SP&S Switching Layout

Based on Madras, Oregon

BY GREG BAKER AKA, MOUNTAINGOATGREG

1. Greg models the SP&S Oregon Trunk line near Bend, Oregon on his home layout. When Greg went looking for a prototype for an "extracurricular" modular switching layout on which to demonstrate the challenges of real railroading, he ended up picking Madras, Oregon, another town also on his modeled line.

A real railroader designs a switching layout as the final exam for real railroad conductors …

IT ALL STARTED WHEN I DECIDED TO BUILD a small switching layout as an "extracurricular" project to demonstrate the principals of switching safely and efficiently. I already had a home layout, so my space was limited for this extra layout.

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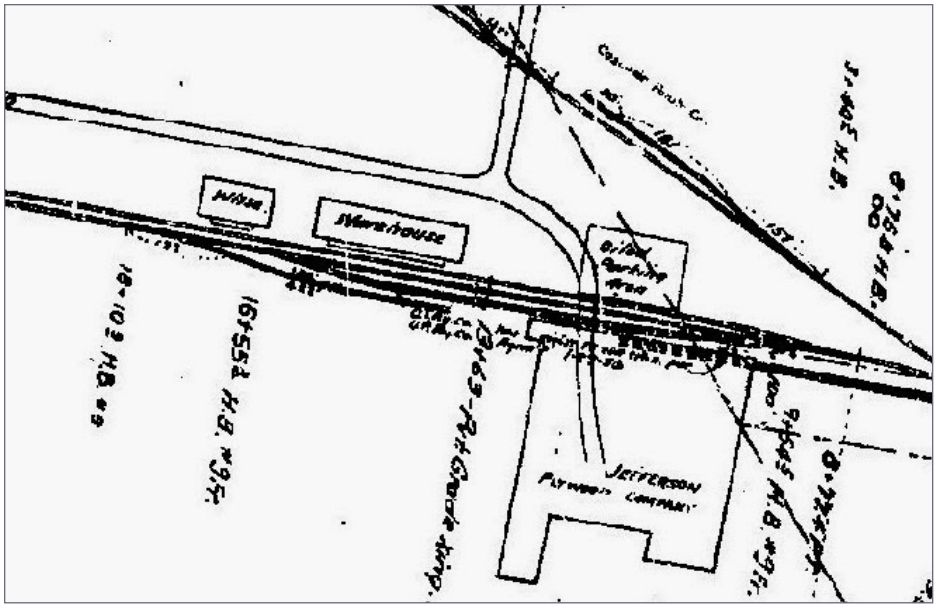
I wanted a design that would support a variety of car types, would be relatively compact, and have some of the common hazards of a real railroad. These hazards would include things like spurs, crossovers, close clearances, and road crossings.

The space for this extra layout is 14 feet long and fairly narrow. I wanted to use Free-mo standards (free-mo.org/standard), but my space won't allow me to use a full 24-inch width. I designed the modules to be 18 inches wide, which still works with Free-mo. I also wanted a narrower module so they would be easier to transport and move around the house.

With the dimensions set, I looked for a prototype so I could anchor my layout plan in reality. I had already looked at Bend, which is where my home layout is set, but nothing was compact enough to capture everything I wanted. Later I came across the Madras, OR industrial area. I had planned to model this location at some point on my home layout, but for this extracurricular switching layout project, I found almost exactly what I was seeking. Notice I said: almost.

Inspiration and design

I located a station plat for Madras. The center of town along the railroad tracks has a sawmill, warehouses, and an elevator. The only thing it lacked was a crossover and some sort of hazardous material. I used a little modeler's license to add the crossover and an oil distributor. See the plat map [2] and the overhead Google Earth views of the area [3, 4].



2. Station plat for Madras, Oregon.

3. Overhead Google Earth view. It looks kind of plain from the air, but there's lots of character in the buildings. The Google Maps link is: google.com/maps/place/Madras,+OR+97741/@44.6546257,-121.1359106,17z/data=!4m2!3m1!1s0x54bee98a71bb48a7:0xc7e8145e5d1dfa82.

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4. You can get an idea of the character of the Madras area from these photos, showing where Greg intends to place structures on his switching layout.

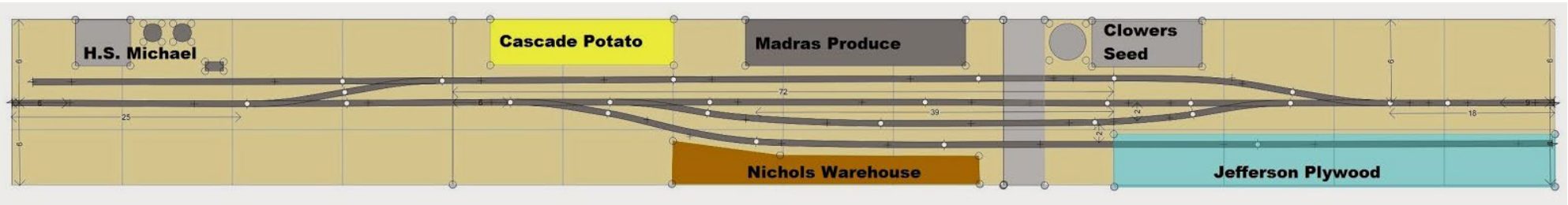
I developed a track plan that meets the Free-mo requirement, fits into the space I have available, and meets the other requirements I have for this project [5]. The one change I made to the prototype was adding the oil distributor and crossovers. The oil distributor and the crossover will be a separate module that can be added to the set if needed.

I wanted to use the minimum number of switches possible in this design, and create the most operational interest. Yes, I could add more turnouts to make switching easier, but the goal is to operate this layout with a fixed number of cars and a specific set of moves. This gives me a "best" way of switching the layout and a way to determine the minimum moves necessary to complete the tasks.

A few things are going on in this plan that make it beneficial to have the crossover attached to a runaround. First, there are multiple customers on the same track. This allows an alternate route for car pickup without having to move all the cars. Also the industries can be switched by a train going either direction, which also increases efficiency.

My goal is to use this layout to help educate real railroad people on switching (*see footnote on bottom of next page*). I also wanted to have a variety of track industry arrangements to show different industry switching scenarios to the trainees.

When designing this layout, I wanted it to appear to be relatively simple. Only when you start switching it do you find it is not as easy as you thought! The lesson taught is that knowing



5. Track plan for Greg's Madras switching layout. The plan is also consistent with Free-mo modular standards.

your circumstances, and conducting good job briefings are critical to success. It is a lot cheaper to mess up some HO scale equipment than some real 1:1 equipment. I planned it so you need to take some cars in more than one cut and also wanted a runaround required to spot the tank cars.

The plan is to start with a train sitting on the main. Left to right will be a loco, two cars for Jefferson, one car for Nicholas and one car for H.S. Michael. Finally come cars for Cascade Madras and Clowers in mixed order. Once the first trainee group has spotted all the cars, I will have the next group pick up the cars with the loco on the other end. I can either run the loco around or start "as is" for the next crew by scrambling the switch list See the sidebar: "The trainees' test problem."

Construction

I started construction on the modules and completed the basic modules over a weekend [6, 7]. I transposed the track plan to the plywood top and started gluing down cork. I took the modules

FOOTNOTE: From an MRH forum member who knows Greg: "Greg and I have known each other and have worked for the same holding company of railroads for about ten years. Greg has worked his way up from conductor, engineer, DSLE, Trainmaster, and now Safety Officer – so he brings a great deal of prototype experience to the hobby, along with wonderful creativity as an artist when it comes to scenery, backdrop painting and scratchbuilding. (A DSLE is a Designated Supervisor of Locomotive Engineers.)

"Greg and I became friends and now we work in the Safety and Rules department of the railroad, with one of our responsibilities being the training of new-hire conductors. We're using all the technical ability we can – including using a model railroad switching layout to teach switching techniques. Greg and I previously discussed his track plan, and I agreed it should keep about a dozen students fascinated for 2-3 hours.

6-7. Greg erected the benchwork for these two modules in a single weekend.

outside and did some sanding to make sure I had smooth transitions all along the modules' top. Once I had completed the sanding, I put the modules back inside, put them together, and leveled them out. Next, I drew the track plan on top of the modules.

I glued some cork roadbed down: I used a combination of HO scale cork for the heavier used track and N scale for the industry tracks. After that, I painted the cork and exposed wood on the top of the layout.

I used Micro Engineering #6 turnouts for all switches and replaced the throw bars with PCB ties. I will eventually superdetail the switches with parts from the ME kits and from Proto:87 stores. I also plan to use Micro Engineering code 83 flex track on the main track.

For the auxiliary and industry tracks, I am using Central Valley tie strips and ME code 83 rail. For the transitions between

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modules, I am using BNM Hobbies Free-mo tie strips. I am using both the Free-mo and intermediate strips for this project. They are a pretty clever design, allowing the rail to be soldered to CNC-cut boards, keeping the rail securely fastened and properly in gauge.

Once I laid all the track, I dropped the track feeders and wired everything to the bus, then tested the DCC by running an engine around.

I mounted the six Blue Point turnout controls, wired up the frogs, and added the throw rods. Finally, with the switch machines working, I had a working railroad!

I keep testing and adjusting the trackwork to make sure it runs well. I want the layout to be very durable and to last, so

8-9. Laying out the track centerlines on the plywood, and then gluing down the cork roadbed.

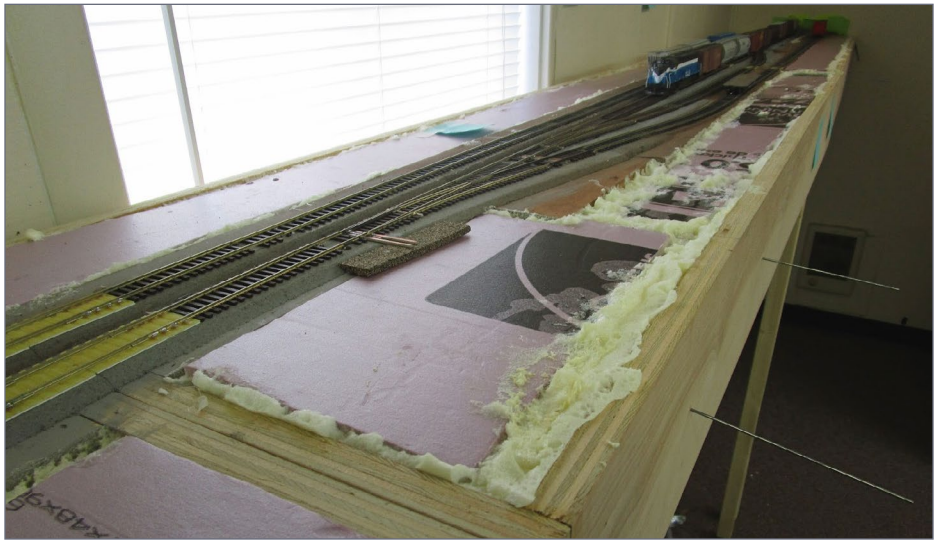
10. Laying the track, installing the turnouts, and attaching feeder drops to the rails.

spending the extra time testing and tweaking seems worthwhile. Here's a video I shot during some of the testing [15].

To avoid a catastrophic event if something derails, I added foam tops to the layout. Before I started the ground scenery, I knew I wanted to spray paint my ties, so after placing the missing ties to hide the feeders, I took the sections outside and gave them a coat of Camouflage Brown.

While that was drying, I printed out some pictures of the area. I find working from the prototype to be the best plan of action for me. Next up is to determine exactly where to locate the structures, then to add Sculptamold to the foam.

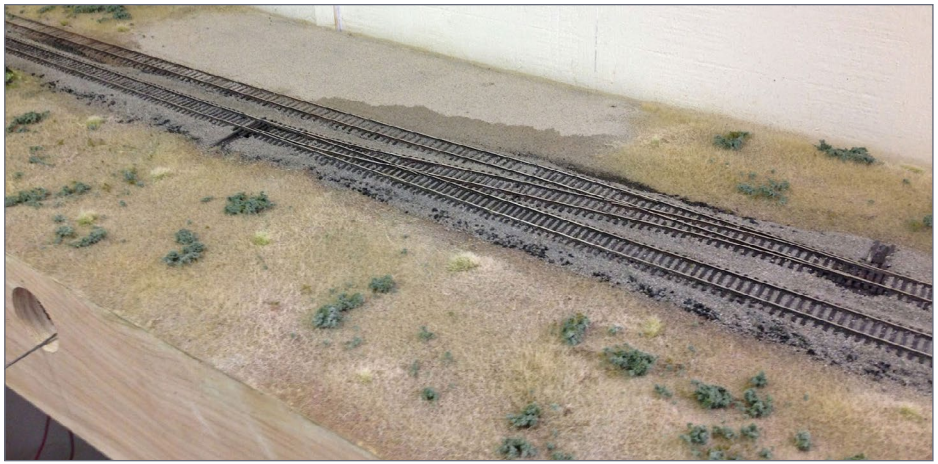
Even flat parts of the world are not really flat. I first laid out where I was going to put the bulk oil tanks and building. Once



11. Filling the open spaces with foam in preparation for scenery work.

12. Greg added Sculptamold contours on top of the foam and spray painted the track with a camouflage brown spray paint. You can see how the taller HO cork roadbed realistically elevates the mainline above the industry spur.

13. Greg used Micro Engineering (ME) turnouts, but replaced the throw bars and headblock ties with copper-clad PC board ties. Greg will add ME and Proto:87 Stores turnout detail to the turnouts to enhance their realism.



14. At the time of this writing, Greg is adding ballast, dirt and basic ground cover to the layout. Next will be building the specific structures needed for the layout. The space here is for the bulk oil depot.

I had that figured out, I mixed up some Sculptamold. I added some brown paint from the "oops" section at Home Depot to the Sculptamold mixture. Using this "goop," I made a few undulations in the terrain to get it away from being perfectly flat.

When I designed these modules, I wanted them to have the look and feel of a branch line. The track that connects the modules would be older and well-worn, but still in good shape. The various industry tracks would be a little more worn-out.

Because I knew that some of the tracks would have older ties and dirt ballast, I decided to really weather those ties that were to be down in the dirt. I used a mix of oil paints and once the ties were painted gave the rail a coat of paint too. This forms the first layer, as I will need to touch things up once all of the ballast is down.

Paints I used are the Windsor and Newton water mixable oil paints. The colors were Burnt Sienna, Ivory Black, Raw Umber and Titanium White. I mixed them as needed to create different shades of browns and grays and painted the ties in a random pattern.

After the Sculptamold dried I painted the top of the module and covered it with actual dirt. In areas that were not well-covered, I added more dirt and sprayed it with water. While the dirt was still wet, I coated it with a 50:50 mix of water and matte medium, with a little rubbing alcohol added to break the surface tension.

Then I added static grass and some shrubs and bushes. Next up will be doing the structures, but that's for another time. Even though the layout is not finished, I was able to put it through its paces with some students. Read about it in the sidebar: "The trainees' test problem." ☑

Note: This article was derived from a pair of MRH forum posts by Greg. See mrhmag.com/node/22267, and mrhmag.com/node/22786.

15. Greg shot this video while testing and debugging the trackwork. The sound is an out-of-the-box Tsunami from Soundtraxx, factory-installed by Athearn. The master volume is turned down a little from the default setting. He is pretty happy with it and will get more of these sound locos.

See the following sidebar ...

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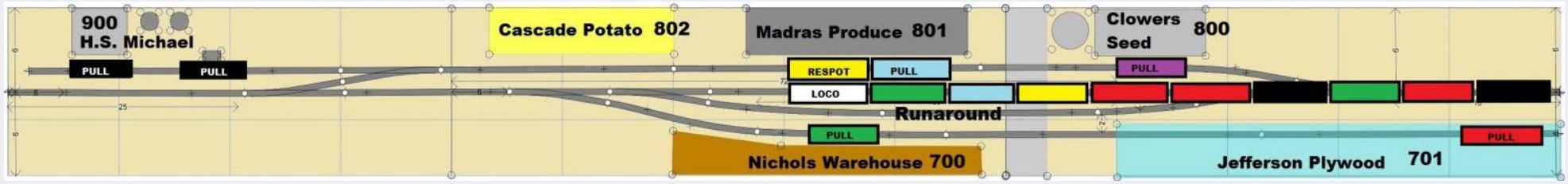
The trainees' test problem



16. Setup for the trainee test problem.

I recently used my Madras, Oregon switching layout for a training session of new-hire conductors. While this little layout is far from finished, all of the track works and I got the turnout controllers operational. Other than a little dirty track and a switch that needed some adjustment, the layout ran really well.

For this operation problem, the purpose is to reinforce in a controlled environment how to switch safely and efficiently. Also, most of the people in these classes did not realize that railroading could be a career until they got the job. Needless to say, they are not experienced with railroading – model or otherwise.

In order make this a good training tool instead of a fancy toy, realism is a must. I started by pre-spotting cars around the layout [16] and creating a list in Excel similar to the switch lists used by the real railroad. I also placed a train on the mainline with cars blocked to customers destinations on the layout [17, 18].

This was the first time any of them had seen switch lists, so I spent a good amount of time going over what each column means, and showed the difference between the cars to be spotted and the cars to be pulled. In order to not make it completely confusing I did condense the lists a little by removing a few columns. Along with the switch lists, I gave them a map of the track with each track numbered to match the customer.

JOB			ENG/COND			TRAINMAN	DEPARTURE		ARRIVAL	
							Date/Time		Date/Time	
SEQ	H	EQMT	L/E	KD	Block To	Switch Instr	Track/SP	Commodity	TRACK	MOVE
Station: MADRAS TRACK 700 NICHOLS WARE										
1		NP 62025	E	F	BEND	PULL				
Station: MADRAS TRACK 701 JEFF PLYWOOD										
1		CBQ 9836	L	B	BEND	PULL		LUMBER		
Station: MADRAS TRACK 800 CLOWERS										
1		GN 170100	L	B	BEND	PULL		WHEAT		
Station: MADRAS TRACK 801 MADRAS PROD										
1		NP 76325	E	H	BEND	PULL				
2		NP 76777	E	H	CLOWERS	SPOT				
Station: MADRAS TRACK 900 HSMICHAEL										
1	H	SHPX 17154	L	T	BEND	PULL		*SODIUM HYDR*		
1	H	MKT 9707	E	H	BEND	PULL		*AMMON NITRA*		

17. Here is the pull list. H indicates a Hazmat car and the crew has separate paperwork to explain the hazard.

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JOB			ENG/COND			TRAINMAN	DEPARTURE		ARRIVAL	
							Date/Time		Date/Time	
SEQ	H	EQMT	L/E	KD	Block To	Switch Instr	Commodity	Station	TRACK	MOVE
Station: Bend M/L 100										
1		ATSF	E	B	Nchols Ware	Door 2		MADRAS		
2		GN	L	H	Madras Prod		OATS	MADRAS		
3		CR	L	H	Clower Seed		OATS	MADRAS		
4		WP	E	B	Jeff Plywood			MADRAS		
5		SP&S	E	B	Jeff Plywood			MADRAS		
6	H	RTLX	L	T	H.S Michael	Tank	*CHLORINE*	MADRAS		
7		GN	L	B	Nicholas Ware	Door 1	PAPER	MADRAS		
8		MP	E	B	Jeff Plywood			MADRAS		
9	H	NP	L	H	H.S Michael	Hopper	*AMMON NITRA*	MADRAS		

18. Here is the spot list. As with the pull list, an H in the second column indicates a hazmat car.

With all the paperwork in hand, I allowed them to then see the layout and get a feel for what they were up against. I asked for volunteers and two individuals were chomping at the bit to give it a try. I instructed the "engineer" on the use of my Digitrax Zephyr and allowed him to move the train forward and backwards. Next I showed the conductor how to unhook cars using a sharpened #2 pencil. I also showed them how to throw the turnouts and check the point position. After that, I stepped back and watched.

Crew #1: I have two guys in class who went to a railroad vocational school, so they came with some experience. I made them go first. After looking over the paperwork for a while, they decided to start moving cars. I'm not sure the conductor had a plan, but he started moving cars anyway.

He decided to tackle the back track with Clower and Madras Produce. After finding out the hard way that only the loco and

two cars would fit between end of track and the crossover, they were able to get one car pulled.

I decided to keep them from totally getting stuck, so I swapped out conductors. The conductor I had take over had been watching, and had seen a few moves that would have made things easier. After 20 minutes, he had taken care of Jefferson Plywood and Nichols Warehouse. He then made a mistake by pulling H.S. Michael and coming down the main, getting himself totally stuck. I guess you can't win them all.

Crew #2: While crew #1 had been flopping around like fishes out of water, two of the guys went into the next room and developed a game plan. They came back in and watched Crew #1 try to get themselves unstuck, and informed us they had a plan they thought would work.

I decided to reset the layout and let them have at it. They still made a few double moves and almost got themselves stuck once when they tried to grab too many cars, but caught their error before it was too late. I allowed a few of the other team to take over and complete the plan crew #2 had developed.

Conclusion: After all the cars were spotted and the pulls were on the main with the power on the opposite end, we concluded with a debriefing.

Overall, the group thought it was a great exercise. I plan to use the layout again with the rest of the class. I also plan to add some derails, track stops, clearance markers and maybe even a timetable of trains coming through heading to other destinations.

They did ask me for more track, and I told them they cannot go any further to the right as that goes out onto a CTC controlled

mainline. They cannot get a signal for the main until they are ready to return to Bend, OR.

I said the other end has a MOW project and foreman Smith won't let them past the red board. I reiterated that there's enough room to get the job done, and that customers are waiting!

It does get them to think outside the box and still complete the task. I also think this proves that a deceptively simple-looking layout can be a real challenge. ■

Greg Baker

Greg Baker has been "seriously" model railroading since 2000, but as long as he can remember he has always been fascinated by trains.

Greg's main interests are the railroads of Central Oregon in 1968 with the focus on the SP&S, Great Northern, and Union Pacific along the Oregon Trunk. He is also interested in the City of Prineville Railway and its connection to the Oregon Trunk.

He currently resides in Lewiston, Idaho, with his wife and two children as he continues his career in railroading. He is actively involved in promoting Free-mo and has created an Idaho Free-mo group. ■