigh Valley Railroad. This appeared in the February 1897 Railroad Car Journal.*

I thought we would start a three part series here on paint. Talk about a hot topic! Paint color, and what is correct, can start some heated arguments. My point here is not to determine what is the right color, or to tell you how I paint my models; but to give some insight into paint, its use around the railroads, how we may be able to duplicate some of the finishes, and some information on color mixing. In this first article, we will start with some information on what paint is, and how the railroads used it. In the next article, we will discuss how to possibly duplicate some of this on our models. The last article will discuss some basics of color so we have some idea of what to add if we want to change a color.

In the railroad industry, there was a trade group called The Master Car and Locomotive Painters Association of the US and Canada. They were very prolific in their writing and, as a result, we have a good amount of information from them. In the 1890's, their official organ (newsletter) was the Railroad Car Journal magazine which can be found online at the Linda Hall Library. I worked for a number of years rebuilding railroad equipment at railroad museums, and studied paint quite a bit. The writings of the painters were a good resource for me. What follows is a little of what I have learned.

Vol. VII. No. 9

RAILROAD CAR JOURNAL

265

**Railroad Paint Shop** Official Organ of the Master Car & Locomotive Painters' Association...

A Department Devoted to the Interests of Master Car and Locomotive Painters.  
Edited by CHAS. E. COPP, General Foreman Painter, Car Department, Boston & Maine Railroad, Lawrence, Mass.

# What Is Paint?

Paint is a combination of a binder, which forms the protective film, and fillers. The binders come in two broad categories: those that set up by chemical reaction, and those that set by the solvent evaporating. This is an important difference when choosing a paint, or varnish for that matter. The paints that set up by chemical reaction cannot be used after they have set. Paints and varnish that set up by solvent evaporation can be made liquid again by applying the solvent. Prior to the advent of epoxy and urethane paints, the common binders for paints were oils. Linseed oil was most common, but fish oil, soybean oil, tung oil, and others have been used. The vegetable oils set by an oxidation reaction and by polymerization. Both reactions are non reversible. The reactions can be controlled by the additives to the oil, but we will cover that later. Around 1920, there were a lot of advances made in modifying the oil binder. Alkyd resin was developed from linseed oil, and made a stronger film. In addition, it added a gloss to paint. This, in effect, was the pigmented varnish made in a new and much cheaper way. The solvent binders are things like lacquer, shellac, and other gums dissolved in alcohol or volatile solvents. The films of these products can be varied by the solvents used. So, without getting too technical, the thing to remember here is that there are two basic binders for paints. Next are the additives.

Additives for paint, and this includes the pigments, are what gives the paint binder its durability, as well as its color. The UV light from sunlight is very destructive. Take a piece of wood and cover part of it. Then, place it in the sunlight for a few hours. Even in that short amount of time, the sun will start to discolor the wood. Sunlight also attacks the paint binders. The fillers and the pigments block the sun from the binder, and prolong the integrity

of the film. In

addition, additives aid in the chemical reactions of oil based binders to give the film hardness or flexibility. Chrome and manganese aid in the oxidation reaction. This will make the surface of the film hard; but can seal the film so it can stay soft under the surface, which may not be desirable. Lead can aid in the polymerization of the film, and will make the film strong. There is a balancing act going on in the manufacture of oil paint to get the properties of the paint matched to what it is to do. As an example, a paint that would be formulated for wood, which has large dimensional changes with the seasons and humidity, may be too soft for metal. Another additive for oil paint is varnish. Oil varnish is a combination of a hard resin and oil. To mix the two, the manufacturer needs to melt the resin and heat the oil so they will mix. A lot of resin in the oil will form a hard finish suitable for indoors, like trim and furniture. Less resin, and the film will be pliable for external use, as in spar varnish. The reason I mention these varnishes here is that enamel paint is pigmented varnish, and that is why it has the high gloss. As mentioned earlier, alkyd resin is similar to the tree gums and resins that were used in oil varnish. This then became a cheaper gloss paint than varnish enamel. Some paints are formulated so that the fillers fall out as the sun attacks the film. These are called chalking paints. The advantage is that the old paint will be gone when you go to apply the new paint. No scraping. Now that we have some basic information on paint, let's get to the pigments.



## “Pure White Work

“For pure white, inside or outside, ZINC WHITE ground in poppyseed oil is the best thing we know of.”  
Master Painter, September, 1904.

## Florence Zinc

Ground in refined linseed oil yields an immaculate white finish. There is no pigment whiter than FLORENCE ZINC--there is no other white pigment as durable as any kind of ZINC WHITE.

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- “The Paint Question.”
- “Paints in Architecture.”
- “Specifications for Architects.”
- “Paint: How, Why and When.”
- “French Government Decrees.”

We do not grind zinc in oil.  
Lists of manufacturers of zinc white paints will be furnished on request.

## THE NEW JERSEY ZINC CO.

71 Broadway, NEW YORK

*This ad for zinc white pigment appeared in the Railway Master Mechanic magazine in 1901. Note that they do not make paint, only pigment. Many people were mixing their own paint at this time.*



## Common Pigments Used Around The Railroads

It's worth the time to look into what some of the common pigments are, and how they are used. Let's start with the whites. Lead white was almost the universal white pigment prior to 1900. Lime was the other common white, as in whitewash. Lime not used in oil paint because it is basic, and that will attack the film. One benefit of lead white is that it aids in the polymerization of the oil. White is technically not a color in the art world, and we will get into that in another article. Lead white is not a brilliant white, but has more of an egg shell appearance. Zinc white started to appear around 1900, and is a very bright brilliant white. Both of these pigments are relatively inexpensive, and were used extensively in white paints. Another lead based pigment that was used was red lead which is red in color. The next group I would like to talk about vary quite a bit in color, but are all the same compound, so they should be covered together. These pigments are rust, earth tones, or iron oxides, take your pick of name. They are yellow ocher, raw sienna, burnt sienna, mineral red, and red ocher. What makes them different in color is the lattice bond that iron oxide forms with water. Also, it makes a difference which iron oxide you have,  $Fe_2O_3$  or  $Fe_3O_4$ . Lets start with  $Fe_2O_3$ , the common brown rust on all of our stuff. Take a close look at something rusty with an area that collects water.



*Railroads made some of their own paint using machines like these. The C&NW had seven of these machines. The ad appeared in Railway Master Mechanic magazine in 1901.*



*C&NW paint lab in Chicago. Photo by Jack Delano, 1943 Library of Congress collection.*

The rust will be lighter in the area that collects the water. The reason that some of the rust varies in color is important to know when talking about these pigments. The rust molecule,  $Fe_2O_3$ , and water molecule,  $H_2O$ , have an attraction to each other, and can bond in a lattice called an ionic bond. The attraction is similar to a static electric attraction, and the molecules do not combine. The more water in the lattice, the lighter the color will be. The lattice bond is stable, and therefore, the color does not change readily. The color can change with the addition or subtraction of water in the lattice, but this takes some effort. By roasting the pigment, you are providing enough energy to drive the water off. Adding water to the lattice to make the color lighter is very difficult. The strength of the lattice bond makes these pigments relatively colorfast. These pigments are as follows: yellow ocher is the lightest, followed by raw sienna. If raw sienna is roasted, it forms burnt sienna, and you will start to get a reddish color. Less water in the lattice, and you get mineral red, indian red, and red ocher, which are all basically the same. The iron oxide pigments are

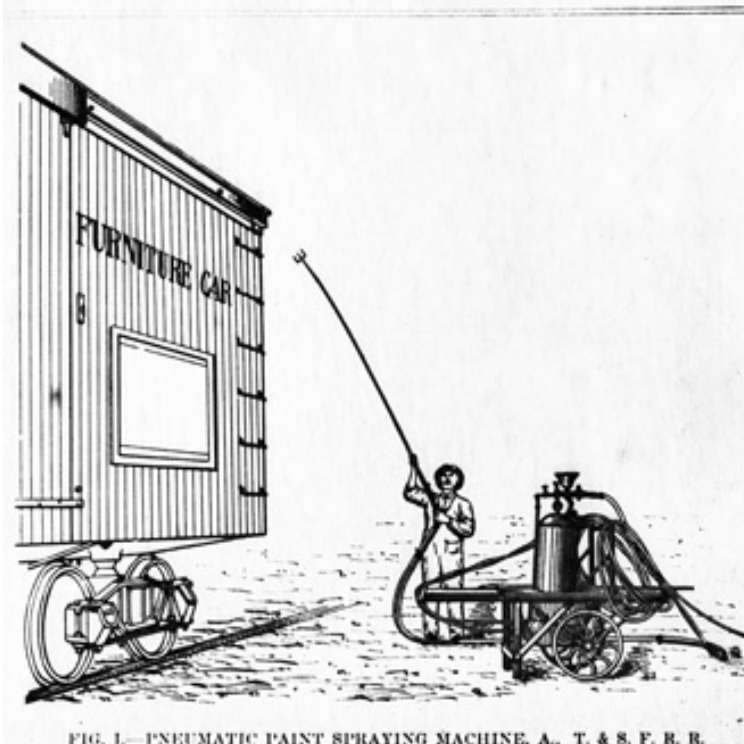


FIG. 1.—PNEUMATIC PAINT SPRAYING MACHINE, A. T. & S. F. R. R.

*An illustration of painting a car with compressed air on the Santa Fe railroad in 1899.*

There are many more pigments used in art, but these make up the base for almost all railroad paints prior to the streamline era with its color full trains. Now, let's move on to the application and composition of paints.

## Railroad Painting

The railroads tended to be self sufficient entities, and all the master painters had their own brew. This also means that like so many other issues regarding railroad practices, there is no definite date when things changed. The colors varied, as did the wearing qualities of the paint. Some railroads even went as far as buying pigment or ore and milling it themselves. This practice of mixing paint yourself was common, even in house painting, until the 1940's. Paint companies have been around for a long time, but the idea of going to



*This photo was taken by Jack Delano in February, 1943 at the Proviso freight yard of the C&NW near Chicago. Not a lot has changed since 1899, has it? The photo is from the Library of Congress depression era photos collection. They are Farm Services Administration photos, and were taken during the depression through WWII. Many are in color, and are a valuable resource.*

some of the most common pigments used in older paints because they were cheap and colorfast. Another pigment worth mentioning is Vandyke brown. This pigment is made from peat which is very young coal. One of the characteristics of Vandyke brown under the microscope is that the cell structure of the vegetation is still present. Vandyke brown is a very common railroad pigment as we shall see when we get to mixing paints. Chrome yellow is lead chromate, and was invented around 1820. It is a very bright yellow, and was found in bright yellow color paints. A very common blue was Prussian blue which is an iron derived pigment discovered around 1724. Chromium oxide was a green pigment found in mineral ores containing iron. Through a chemical process developed around 1838, the chromium was separated from the ore to make chromium oxide – a cheap and colorfast green pigment. The last pigment I should mention is lampblack, which again is not considered a color in the art world.

the store and getting a squirt of this, and a squirt of that in your paint, did not exist. You purchased the components from the paint company, and mixed them yourself. Pigments were sold dry, drying additives were sold separately, as was the oil. Paint was brushed on the cars; however, spraying came into being in the 1890's.

The color we all call freight car red was made of iron oxide with a small amount of fillers like calcium carbonate, gypsum, magnesium silicate, and other such fillers. As an example of the cheapness of iron oxide pigment, 1941 paint specifications from the C&NW called for 84% by weight of iron oxide, with the remaining pigments being fillers for their freight car red. In a 1910 history of the C&NW, they called for the paint to be made from ore mined in North Freedom, Wisconsin. As we have discussed earlier,

iron oxide comes in a variety of colors. This was a way of controlling the color. It also means that the color varied quite a bit, ranging from a dark brown to a reddish brown. The paint of the era consisted of linseed oil and pigment which was applied with a brush. The iron work on a lot of cars in this era was "blackened off", as the painters would say, which consisted of oil and lampblack. Black freight cars did not come into being much until steel cars started to become common. The basic formula for freight car paint was pigment in oil with some filler and driers. This formula gave a flat finish similar to what we would call a heavy body stain that would be put on our house today. A 1941 paint specification for wood cars on the C&NW used this formula. For the steel cars, they added alkyd resin to the paint, giving the paint a semi gloss finish. Alkyd resin is a modified linseed oil that made the paint film stronger, and gave the paint some gloss. High gloss paints are gloss enamels which are basically pigmented oil varnishes. In the 1890's, the Santa Fe railroad used a paint sprayer that cut the time down from a day to five minutes. The sprayer was little more than a hose for applying the paint. A worker on each side of the car hosed the car down as it passed. This paint was flat, and had a look of what would be called a heavy bodied stain today. The paint "chalked" and wore off. Repainting consisted of brushing or hosing more on. Refrigerator cars were in a class of their own, and passenger car painting covers them better.

Passenger cars in the wood era were an elaborate process that took weeks to do. To start, the bare wood was primed with 2 coats of oil, lead white, and fillers. The whole car was "rubbed down" (sanded) and "knifed off", which was filling the nail holes and other imperfections with a putty made of white lead. The car was again primed and sanded. Two coats of color were added, and more sanding was followed by two more coats of color. The car was then lettered and varnished. The varnish used was a spirit varnish. Oil varnish was very expensive, and not suited to this application. What made spirit varnish good was that once a year when the finish was touched up, all that was needed was to apply more varnish. The solvent in the varnish softened up the varnish on the car, and the two coats merged as one. The application of the varnish changed the look of the color on the car, and successive applications of varnish changed it still further. After about five years, this paint was worn out, and the car needed repainting. Unlike the freight cars whose paint wore off, the passenger cars needed to be stripped. This was accomplished by "burning off", much like a heat gun today for removing paint. This, and the spontaneous combustion of paint rags, burned down a lot of car shops. In the late 1890's, the D&H railroad started to experiment with the two step paint process which was a self glossing enamel paint on secondary cars. The sleepers, diners, and observation cars were still done the old way. The master painters really took them to task for such a cheap and inferior job, "It just don't look right!", was the cry. At the same time, the



*Torches like this, and even compressed air torches, were used to burn the paint off of passenger cars. There were reports in Railroad Car Journal of compressed air torches blowing up, and car shops burning down. This ad appeared in the February 1897 issue.*



# Chicago, Milwaukee & St. Paul Railway. B. and Painted.

## PAINT AND VARNISH RECORD.

Received at W. Milwaukee Shop, 6-13-1898.

Left Shop, 8-6-1898.

Passenger Car No. 92.

KIND OF WORK.	Whole or Part.	DATE.	LABOR & COST.				KIND OF MATERIAL USED.	REMARKS.
			Hours.	Dollars.	Cents.	Dollars.		
Paint burnt off.....	Part.	.....	41	8	47	41	Gas.	New sheathing on lower part applied
Scrubbing.....	.....	.....	.....	.....	.....	.....	.....	.....
Priming.....	Deck and Whole	7.9	18	3	80	95	15 1/2 Lbs. Formula: 1 part dry min., 1 part dry lead. Paste, 3 p. oil, 1 p. turp.; Thinner, 1 p. oil, 1 p. turp.	.....
Sandpaper.....	"	.....	6	1	25	06	3/4 qt. sandpaper.	.....
Priming.....	"	7.13	10	2	20	1 15	16 1/2 Lbs. Formula: 1 part dry min., 1 part dry lead. 1 p. oil, 1 1/4 p. turp.; 7 p. turp., 1 p. Jap.	.....
Sandpaper.....	.....	.....	.....	.....	.....	.....	.....	.....
Putty.....	Whole.	7.15	44	31	04	55	5 1/2 Lbs. Formula: Putty.	.....
Rubbing down.....	"	.....	56	11	20	54	6 qt. sandpaper.	.....
Color, deck and repully	"	7.22	14	2	80	1 35	12 1/2 Lbs. Formula: Body color.	.....
"	"	.....	3	.....	.....	05	1/2 lb. putty.	.....
"	"	7.25	10	3	00	06	8 lbs. body color.	.....
"	Deck.	.....	6	1	20	26	3 lbs. oil body color.	.....
Color and varnish.....	Whole.	7.28	12	2	40	2 88	12 lbs. Formula: 2 parts Valentine rubb. varnish, 1 p. paste body color, 1/2 p. turp.	.....
Lettering and orn. ....	"	.....	35	5	64	2 06	8 books gold leaf, 1/2 pint size, 1 lb. orn. color, 1 lb. waste.	.....
Varnish.....	"	7.30	13	2	94	4 00	1 1/2 gal. Degoiler Rock body varnish.	.....
"	"	8.1	10	2	10	3 80	1 1/2 gal. " " " "	.....
"	.....	.....	.....	.....	.....	.....	.....	.....
"	.....	.....	.....	.....	.....	.....	.....	.....
"	.....	.....	.....	.....	.....	.....	.....	.....
Seal paint.....	Whole.	.....	125	25	16	3 22	3 qt. sandp., 2 1/2 lbs. filler, 1 lb. waste, 1 lb. putty, 10 lbs. paint, 1/2 gal. Val. Rubb., 1 1/2 gal. Mur. Rp. Body Var.	.....
"	.....	.....	.....	.....	.....	.....	.....	.....
Cleaning glass.....	Whole.	.....	19	3	72	10	Material.	.....
Glazing.....	Part.	.....	43	8	54	6 15	9-10 x 18.3-18 x 20 glass, 22-28 x 18 1/4 cut glass, 6 lbs. putty.	.....
Blinds, varnish.....	Whole.	.....	72	11	24	2 37	3 qt. sandp., 1 lb. paint, 1 1/2 gal. Mur. Rp. B. Var.	.....
Washing.....	Whole.	.....	25	4	17	75	Washing material.	.....
Filling and putty.....	Part.	.....	40	8	02	95	4 1/2 lbs. filler, 3 1/2 lbs. waste, 1/2 lb. unslud putty.	.....
Sandpaper.....	"	.....	31	10	13	34	6 qt. sandpaper.	.....
Stain and shellac.....	"	.....	56	11	20	7 31	2 1/2 lbs. stain, 3 1/2 gal. shellac.	.....
Varnish.....	"	.....	13	2	40	2 43	1 1/2 gal. Murphy interior varnish, 1 1/2 gal. ceiling varnish.	.....
Paint, New Coaling, etc.	.....	.....	22	17	26	7 20	1 1/2 lbs. Ormaz, 4 1/4 lbs. various paints, 1 lb. waste.	.....
"	.....	.....	.....	.....	.....	.....	.....	.....
Polishing.....	.....	.....	.....	.....	.....	.....	.....	.....
Cleaning up.....	Whole.	.....	2	.....	26	3 1	Material.	.....
Roof, Paint, New Roof	Whole.	7.15	14	2	80	1 20	9 lbs. red lead, 25 1/2 lbs. roof paint.	.....
Iron under Car, Paint.	"	.....	3	.....	80	18	4 1/2 lbs. Asph. black.	.....
Tracks and Platf. Paint	"	.....	15	3	00	1 20	17 1/2 lbs. truck paint, 1 lb. putty, 1 lb. waste.	.....
"	.....	.....	.....	.....	.....	.....	.....	.....
Platf. Rails, Paint.....	Whole.	.....	9	1	80	20	2 lbs. railing paint.	.....
Cost.....	.....	.....	545	173	25	54 15	Total Cost: \$223.22.	.....

In this report, we can see some of what went into painting a passenger car in the wood car era. This is also an illustration of why some railroads were experimenting with enamel paint to save time in painting the cars.

been used on passenger cars. Freight cars still needed the thicker film of the oil paints, and finish was not a big concern on freight cars. The enamel paints came back with the advent of formulas that gave better drying time and harder finishes.

Here we have some information on paint, paint pigments, and paint processes. Different paints used on railroad cars gave different looks to the cars. The all wood cars had no gloss to them, and in good builders photos you can see the grain in the wood. In later day cars, the paint had some gloss to it. In the next issue, we will cover some thoughts on duplicating these finishes on models. In addition, I will have some comments from different modelers on how they achieved their results.

CB&Q was also experimenting with enamel paint. By the time the steel cars started to appear, enamel paint was here to stay; and better spraying equipment made the job simpler. What came next was lacquer paint. This looked like the save all. It covered well, dried fast, and was able to be sprayed. It also had the ability to be touched up by spraying on another coat since lacquer is a finish that sets by the solvent evaporating. This is similar to spirit varnishes. The problem was that these early lacquers did not hold up. They tended to get gummy and sticky. I worked on an interurban car that was painted in 1915 with some of this paint on it. You could stick your fingernail in the paint. So, the railroads were still using enamel paint, and putting up with the slow drying time. The automobile industry was not as complacent, and the early lacquers were improved for their use. A 1927 article in Master Mechanics magazine described the new paint shops of the Pennsylvania Railroad in Wilmington, Delaware. They had installed drying ovens, and were using Dupont lacquer paint. The article credits the advances made by the auto industry for making the paint better. Lacquer could be formulated to give a high gloss, and a whole car could be painted in one day. The lacquer dried fast and, as a result, the cars could be painted outdoors with little problem from dust. The lacquer paint seems to have only

# Amps is Amps

## What we really need to look for in a decoder

By Dan Dawdy

A lot of things bug me, just ask my wife. One thing I don't understand is why some decoder manufacturers and retailers label decoders as HO scale or N scale, especially sound decoders. I understand it's a physical size

thing, but when O scale people look at the offerings, many will just assume they will not work in O scale. The main specification to look for is current handling. Trying to find that on some decoder websites can be a challenge.



If there is one “must have tool” for DCC, it's something that can read amp usage on the layout. Normal digital meters will not read accurately for many reasons including, but not limited to, square wave voltage and signal applied, which are not the scope of this article. Suffice it to say that we need something designed for DCC. The [RRampmeter](#) sold at many places is just that.

I want to know what my locomotive is drawing under different conditions. This allows me to make a decision on just what decoder to use; or if it's an older unit, if it's worth replacing the motor altogether. The [RRampmeter](#) also allows us to see just what our layout is doing.

In Figure 1 to the left, my layout, using an NCE 10 amp system, shows that the layout is putting out 16.6 volts to the track. This will vary a bit, but look at the bottom number. This is the amp reading – it registers 1.92 amps just by turning on the power. So, what is going on here? Well, I have nine locomotives on the track, and those decoders are powered up even if they are not making sounds or moving. In addition, I have two PSX-AR auto reversing units, as well as, four Hex Frog Juicers, three NCE Switch-8's and 20 Circuitron Tortoises. I am using almost 2 amps without moving anything, making my base current draw about 1.9 amps.

OK, let's move some engines. I have three Atlas RS-1s in a consist. These have been reworked by me, and we'll discuss that in an upcoming issue. With a 10 car train (all Atlas reefers in this demo) and speed step 5 or 4 scale miles per hour

(SMPH), Figure 2 shows 2.08 amps; therefore, the three units are pulling well under  $\frac{1}{4}$  amp. (2.08 amps less the base current draw of 1.92 amps equals 0.16 amps used by the three locomotives.)

Figure 3 shows this train running at 40 SMPH – this is the fastest I allow on the layout. Using the same formula as the last example, just under  $\frac{3}{4}$  amp. Yes, believe it or not, this is O scale.



Figure 4 has all three RS-1's wide open, and me holding them in place (see Figure 5). In full wheel slip, at speed step 128, these three locomotives are drawing less than 2½ amps.



(We can debate using wheel slip vs stall current, but in reality, wheel slip will happen, whereas full motor lockup is rare, and means the decoder is the least of your problems.) So, would a 1 amp Soundtraxx Tsunami “HO” decoder work in these units? Yes, obviously very well since I have been doing just that for three years now. Does that mean you should not use a QSI Titan rated at 4 amps? Not at all, it means you have “choices”. Knowing what the current draw is allows you to test many different scenarios on your own layout.



Postscript...

The locomotive above is an older NJ Custom Brass Z1. It does have a Stu Kleinschmidt drive so I thought I could get away with a 1 amp decoder. To make sure, I ran some quick tests as outlined above proving that I could indeed use a single 1 amp decoder. I do have some other locomotives that draw well over 1½ amp, so there I went with two decoders: one for the motor control, and one for sound as I really like the sound decoders I have.

A quick tip on using two decoders. People always ask about programming them individually if they have the same addresses. How do you “talk” to one and not the other? There are many ways, such as using the short address or on-off switches, but I simply set them to two different addresses. I can then program the motor and the sound separately. To run, I created a consist with the two decoders together as if they were two different locomotives. 🐼

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# Installing a Tsunami Sound Decoder in an Atlas RS-1

Article and photos by Dan Dawdy

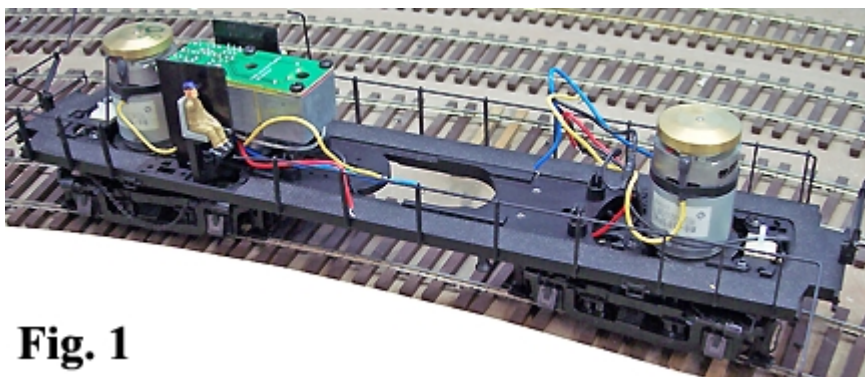
Let me preface this article by saying it serves two purposes. One is re-working an Atlas “China drive” locomotive. The second is that once we strip out the circuit board, we are left with a basic DC locomotive which allows us to go on from there to choose a decoder and wiring.

Living in an apartment is not conducive to building an O scale layout, but it is for buying and stashing away items purchased at shows and such. I knew one day the layout would come. That day has now come, and while building the layout, I started to find and unbox many of the items I had squirreled away over the years. One such item was a pair of Atlas RS-1s, the silver version. The silver version was DC, but came with the DCC plug and cost much less than the gold version, which had a QSI decoder installed. (Atlas no longer makes the silver version.) My layout is controlled by an NCE 10 amp Power Pro 10-R, so I now had to decide on a decoder.

Most Atlas engines use the so called “China drives” which are mounted vertically into each truck. One of the inherent problems of this can be achieving and maintaining slower speeds, in addition to, high current draw. One trick to help both of these problems is to wire the motors in series. I did not think up this idea, it’s been around for a long time in the three rail community. By wiring in series, the motors are seeing  $\frac{1}{2}$  of the voltage. Therefore, in DC terms, if I apply 5 volts to the track, a series wired (two motors) locomotive will see 2.5 volts per motor – not the whole 5 volts per motor. There is a drawback in that your top speed is reduced, but for most of us, this is not a issue. Another problem can be with heavy loads traveling up a grade. One of the motors may stall because of increased back emf (back electromotive force) thus reducing the current flow. The other will then draw most of the current and continue to run. Ever get your car stuck in the snow or sand? One rear wheel spins like mad, while the other doesn’t move. That’s when it’s time for more locomotives! This is not going to be a step by step tutorial of how I accomplished this. It’s more of an overview of installing a decoder in any locomotive. Once we remove the circuit board, we are left with what most non-DCC ready brass locomotives have. Two wires coming from the track, and two going to the motor.

I started by removing the shells from the RS-1. It is three pieces, and there was a lot of swearing (at least for the first one). Inside was a circuit board with wires going down to both trucks, the motors, the smoke unit, and the

lighting. My first try was to simply tap into the decoder, but I saw that my four engines (yes, I had picked up two more by now) were not wired the same, and one even had a different smoke unit. That got me a bit worried, so I checked with Atlas to see if there was any rev control on these engines. Rev control is a throwback to my days as a process engineer at a telecommunications manufacturer. Any change made to a product or PC board had to be documented and controlled. The answer from Atlas was



**Fig. 1**

“No, we get what we get.” So, to be safe, and make sure all units were the same, I removed the Atlas board totally, and simply hard wired a decoder. See Figure 1.

I was impressed with the sound of the Soundtraxx Tsunami decoders, as well as their programming options, so that’s what I wanted to install. I knew that with the engine wired in series, my high end amp draw was just



under 1 amp, and that was within the Tsunami specifications. The ALCO RS-1 used an ALCO 539T prime mover, making the Soundtraxx 828049 TSU-AT1000 perfect.

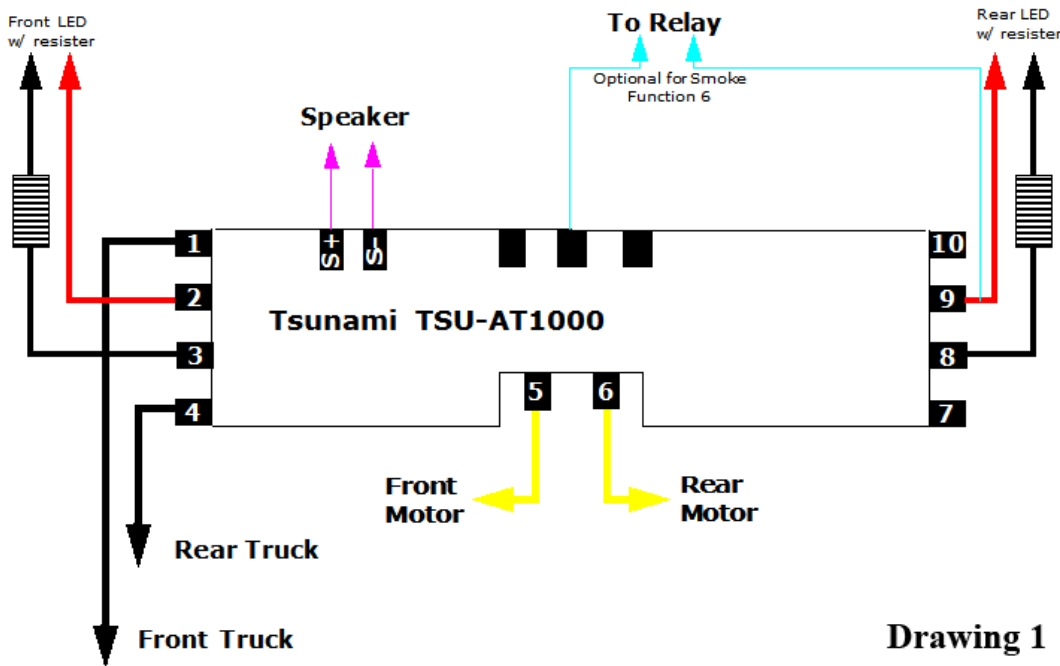
After removing the stock circuit board, I started tracing back the motor wires to the trucks making sure the colors did match – ie: color the same on the right side (red) and the left side (black). On my units they did not. Atlas had the red wire on one side of the front truck, and also on the other side of the rear truck, so I tied the red wire from front truck to black wire of rear truck. That became one input to the decoder. Then, I tied the red wire from rear truck to the black wire of the front truck. That became the other input to the decoder. (All we are doing here is tying the wires from the power pick up on the left rail of of the trucks together, and then the right rail of the trucks.) I used the front right and front left terminals, 1 and 4, of the decoder. Refer to Drawing 1. The rear pickup terminals, 10 and 7, are not used. I tied the blue wire from each motor together. The yellow wire from each motor will become the outputs of the decoder (motor + and motor -).

Next was lighting. Since I removed the circuit board which had the onboard resistors for LEDs, I needed to add a resistor in line with both the front and rear lights. Again, refer to Drawing 1. A 1000 ohm ¼ watt resistor will work well. If you want a little dimmer light, you may want to use a 750 ohm ¼ watt resistor.

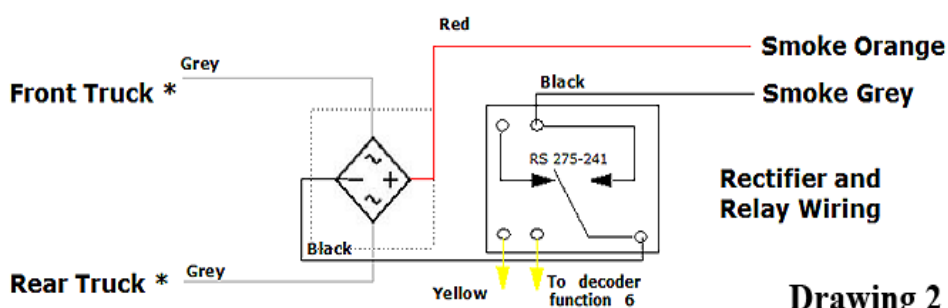
I used a large bass reflex speaker since it fit inside the fuel tank. Any of the new high bass speakers will work, as long as they are rated for 8 ohms.

I also wanted the smoke unit to function. I know... but I do a few shows and also have grandkids. The current draw of the smoke unit is much too heavy for the Tsunami functions, so I had to use the function to activate a small relay that would turn the smoke on and off via a rectifier. See Drawing 2. The rectifier was needed to convert the AC (DCC) track power to DC for the smoke unit. The input of the relay has a very low current draw so the Tsunami can turn it on and off, while the other side of the relay can handle the higher amperage of the smoke unit.

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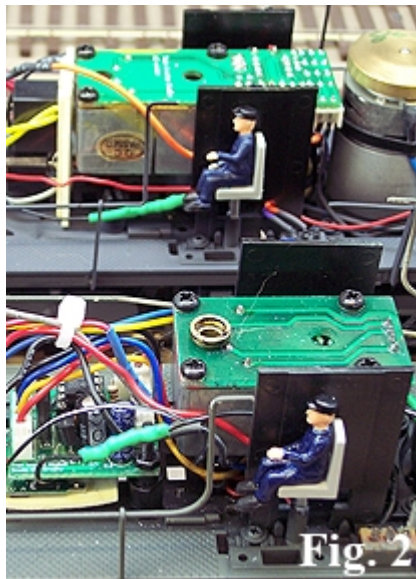
**Drawing 1**



**Drawing 2**

Once all the components are installed and wired, it's time for a test. I always test on a programming track – never on the main. If there is a wiring problem, and you go right to the main trackage of your layout, you could see a beautiful puff of smoke. We really don't want that. On the programming track, you can read back the Configuration Variable (CV), and then begin the programming. My NCE system will not read back CVs on some sound decoders. To do so, you need a Programming Track Booster such as the Soundtraxx PTB-100. I use JMRI

(Java Model Railroad Interface) for all my programming which I'll cover in a later issue. You don't need it, but it sure makes things easier, especially with some of the more advanced decoders that have thousands of variables.



You can see from Figure 2 that two different smoke units were used in production. This leads to a warning about any ready to run model, regardless of who made it. Things change, and wire colors may not be the same from model to model, so you must be careful to trace and mark all wires. The NMRA does have a wire color code standard for DCC.

- RED - Right-hand rail power pick-up
- BLACK - Left-hand rail power pick-up
- ORANGE - Decoder to motor (+)
- GRAY - Decoder to motor (-)
- WHITE - Front headlight
- YELLOW - Rear headlight
- BLUE - Common (+) headlight

These are the common colors, but there are more, such as green, purple and brown, just to name a few, that are used for function control. Being kind of anal, I bought a supply of all the major colored wire. That way, when I rewire any of my older brass locomotives, I can use the proper color. I even have colored shrink tubing!

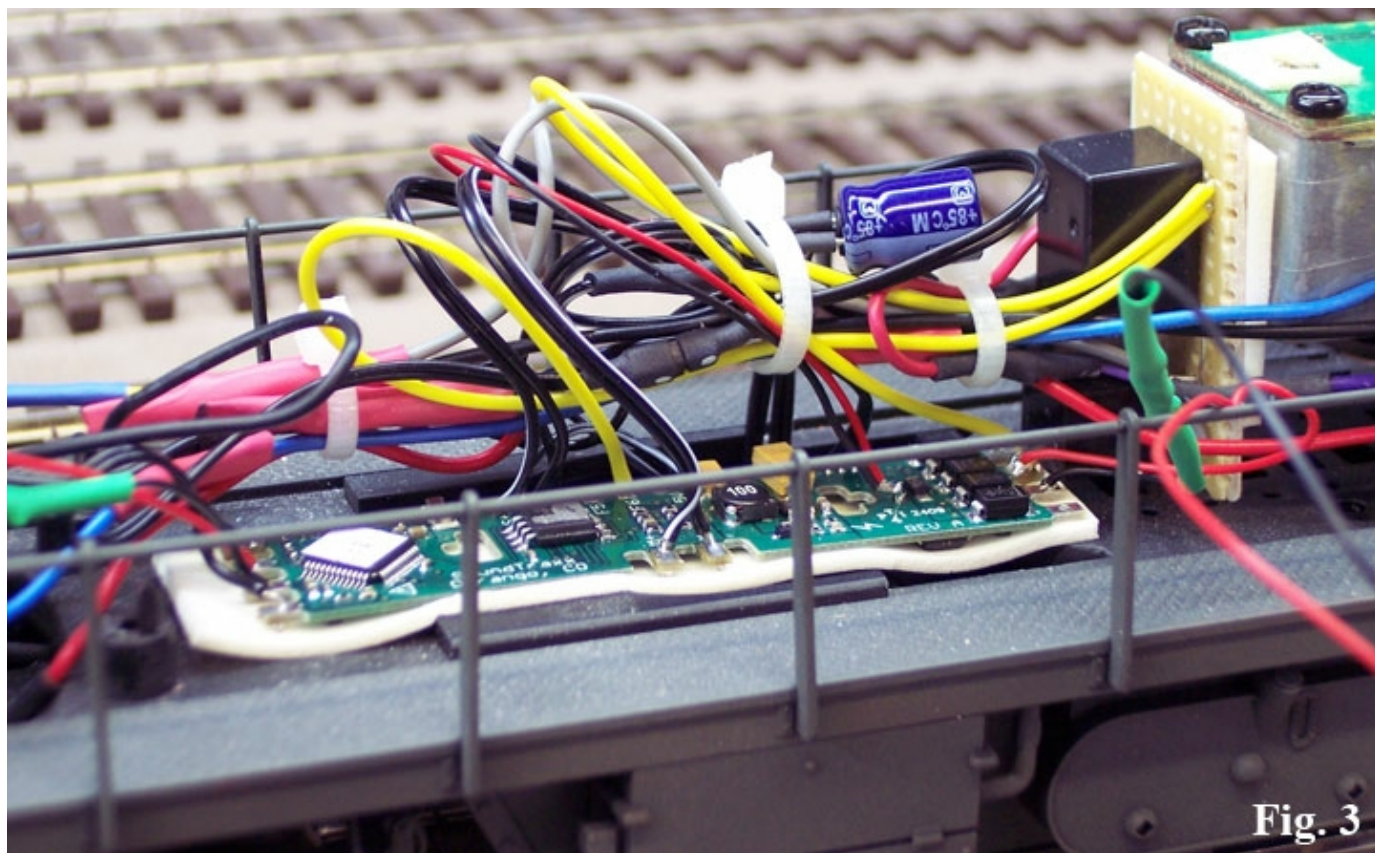


Figure 3 shows a close up of the installed decoder and optional relay for the smoke unit. I used simple carpet tape to hold the decoder in place. The speaker is just below the decoder in the fuel tank.



Figure 4 shows the first four units ready for testing, while Figure 5 shows the smoke units at work.

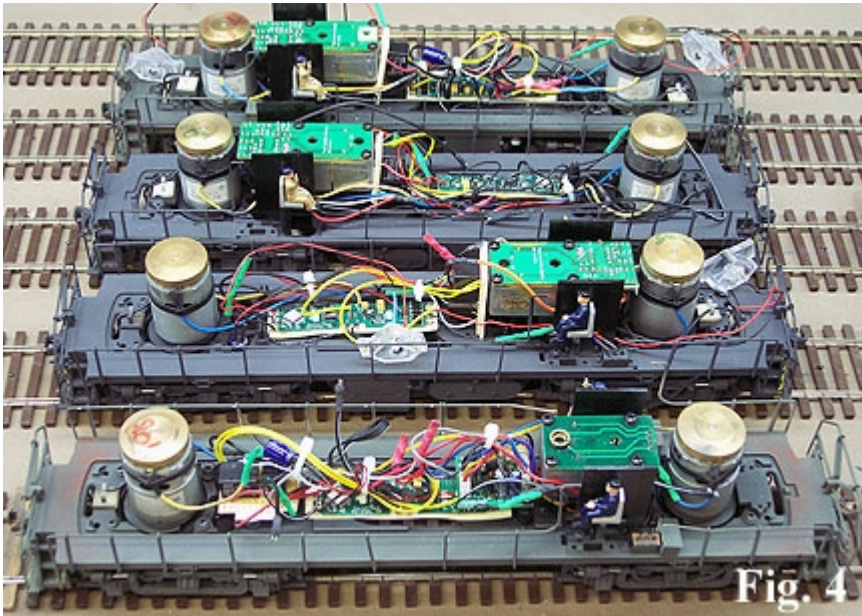


Fig. 4

What I have done works well for me. I have had five of these running for over three years without any problems. That does not mean that it will work for any Atlas locomotive. As I have said, things change, and you need to always be aware of the current draw of the locomotive you are working on, as well as the wiring.

OK, but what if you don't have an Atlas locomotive? You have a brass DC only locomotive that you want to convert to DCC. How does this help you?

Figure 5 shows a Gilmaur Models ALCO S2 that I bought from Ed Reutling. The first item was to check the current draw using an RRampmeter. It drew over an amp, and had a less expensive Pittman motor. I repowered it with a better and higher efficiency Canon motor. After doing so, the current draw while slipping was  $\frac{1}{2}$  amp. Now that we know the current draw, we can make a decision on a decoder. Again, I chose a Soundtraxx Tsunami, replaced the wires with the proper colors, added LEDs with resistors, and "Bob's your uncle" as my Aussie friends would say.

Postscript...

People ask me why I am such a Soundtraxx Tsunami fan, and don't like anything else. Sound is very subjective, and at the time, the Tsunamis sounded best to me. Times change, and the new QSI Titans also sound very good. Now, the newest decoder is the TCS WOWSound™ steam. From the videos I have seen with beta testers, this may be a game changer. I have one on order, and we'll see just how it performs for not only sound, but speed performance. There are others, and it really comes down to speed performance, plus how it sounds to you in your locomotive. 🎧

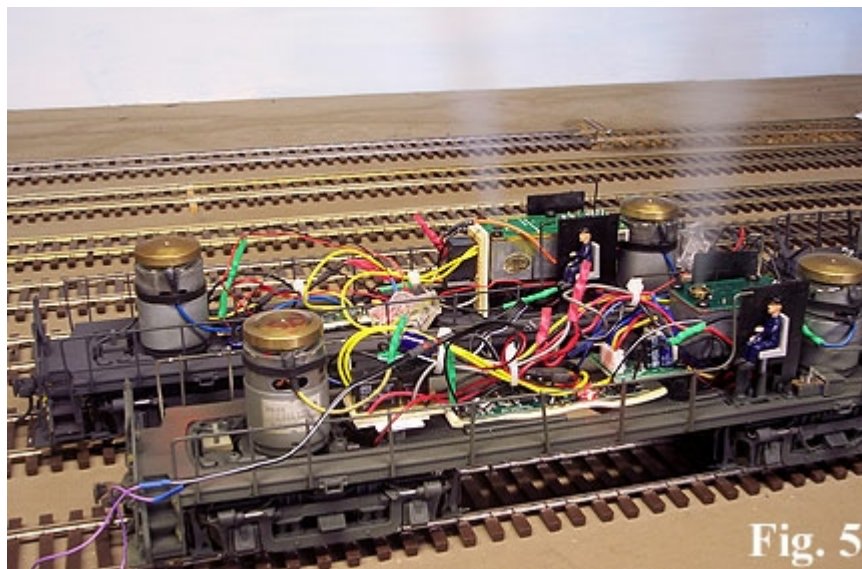


Fig. 5

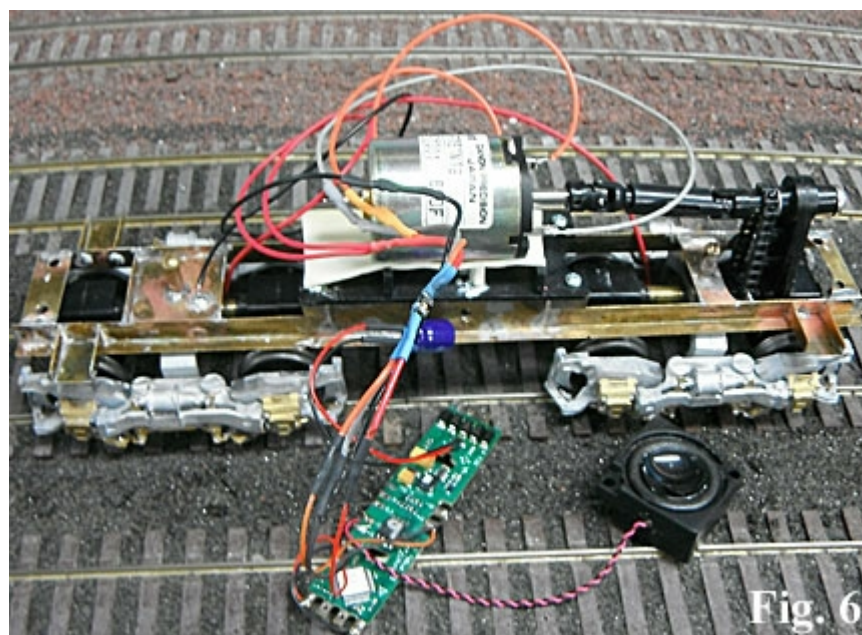


Fig. 6





# Making Rocks

**We visit with Gary Engle to see how he does it.**

By Glenn Guerra

Photos by Dan Dawdy

The first time I saw Gary Engle's layout, the rock work caught my eye. Gary lives in Valparaiso, Indiana, and is usually on the layout tour for the Chicago March Meet. He likes the Great Northern, and that is what he models. We went back to see Gary again, and got some pointers on how he did it. In this article, we will see some of the results, and get some tips. For the next article, Gary will stop by Dan's house, and we will get some hands on photos while Gary instructs Dan. I'm looking forward to that day to get my hands in the plaster also. For now, we will cover some of the methods and show the results, so here we go.



*This photo is an excellent study of the subtle tone variations in the rocks. Note how Gary highlighted all the features of the rock. The very light tan colors on the left center of the photo are the first coat. This is how light you want to go on the first coat.*





*This rock caught my eye because of the shape. Gary said that the molds are very flexible and can be formed to any shape. He had the rough shape of the rock in the base plaster, and took a rock mold full of plaster and wrapped it around the rough shape. Again, note the subtle tones in the color and the highlights.*

The first thing that caught my eye were the shapes and fractures in the rocks. Gary said they are all done with rock molds. I asked how many hundred he had, and he showed me a box with about 10 molds in it. He buys the molds from Bragdon Enterprises, and just uses them in different ways. If you look for it, you can see the repeat of the molds, but you really need to be looking for it. The process goes like this. Build the basic shape of your scenery in plaster. This will give you the base to work on. Don't worry about the contour. The molds are very flexible, and will fit any contour. When you are ready to go, wet the existing plaster so you get a good bond. The mold is then filled with plaster. When it starts to set, the mold is placed on the scenery, and



*These rocks have been weathered smooth. Again, note the white light tones. These are your first coat. The wet wash of the highlights blends them in, and softens the edges. This area uses the same mold many times, and by overlapping, you don't notice the edges of the mold.*





*In this highly fractured rock outcropping, you see how the darker color washes will migrate into the cracks and fissures. When applying the darker color with the small brush, you can apply it right to the crack. Then, by washing, you spread the color, without removing it from the crack. This also darkens the whole effect, which is why you should go very light to start.*



held there until it will stay put. My next question was what to do about the joints between the different applications. This was a learning curve for Gary. When he first started, he said he would butt the various applications together. That required dressing up the joints, so he then went to overlapping the molds and got better results. The rock molds come in a lot of different types, and you can model fractured rock, weathered rock, or layered rock depending on which molds you use.

Then the painting – this was what really caught my eye when I first saw Gary’s layout. Gary said he starts with the base color first. He cautioned to start very light as you can always go darker. He uses acrylic tube paints from the craft store. Like all artists, he works from a pallet. Gary uses a large baking pan for a pallet. He tips the pan, and fills the lower side with water to dilute the paint. On the high side, he puts some blobs of the colors he will use. Then, with a wide brush, he thins





*This scene is a very good example of how a lot of different molds can be used, and how the molds will fit the contour of the base you create.*

the color he wants in the middle of the baking pan and spreads it on. In this first step, he said you want the paint weak and very runny. This will start to develop the base. Again, he stressed to not try to achieve the final color in the first application. This needs to sit and dry for about 20 minutes before you are ready to do highlights. Now comes the part that accents the cracks and fissures in the rocks. When doing the highlights, keep in mind how rocks weather. Rain







*Gary (striped shirt) and Dan discuss some of the techniques while Lee Gustofson looks on. It's always fun to visit other people to see what they have done, and talk about how they did it.*

and sun tend to make the upper surfaces lighter. Undersides and cracks tend to collect debris, and are darker. Since the paint has dried a little, it will not streak when you put the highlights on. The highlights are done using the same color pallet as the base. Generally, the cracks and fissures are a darker version of the base. For this, Gary uses a smaller stiffer brush about  $\frac{3}{4}$  inch or  $\frac{1}{2}$  inch wide. Mix up your color as before, and brush it into the areas you want darker. Take a clean wet brush and wash the area to blend the paint. A vertical wash tends to mimic the effect of rain. Gary said that you will wash off the high spots just like natural weather does, and the cracks and fissures will be darker. Since you are using a more concentrated and darker version of your base color, the whole rock will be



*Not a rock shot, but still nice. Dan's wife, Amy, is looking out the rear window as we head back to the Midwest on the Oriental Limited. It's been a good day and will soon be dark.*



getting darker, which is why you need to stay light on the first coat. Other effects, like a darker layer in the stone or different stone, can be achieved by washing on other colors. Lastly, you can dry brush color on. Gary takes his brush after it is full of paint and squeezes the paint out of it. There is still paint in the brush, but not enough to run off the brush when the brush touches the rock. Now stipple the color on where you want. Acrylic paints can be glossy, so I asked Gary if he had to put a flat coat on. He said no since the plaster is porous the paint soaks in and goes flat. These are the basics, and we will cover more of the techniques in detail in the next article which will be the hands on. For now, enjoy the photos of Gary's work, and study the changes in tone of the colors.

One other technique Gary showed us was how to create cut stone. There is a technique for creating stone by mixing up Duram's Water Putty, and applying it to your building to look like cut stone. The problem, Gary told us, was that the putty would not stick to styrene very well, and the styrene needed to be primed first. Gary wondered if you could use acrylic paint in place of the water when mixing the putty. He tried it, and it worked very well. The binder in the paint attached to the styrene, so no priming was necessary, and the paint also gave him the color he wanted. (*Renee Grosser uses the same technique to create a stucco finish on her buildings.*) Gary did this on the corner stones of his depot. A thin styrene shape of the stone outline was made and fit to the building. The styrene was removed, and the putty mixed. The putty was dabbed on the styrene. When it started to set, Gary would poke and push it to give the stone the shape he wanted. Then he used a chisel type of blade to push the mortar lines into the stone. When it had set, he used the same painting techniques discussed earlier to highlight the stone. When they were all painted, he glued them to the building.



*The stone on this depot was made by mixing Duram's water putty with acrylic paint, and dabbing it on to a precut styrene shape. The mortar lines were put in while the putty was starting to set. Use a chisel edge blade, and push the mortar lines into the putty. Then, glue the stone to the building.*

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We had a good visit with Gary, and Dan has already purchased some rock molds. We are looking forward to the hands on day with Gary. I will be there to take notes and photos. That article will give you some good information on the tools and preparation you will need to get the effects you want. See you next issue.

# Prototype Car Routing

As explained by Fred Steffen



By Glenn Guerra

We are going to talk to Ted Schnepf about model operations, and go to an operating session on Ted's layout, but before we do, that lets talk to Fred Steffen. Fred grew up in the western Chicago suburbs, and was a railroad clerk his whole working career. Fred started with the Burlington Truck Lines in Chicago. Eventually, he ended up on the C&NW working as a station agent. There is seniority in the station agent jobs, just like the train crew jobs. When you are starting out, you move around a lot, and Fred worked many agent jobs around Wisconsin in the beginning of his career. He has also worked in Norfolk, Long Pine, South Morrill, and Chadron, Nebraska. Before coming back to Wisconsin, Fred worked in Bill and Casper, Wyoming. Fred's last full time job was working for the Wisconsin Central Ltd in Wisconsin. Fred is still working part time for the railroads doing job site safety. The railroads call it flagging, but it really is job site safety – keeping the workers from getting hit by the trains, and making sure they don't damage the railroad.

I wanted to talk to Fred about the station agent's job, and in particular, how the railroad directs the cars from one place to another. On the streets, we use the address to locate where we are going, for example 118 Huson Ct. Plymouth, Wisconsin. The railroad has its own system of tracks, and uses

*This is an example of an Empty Car Slip. When the station agent requested a car, this slip was made out to route the car. The station agent would also make out one of these cards when an empty car was at a customer. The station agent would contact the car distributor to get direction where to send the car.*

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REV. 12-74

Chicago and North Western Transportation Company

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## EMPTY CAR

Movement authorized as indicated by X.

HOME ROUTE  
 SPECIAL ORDER  
 GENERAL ORDER

Initials \_\_\_\_\_ No. \_\_\_\_\_  
Kind of Car \_\_\_\_\_ Class \_\_\_\_\_  
Last contained \_\_\_\_\_ Weight \_\_\_\_\_  
Date Billed \_\_\_\_\_  
From \_\_\_\_\_  
To \_\_\_\_\_  
Via \_\_\_\_\_  
Deliver to \_\_\_\_\_ R.R. \_\_\_\_\_  
Home Route a/c \_\_\_\_\_  
Conn. Line Order No. \_\_\_\_\_  
Supt. Car Service Order No. \_\_\_\_\_  
To Load by \_\_\_\_\_

Bill Made by \_\_\_\_\_

---

A completed bill on this form must accompany each car.

Ass't. Vice Pres. Transportation



its own system of addresses. Locations on the railroads have names and are in states, just like postal addresses. The locations on the railroad are not necessarily town locations. Railroad junctions have their own names and abbreviations that can be a destination. Customers on the railroad are all located in, or near, a place with a name. All named railroad places can be found in the Official Railroad Stations list which most agents have. All places that have rail service are in this book. At this point, I said, "Let's take an example step by step." Fred suggested we use Oostburg, Wisconsin, where he worked for a while. Oostburg is located between Milwaukee and Sheboygan on the C&NW shore line to Green Bay. There was a manufacturer that made cement mixers. The siding was known by the local crews as belonging to that customer. Today sidings are numbered and referred to by that number.

The first thing that happened was the shipper called Fred at the depot, and requested a car. They needed a box car that was 10' 4" wide and 50' long. Fred would call the car distributor in Green Bay, and request a car of those dimensions. In those days, car distribution was handled on the division level, whereas today it is handled on the system level. The car distributor would find a car, and then route it to the customer Fred requested the car for. The routing was done with a piece of paper called an Empty Car Slip, and showed the customer in Oostburg as the destination. The empty car did not necessarily come from a terminal. When a customer was finished with a car, the station agent notified the car distributor, and would receive instructions on where to send the car.

Sometimes the car was routed directly to the next customer. The car was not left empty on the customer siding, it went somewhere.

In those days, the car was put on a through train and sent to Sheboygan first. The reason for this was that Sheboygan was the nearest terminal to Oostburg. At Sheboygan, the car was put on a local freight, and delivered to Oostburg. At Oostburg, the customer siding did not have an address like your house would, but the station agent and train crew knew where that siding was. It would be like sending a letter to me at the Plymouth post office, and the post office knowing where I lived in Plymouth.

(Form 12 Regular-Small)  
 (For use in connection with Uniform Domestic Freight Bill of Lading, adopted by Carriers in 1917, Southern, Western and Illinois Cls., on territories, March 15, 1922, as amended August 1, 1926, and 21, 1927.)

**THIS MEMORANDUM** is an acknowledgment that a Bill of Lading has been issued and is not the Original Bill of Lading nor a copy or duplicate covering the property named herein, and is intended solely for filing or record.

Shipper's No. \_\_\_\_\_  
 Agent's No. \_\_\_\_\_

**The Atchison, Topeka and Santa Fe Railway Company**

Portales New Mexico 7/22, 1947 From **3274329 Jaff** to **F. E. Pratt**

Consigned to **Rudolph Simonson** (801-12th Ave)  
 Destination **Two Harbors** State of **Michigan** County of \_\_\_\_\_  
 Routes \_\_\_\_\_

Delivering Carrier	Car Initial	Car No.
2 Wdn Boxes H H Goods		
6 Paper Cartons H H Goods		
2 Cartons Radio		
1 Idle Vise	650	559
1 Crates Electric Motor	116	
	7 66	

Signature of shipper: \_\_\_\_\_  
 Signature of receiver: \_\_\_\_\_  
 Tax 28.45  
 Inx 29.30  
 Agent or Collector: \_\_\_\_\_

Per \_\_\_\_\_ Shipper. Per \_\_\_\_\_ Agent.

Permanent postoffice address of shipper: \_\_\_\_\_

*This is the memorandum copy of a Bill of Lading for some items shipped to Rudolph Simonson in Two Harbors, Michigan (it should be Two Harbors, Minnesota). The shipper was F.E. Pratt, and the freight bill was prepaid. This Memorandum was one of three parts of a Bill of Lading, and would have been kept by the shipper. This was found in the affects of the receiver, and was most likely sent by the shipper to the receiver to let them know what was coming.*

closed, the train crew left the slip in the bill box. The bill box was usually mounted on an exterior wall of the depot, and locked with a switch lock. That kept the waybills and Empty Car Slips at the place where the car





was. It was also a means of transmitting paperwork from the agent to the train crew if the train was there when the agent was not. Fred said that there were times when he would work at one location, but was the station agent for four other stations. The reason for the date and time on the Empty Car Slip was the demurrage. The clock started running at 7:00 AM on the business day following the delivery of the car. The customer had 48 hours to load or unload the car. The curious thing here is that if the customer only used 24 hours, they got credit for the

60M-1047-CPC **FREIGHT BILL** Form 35-A  
 MAKE CHECKS PAYABLE TO COPPER RANGE RAILROAD COMPANY  
 Dollar Bay, Mich. STATION 11/24/48  
 CONSIGNEE Francis E Pratt Bx 123 FREIGHT BILL NO. 82  
 DESTINATION \_\_\_\_\_  
 ROUTE Soo Dul DS Sid STP Mc Keever CR  
 (POINT OF ORIGIN TO DESTINATION)  
**To COPPER RANGE RAILROAD COMPANY, Dr., For Charges On Articles Transported:**

WAYBILLED FROM Minneapolis, Minn. POINT AND DATE OF SHIPMENT	WAYBILL DATE AND NO. 59346 11/13/48	FULL NAME OF SHIPPER Mont Ward	CAR INITIALS AND NO. PRR 99263		
CONNECTING LINE REFERENCE	PREVIOUS WAYBILL REFERENCES	ORIGINAL CAR INITIALS AND NO.			
NUMBER OF PACKAGES, ARTICLES AND MARKS	WEIGHT	RATE	FREIGHT	ADVANCES	TOTAL
1 Bdl 6 Window Sash Wht Glazed Nat NFF 90					
1 Bdl 2 Sash Glazed	18	136	1.47		
	Tax 3%		04		
LOCATION WAREHOUSE POST OR SECTION	RECEIVED PAYMENT FOR THE RAILROAD 154	WEIGHT SYMBOL L.C.L.F.R.'T	★ TOTAL PREPAID \$	TOTAL	1 51
AGENT CASHIER OR COLLECTOR			A. A. R. STD. FORM AD-161		

THE ORIGINAL PAID FREIGHT BILLS MUST BE SURRENDERED FOR OVERCHARGES TO BE REFUNDED, AND MUST ACCOMPANY CLAIMS FOR OVERCHARGE, LOSS OR DAMAGE.

Curran & Mitchell

★ FOR USE AT JUNCTION POINTS ON FREIGHT SUBJECT TO CONNECTING LINE SETTLEMENT  
 JUNCTION AGENTS WILL, ON CONNECTING LINE TRANSFERS, INDICATE BY SYMBOL HOW WEIGHT WAS OBTAINED

*This is a freight bill for goods shipped to Francis E. Pratt in Dollar Bay, Michigan from Montgomery Wards in Minneapolis. The routing of the car was SOO Line from Minneapolis to Duluth. At Duluth, the SOO Line handed the car over to the DSS&A. They took the car to Sidnaw, and handed it off to the CMStP&P. They took the car to McKeever, and handed it off to the Copper Range. The Copper Range delivered the car to Dollar Bay. This is a Less Than Car Load (LCL) shipment, and was sent freight collect. The items were unloaded at the Dollar Bay depot, and kept in the freight room for Francis Pratt to pick up. The station agent would collect the freight charges due. This form would then be used by the accounting department to balance accounts with all the other railroads who handled the car.*

unused 24 hours that they could then apply to the next car.

At this point, the shipper had his car, and there was a way to get the paperwork handed off between Fred and the train crews. When the customer was ready to ship the car, they contacted Fred. At this point, the shipper made out a Bill of Lading. This is an accounting document that has the originating location, destination, car contents, and freight rate listed on it. There are three copies of the bill – the original, the shipping order, and the memorandum. The shipper would keep the original and the memorandum, and the station agent got the shipping order. Fred worked up a rate for them based on standard routing. The shipper could request special routing if they liked, but that needed to be approved by the traffic department. At this point, the accounting department had the paperwork to bill the shipper or the consignee. The station agent could collect the freight charges at the station, or the railroad would bill the customer. Now the car was ready to move.

The shipper notified Fred when the Bill of Lading was done, and the car was ready to ship. Fred made out a waybill that showed the car reporting marks, originating location, receiving location, car contents, car weight, and other information as required. The waybill was what told the people on the railroad what to do with the car. Fred then called the station in advance of Oostburg to let them know that a loaded car was ready to ship in Oostburg. Note that it was not necessary to call a terminal to pick up a car. If the shipper called Fred in the morning to say they were ready, Fred would call the stations on each side of him. If the local freight was working its way towards Oostburg, the crew of the local would be notified that there was a car ready in Oostburg, and it could get picked up the same day. If the car was not picked up the same day, the next local train would pick up the car. The car would be taken to the next yard, and then start moving in the direction of its destination. In this case, it was easier for the north bound local to pick the car up than a south bound local, so the car would go to Sheboygan first. The waybill now traveled with the car, and directed each train crew and yard master where to send the car. At the end of each run, the train crew turned in the waybills. When the next crew came on duty, they would check the cars in the train against the waybills to make sure everything matched. When that train crew gave up the train, the waybills stayed with the train. The next train crew did the same thing until the car reached its final destination.

It's the waybill part of the process that we usually simulate on our layouts. We can use waybills to direct the movements of cars on our layouts just like the railroads do. There are a number of ways this is done, and next we will visit with Ted Schnepf to see how one of those ways works. In addition, we will get some information from Ted on how to design this process for use on a new or existing layout.

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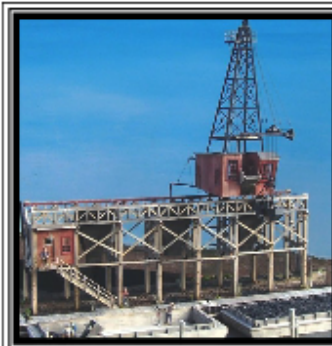
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# Model Operations

## On Ted Schnepf's Layout

By Glenn Guerra

Photos by Dan Dawdy

After talking with Fred Steffen about how the railroads get cars where they are going, we went to see Ted Schnepf. Ted has an O Scale layout in his home that features a lot of prototype operation. The layout is very large, and operates much like a real railroad. The size and scope of this operation may seem overwhelming, but don't let that scare you away. Ted has some very basic points to help you develop an operation for any size layout.

We asked Ted when he started planning this layout and the operations. He told us that while working as a civil engineer on the Milwaukee Road, he was already starting to form ideas of a dream layout. Ted told us he was inspired by the principles of model railroad operation presented by John Armstrong in the 1960's, and started to think about what he would like to do. This dream layout



*Some gondolas of coal are sitting on a siding south of the South Marquette yard. The limestone bluffs are typical of the scenery around the Mississippi River valley. This was one of the features Ted wanted on his layout.*



*These bluffs south of Marquette along the river are typical of the scenery in the area. The waterfront in the foreground was for loading river barges. This was one of the things that Ted considered when choosing an area to model.*

would be a single track railroad with passing sidings, and at least one terminal. The operation of a single track railroad would be more interesting with the meets at sidings. The terminal would have multiple lines coming into it providing some variety in the operation and car types. Ted also wanted the railroad to have a moderate amount of freight traffic with some colorful cars. The final consideration for traffic was to have a few passenger trains. Location was considered for





*The town of Sewell on Ted's layout is inspired by the West Virginia town of Sewell. The coke ovens are to the right, with the coal supply bunker above them. The stone engine house belongs to the narrow gauge line that ends at Sewell. The foreman's house is the big white one on the hillside, and the company store is right in front of his house. The small houses in the background are company houses for the workers. The box and refrigerator cars are waiting for pickup by a through train.*

scenery, and Ted liked the rolling hills around the Mississippi River where he spent some time working for the Milwaukee. Ted's work with the railroad took him to most all parts of the Milwaukee Road, and the area around Marquette, Iowa was starting to fit the bill for his layout. The hills are covered with hardwood trees that turn color in the fall, and Marquette is the crossing point for two main lines. In addition, once you are out of Marquette, there are branch lines off both main lines. The last bonus was that the grade going westbound out of Marquette could require helpers which would add to the operation. This dream layout is coming together now in Ted's basement. Ted corresponded with John Armstrong, and John was able to visit Ted's layout before he passed away, which was a special visit for Ted.

Now that Ted had a location and some potential traffic, it was time to think about the equipment. Ted wanted to model the 1954 timeframe as much as he could. In addition, he wanted to model the early fall because the train traffic would be heavy. In the fall, grain harvests use up all the available

*Ted made this list of trains for a typical 24 hour day on his railroad. The schedule is a big help to the terminal yard people because it gives them some idea of what trains to expect.*

MILWAUKEE ROAD DUBUQUE - IOWA & DAKOTA DIVISIONS TRAIN SHEET					
TRAIN	DIR	CALL	LOCATION	TRAIN DESCRIPTION	DESTINATION
#69	WB	1:15A	SAVANNA	DRAG FREIGHT	MASON CITY
#163	WB	1:35A	NAHANT	OIL TRAIN	LA CRESCENT
#62	EB	1:55A	MASON CITY	SIoux FALLS MEAT	SAVANNA
#95	WB	2:20A	MADISON	DRAG FREIGHT	MARQUETTE-W
#176	EB	6:30A	LA CRESCENT	DRAG FREIGHT	NAHANT
#96	EB	6:20A	MARQ-W	DRAG FREIGHT	MADISON
#368	EB	7:50A	WAUKON	MIXED	MARQUETTE-W
#35	WB	8:40A	SAVANNA	PASSENGER	LA CRESCENT
#4	EB	9:00A	MASON CITY	MILK TRAIN	SAVANNA
#11	WB	9:50A	MADISON	PSGR- The SIOUX	MASON CITY
#75	WB	11:15A	SAVANNA	DRAG FREIGHT	MARQUETTE-W
#369	WB	11:20A	MARQ-W	MIXED	WAUKON
#166	EB	11:30A	LA CRESCENT	TIME FREIGHT	SAVANNA
#167	WB	12:30P	SAVANNA	TIME FREIGHT	LA CRESCENT
#68	EB	3:01P	AUSTIN	AUSTIN MEAT	SAVANNA
#61	WB	3:05P	MADISON	AUTO TRAIN	MARQUETTE-W
#81	WB	4:30P	NAHANT	DRAG FREIGHT	MARQUETTE-W
#64	EB	5:00P	MARQ-W	AUTO TRAIN	MADISON
#338	EB	6:00P	WAUKON	MIXED	MARQUETTE-W
#12	EB	7:00P	MASON CITY	PSGR- The SIOUX	MADISON
#38	EB	7:20P	LA CRESCENT	PASSENGER	SAVANNA
#161	WB	7:40P	SAVANNA	DRAG FREIGHT	LA CRESCENT
#303	WB	7:50P	MARQ-W	MIXED	WAUKON
#164	EB	8:15P	LACRESCENT	TIME FREIGHT	SAVANNA
#761	WB	9:45P	MARQ-W	AUSTIN FREIGHT	AUSTIN
#63	WB	10:15P	MARQ-W	SIoux FALLS FREIGHT	MASON CITY
#3	WB	10:30P	SAVANNA	MILK TRAIN	MASON CITY
#70	EB	10:55P	AUSTIN	AUSTIN MEAT	SAVANNA
#231	WB	EXTRA	DUBUQUE	DUB. DIV. COAL TURN	SPECHTS FERRY
#230	EB	EXTRA	SPECHTS	DUB. DIV. COAL TURN	DUBUQUE
#232	EB	EXTRA	CALMAR	I&D DIV. COAL TURN	SPECHTS FERRY
#233	WB	EXTRA	SPECHTS	I&D DIV. COAL TURN	CALMAR
#234	EB	EXTRA	LA CRESCENT	L&R DIV. COAL TURN	SPECHTS FERRY
#235	WB	EXTRA	SPECHTS	L&R DIV. COAL TURN	LA CRESCENT
#237	WB	EXTRA	SPECHTS	OSSIAN COAL TURN	OSSIAN
#236	EB	EXTRA	OSSIAN	OSSIAN COAL TURN	SPECHTS FERRY
#33	WB	EXTRA	DUBUQUE	BANANAS	MASON CITY
#91	WB	4:30A	MARQ-W	WAY FREIGHT-OSSIAN	CALMAR
#92	EB	1:30P	CALMAR	WAY FREIGHT-OSSIAN	MARQUETTE-W
#94	EB	EXTRA	MARQ-W	EDMORE PATROL	EDMORE
#93	WB	EXTRA	EDMORE	EDMORE PATROL	MARQUETTE-W
#98	EB	EXTRA	MARQ-W	SHORT PATROL	TURKEY RIVER
#97	WB	EXTRA	TURKEY RIVER	SHORT PATROL	MARQUETTE-W
#203	WB	EXTRA	MARQ-W	WATERVILLE PATROL	WATERVILLE
#202	EB	EXTRA	WATERVILLE	WATERVILLE PATROL	MARQUETTE-W
#241	WB	EXTRA	SAVANNA	DRAG FREIGHT	MARQUETTE-W
#242	EB	EXTRA	MARQ-S	DRAG FREIGHT	SAVANNA
#243	WB	EXTRA	NAHANT	DRAG FREIGHT	MARQUETTE-W
#244	EB	EXTRA	MARQ-S	DRAG FREIGHT	NAHANT
#246	EB	EXTRA	LA CRESCENT	DRAG FREIGHT	DUBUQUE
#249	WB	EXTRA	MARQ-W	DRAG FREIGHT	MASON CITY
#248	EB	EXTRA	MASON CITY	DRAG FREIGHT	MARQ-S



box cars. The seasonal use of some of the box cars also means that some older cars are still being used. There are a lot of refrigerator cars going through the area full of mostly meat, can goods, and dairy products; and the colorful refrigerator cars would look good in the train. In his research, he found that the Illinois Central brought bananas up from New Orleans to Dubuque, handing the cars off to the Milwaukee to forward. This added more refrigerator cars to the trains. In this same timeframe, the Milwaukee Road was receiving tank cars of petroleum products in Kansas City and hauling them north, mostly to north and west of Marquette. There are many stone quarries in the area, and they provide hopper, gondola, and box car loading. Manufacturing is also present, both metal and wood. Lastly, is the coal traffic. Ted is the co-author of a book about the coal operations around Sewell, West Virginia, and he wanted to model some of it. So, with



*Tim Bernaden checks out his nephew on the throttles while Ted does some paperwork.*



*Russ Pohlman is plugging in and getting his engine. Russ is from Moline, Illinois, and brings his own engine when he comes to Ted's to operate. Today, Russ will be working the Dubuque interchange yards. Steve Karlson will be working the Marquette yard, and is surveying the situation.*

some artistic license, he put the mines and coke ovens in the Mississippi River valley. No problem, it gave him a lot of coal traffic to model. Ted uses a lot of gondolas in this service which is common to the Midwest. There is even a small iron mine that actually existed in the area. Now he had all the industry and traffic to use most any type of car you would see on the railroad in 1954. The next item on Ted's list was to look at the prototype train operation on the Milwaukee Road at the time.

Ted said he looked at employee timetables from the locale and era. These are fairly common at railroaders shows, and historical societies are also a valuable resource. Checking timetables from the era he was modeling, Ted found that there were six scheduled trains each way passing through Marquette. Add in the locals and extras, and you start to have a lot of traffic and car routing possibilities. Ted developed all this traffic into a 24 hour schedule, and we

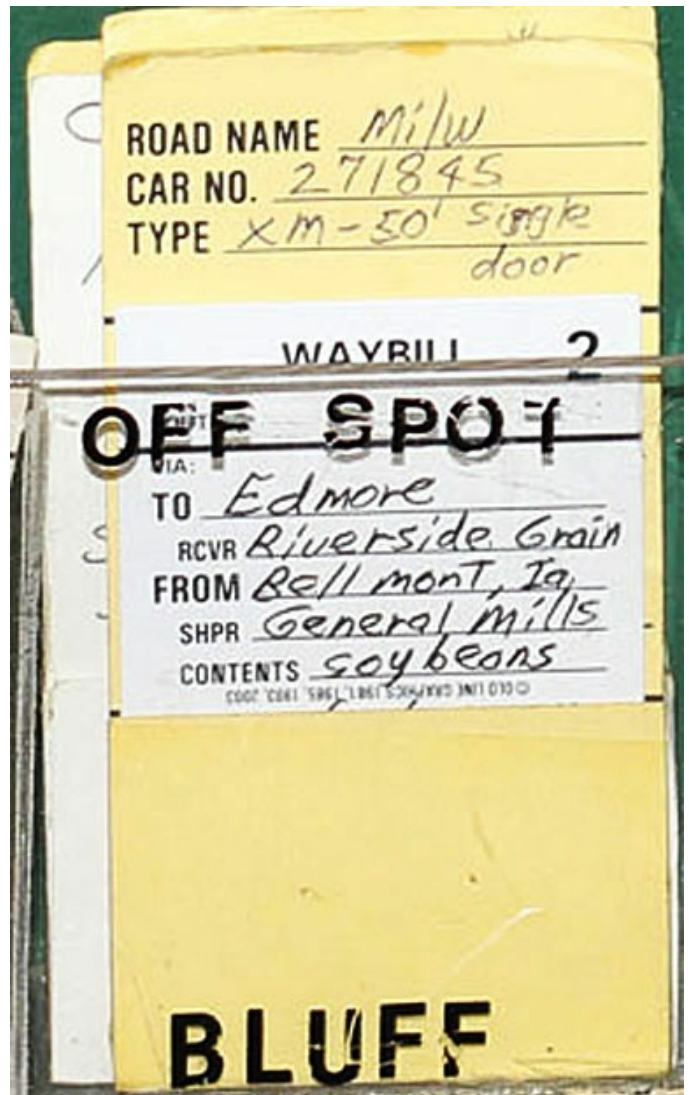


have reprinted that elsewhere in this article. Now he had train movements that could take or bring cars places, but what were those places?

Ted made trips to towns he wanted to model collecting photos, as well as, taking many himself. In addition, Ted looked at Sanborn fire maps when he could find them. These are a good resource for track and building locations. The fire maps are for insurance providers to assess risk. Local plat maps from communities are also helpful, and they can be found in almost any town library or history center.

Now it's time to think about the customers on the lines. Ted loads the towns up with customers as they existed in the 1950's. When planning operations, you need to match customers to car type. The idea here is to have an origin and destination for each car, even if one of those points is off the layout in a staging location. Shippers lists from the railroad can usually be provided by historical societies, or reprints are available through some dealers. These would list all the shippers and customers in an area. At this point, Ted now has a place for every car to go, and a car for every place.

The next step is to route the cars. Fred Steffen told us about waybills, and how they travel with the cars. Ted uses a system of simulated waybills to control the movement of cars on the layout. On his layout, Ted created a simplified waybill that travels with the cars on the layout. Ted explained the card routing system he uses



*This is a typical waybill on Ted's layout. The car information is at the top of the card. The waybill is the white card in the pouch. You can see where the car is going, where it came from, and what is in it. The waybill can be turned over or flipped to show different locations and routings.*



*Bill and Rick are working the Hawkeye Grain elevator on the Mississippi River south of Marquette.*

for this task. There is a card for each car on the layout. This card has the reporting marks, car number and type of car. These cards have a pouch on them that contains the waybill. Ted made the waybills so only one half of one side will show at a time when they are in the pouch. The part that shows has the destination of the car on it. The railroad routes the car to the town first, and then the industry, so that is how Ted did his cards. The card has the originating town and shipper, along with the contents of the car, just like the prototype waybills. Because only one half of one side shows in the pouch, the waybill can be turned over or rotated to show a total of four destinations. To keep





*We are at Spechs Ferry. Dick Koch is running his westbound train up Monona hill towards Beulah, Iowa. Bill Navagato is working the yard at Spechs Ferry getting coal loads sorted out for pick up. Bill knows which trains will be coming next, and he is getting cars ready for them. Bill has an HO layout at home, and is part of the operating round robin that Ted belongs to. One of the interesting things about DCC is that Bill can bring his own throttle to Ted's house when operating there.*

things interesting, Ted will change these bills after the fourth destination is used so the same car does not go through the same cycle for years at a time. To do this, all you need to do is swap the waybills from one car to another. If cars go to staging, they are billed to the staging yard where they stop.

At this point, you have developed a general idea of your railroad, the surrounding countryside, the traffic potential, schedule of trains, types of cars, and a way of controlling their movement. The last step is to incorporate these ideas into a track plan, but that is another topic. For now, let's go through an operating session on Ted's layout to see how it works.

You pick your train up at its originating location, and get a train card



*These are the waybill bins that Bill is using at Spechs Ferry on the outbound yard. Each track has a bin, and Bill will use a bin for each train that will be coming soon. The waybills tell Bill which train to sort the cars for. When the train gets there, it will pick up the cars Bill has waiting for it.*





*These are the inbound bins at Spechts Ferry. There are five tracks for the coal mine. Each track is a location, and is marked on the waybill. The cars are usually spotted by the delivering crew, and the waybills are placed in the corresponding bin.*

that tells you what you are going to do. Your train is the next train on the list. The reason you take the next train is because the terminal operators at Dubuque and Marquette are expecting the trains in order. This is important because they will be getting your pickups ready for when you get there. Remember that some trains are through trains, and only stop at some locations, but they do make set outs and pickups at these locations. One thing to look at is what the instructions for your train are. If you are a through freight, you need to make sure your cars are blocked as groups. Then, when you get to the set out location, you can cut the whole intermediate group off and/or pick a destination group, and be on your way. I was tagging along with John and Bart while they worked #68, the eastbound from Austin, Minnesota, to Savanna, Illinois, passing through Marquette. There are a lot of refrigerator cars in this train.



*At Marquette, Steve Karlson has a bin for each track like Bill Navagato does at Spechts Ferry. Steve will use available tracks to build up cuts of cars for the next train that arrives, and will try to keep a track open so the arriving train has a place to drop cars.*



We stopped at Calmar to block our train. There were cars for Edmore, so I blocked them at the front of the train not realizing that we were a through train, and would not stop at Edmore. (*What a ding dong, guess I should have read the train card.*) Instead, we went through Edmore to Marquette, and dropped the cars off at Marquette. The local then took the cars back to Edmore. On the way to Edmore, we stopped at Ossion, and set some cars on the pass track for the next local to spot. We moved on to Marquette, and dropped the cars for Edmore with the yardmaster. The yard job switched the cars out while we went to service the engine. We picked up what was left of our train, all refrigerator cars by now, and headed to the South Marquette yard ice dock to ice the refrigerator cars. While the cars were being iced, we picked up some cars to fill the train out, picked up the refrigerator cars, and made up the air. After doing a brake test, we were on our way to Savanna, a staging point on Ted's railroad.

When you get to the location where you will set out some cars, you refer to your waybills. The waybill will tell you what to set out, and where to spot the car. When you set cars out, you leave the waybills with the cars at the town. At each town, Ted has a group of bins for the waybills. When you spot cars at the customers, you place the waybills in the set out bin. The cars you need to pick up are in the pick up bin. When your work is finished, you move on. Before the next session, Ted goes to each bin location, and changes some of the waybills based on industry needs. To do this, he takes the bill out, rotates it, and sticks it back into the pouch. Now a new location shows. The waybills are then put in the pick up bin for the next train that stops at that location. There are two more bins I should talk about. Ted has bins for off spot and hold. If you are delivering cars to an industry, and there is no room for them, you spot them in a convenient location, and place the waybill in the off spot bin. If the customer is not finished loading or unloading the car, Ted will place the waybills into the hold bin when he stages the layout for the next session. This adds some additional features to the operation, and will hold the car until it is ready to move. When a car is in the hold bin, you cannot remove it from the customer,



*There is more coming, and Ted is adding onto the layout. This view looks into the original part of the layout. On the right is Calmar. The view is looking toward Marquette, and the next town will be Ossian. On the left, the bottom track comes from Savanna staging and goes to Dubuque, which is to the right below us. The next track up with the water tank is located at Reno, on the line to La Crescent, Minnesota. The top level comes from Mason City and Ahston staging, going to Calmar. There are still two more levels to be added to the wall.*



*Here I am at Calmar showing the visitors what to do. This is where I blocked the Edmore cars at the front of the train, and we had two extra moves at Marquette because of that. Shows you what I know. Well, it all worked out OK anyway.*

and will need to spot your delivery in an off spot location until the hold car can leave, thus making room on the siding. The next train that is working the area will look at the off spot waybills to see if the cars can be spotted at the customer. If so, the waybill goes into the set out bin. Ted will change the routing on the cars in the hold bin when he stages the railroad, and he will move the card to the pick up bin for the next train that is working the area.

This may seem like work, and a task that many would not like to tackle, but there are a lot of good points to this system. Ted has modeled a large area with lots of traffic and customers. The way the whole system was developed is the important thing, and those same principles can be applied to any layout. The first principle is to determine a location or theme for your railroad. Then, determine the number of trains coming through or operating out of your area, and try to develop a 24 hour schedule of

those movements. Think of the type of freight being shipped, along with where it is going. This will help you determine the car types you will be using. These last two steps go hand in hand, so they need to be thought of together, not as one before the other. If you have a favorite type of car, you can create customers to use that car. Lastly, route the freight. If you do these things in this order, you can develop some operation for any layout. You could model a single industry as a layout and still make this approach work.

For example, let's say you wanted to model just a steel mill. Your mill has its own railroad. Now we have some idea of a location and potential operation. The next step is to schedule the trains. We would have a pick up and delivery for the mill. These trains would most likely come from staging. The trains would be picking up and setting out blocks of cars for the mill. Next, we would need to switch the cars around the mill as that is what our mill railroad does. The blast furnace needs to be charged on a regular basis. This would require ore, coke, scrap, and limestone.

These would need to be put in the furnace in the correct order, so now we have switch moves with loads in and empties out. The furnace runs continuously, and gets tapped regularly. A train needs to be there with the ladle cars. Now we have two movements going at the same time. A third movement is spotting empty cars for loading, and gathering loaded cars from the mill buildings. You know that the connecting railroad switches to your location twice a day, so you need to have cars ready for pick up. We can do these tasks one at a time ourselves or all together. This could keep five operators busy at the same time. So now we have developed a list



*Part of the new extension on Ted's layout. This view looks toward Dubuque. The IC and the CB&Q cross on a lift out section in front of us. The tracks continue to the Dubuque interchange yards. Behind the divider on the left, is the Milwaukee Road Dubuque yards. On the left, you can see Ted's plans.*



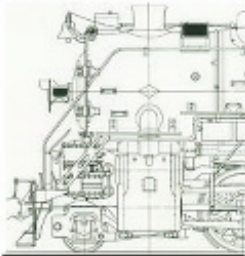
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of train movements. Next, we look at car types. We have hopper cars of coal if we coke our own coal, or coke cars if we buy coke. If we have a coking operation with the mill, we have chemicals produced. That would mean we need some tank cars. We have lots of gondolas for rolled product out and scrap in. Lastly, we need hot ladle cars. At this point, we have the general theme and location of our railroad, some idea of the movements on the railroad, and what cars we would need. Now it is time to think of the customers. Since we are modeling a single industry, the customers are locations around the industry. The coal coming in goes to the coke works, or to the unloading area for the blast furnace. Empties go back. The same for the limestone, scrap, and ore. The ladle cars go back and forth from the blast furnace to the rolling mill. The gondolas go to different rolling mills, and those are different door locations. The scrap goes to the scrap pile to be used in the melt furnace. So, Ted's principles can be applied to any size railroad if you would like to have an operating scheme.

Ted is very interested in operation, and is involved with an informal group of other modelers that all share the same interest. They go to each other's layouts to operate, and are always coming up with good ideas. By the way, most of the people in Ted's group are not O Scale Modelers. One last point Ted made was, you do not need to start from the beginning to have an operation. If you have a layout already, and would like to create some operation for it, start with listing your industries, and go from there. Once you have determined your cars and customers, your train schedules will naturally follow. Then, route the cars for their movement.

When I lived in Illinois, my nine year old nephew (an airline pilot today, how time flies) and I would go to Ted's house on a regular basis to work on the layout. I started learning some of the operation, and have come to like it. Ted is always willing to talk about operation, so don't be afraid to ask him when you see him. We took some photos of an operating session at Ted's layout for you to see with this article. We had a good time that day, and want to thank Ted for taking the time to explain some of this to us.

Ted, you have quite the empire going, and John Armstrong would be happy to see what you are doing.

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