Adding Operations to Your Layout

By George Paxon

Just running trains vs. operating a model railroad realistically, as if it had a purpose, are two different things. If you get your thrills watching trains scream along the main, or just dragging hoppers up a steep grade, maybe operations is not your thing. Some of us just like to watch the trains go by, which is fine. But many of us, once we get trains running, look further and get into operations so our layouts better mimic the real thing. To each his own. Our hobby is big enough to cater to all needs and wants thankfully. If interested in moving on to prototype operations, you may find the following helpful. If someone had told us all this, before we learned most of it the hard way over the years, it would have been good. All of the following information may have been available earlier, but maybe at that point in time, we had no idea where to find it.

Before contemplating serious operations, get your layout running well. Trying to operate with repeated derailments, couplers that don't match, bulky locos, dirty track/wire, etc., is very frustrating to yourself and an operations crew. You certainly can't keep to a schedule or even get from point A to B if the trains won't stay on the track and run reliably. All layouts experience derailments and other operational problems. The real railroads seem to have their share of them, too. But they should be the exception rather than the rule.

Organize a crew. You can't run many trains without some help. Train friends are good prospects for crew members. Others that visit hobby shops and some that are not into model railroading, but would like to be, are very good candidates. Many model railroaders have some trains, but no room to build a layout. They probably would love a place to run trains. And, crew members can come from other gauges and persuasions, but they can be just as effective and useful as those with modeling interests the same as yours. Be open minded, and you will probably easily form a crew. Once the word gets around that you are looking for a crew, they may appear out of the woodwork. A small crew makes for a good start. You can grow the crew as you grow in experience as a team. Always keep a look out for potential new crew members as some regulars will drop out from time-to-time and need to be replaced. You can accommodate extra crew members by having two-man crews on some trains. As addressed below, you can add trains to the operating schedule as your crew grows in size. Having a good operations design, that allows flexibility based on the number of crew members available, will allow you to adjust for extra/new crew members easily.

After finding a crew, you need to keep them. Don't be a Hitler-type. Yes, it is your layout, but be democratic and diplomatic. Remember, you can't have much in the way of operations if you drive all your crew members away. Keep in mind the crew is helping you to achieve realistic operations as much as you are helping them by providing train running fun. It's OK to have some rules such as where to put cups and glasses, what not to handle, no fast running, policies on not bullying others, use of bad language, etc., But keep it low key and keep it reasonable. Accidents will happen: be tolerant and forgiving. Your railroad can even have a demerit system for mistakes, but keep it humorous to avoid a stigma of fault and failure. Some crew members may take these very seriously and decide not to take part.

Design for a variable number of operators. Different timetables can be used for different crew sizes. Design operations for from 1 to n operators. You can exercise the 1 operator case when you feel the need to operate your layout alone as this will provide a sense of purpose to such a personal session instead of just running trains around in circles. You don't need a different timetable for every increment of operators. You can have a few and just annul some trains to make sure the workload can be readily handled by the number of crew members on hand at the time. Schedule trains as "jobs" as does the real railroad. Have varnish, important freight runs, drags, mine runs, switching assignments, etc., to mimic the real railroads of your choice or era. Give the trains names, numbers and/or symbols to add a sense of reality to your operations. You might be copying the trains of your favorite railroad. Schedule to allow breaks for crew members between jobs. Try to have many short jobs. A long job or two is OK, too. Short jobs provide more scheduling flexibility though. Crew members can then

have several jobs in a session. This will yield more variety and avoid monotony. Don't try to cram too much into early sessions. Start with short sessions, then make them longer as you and your crew gain experience. When working out the planned length of a job, leave lots of time for any switching. You can adjust the job time as you get experience with it. And make sure you leave an hour or so for the crew to go to eat at meal times! Initially there will be an intensity and some stress to operating sessions that you need to manage to keep your crew comfortable and motivated. Remember, this is fun – not really work.

Provide a thorough introduction to the layout for newbies. Track route, station names and locations, industries, electrical system, controls, communications system/protocols, hand signals if used, etc., can all be quite baffling and intimidating to others. All this might be easy for you to understand, but then you are the fellow that built it all. Others need some help to understand it all. Look at this task as an important investment, because the sooner they understand it all, the sooner they can make meaningful contributions to your operations. Much of this knowledge could be included in a model rule book, to be discussed later, for reference and future use.

Consider having work days/social days without operations where crew members can come around and help with layout work and problem solving. At these sessions, track/wire and wheels can get cleaned; errant coupler heights adjusted, journals oiled, etc.; new operations ideas can be discussed/developed; timetable and rules changes discussed; operations experiences discussed/critiqued; etc. Such sessions provide opportunities to build teamwork and a sense of belonging to the group for crew members. Even if you are the one doing most of the work, having others there during your work will do much to build a cohesive and motivated team.

Figure 1

The Rio Grande Western Railroad Company
Timetable No 11
1 June 1939

	West							East		
Mixed Train 23	3M Spec 21	RGW Exp 1	Smls to NR	Sym	Station	Svc	Sidg Capy	RGW Exp 2	3M Spec 22	Mixed Train 24
					Denver via D&RGW					
Lv 805	Lv 615	Lv 1100	0	NR	Noo Roo Jct	CPS TW	Yard	Ar 1000	Ar 456	Ar 341
f 811	f 620	n 1105	2	NX	Denver Jct (D&RGW Interchange)		45	n 955	f 451	f 335
Ar 829	Ar 634								Lv 437	Lv 317
Lv 839	Lv 644	f 1119	8	DA	Coaldale	PW	12	f 941	Ar 427	Ar 307
	Ar 651								Lv 420	
f 846	Lv 701	n 1126	11	WS	Coal Washer		Yard	n 934	Ar 410	f 258
f 849	f 703	n 1128	12	LM	Lumber Mill		-	n 932	f 412	f 255
Ar 855	Ar 707	Ar 1132						Lv 927	Lv 407	Lv 249
Lv 915	Lv 722	Lv 1142	14	CO	Chilli Verdi	P	10	Ar 917	Ar 352	Ar 229
Ar 927	Ar 732								Lv 347	Lv 217
Lv 942	Lv 742	f 1152	18	RF	Rattlesnake Flats	W	10	f 907	Ar 337	Ar 202
f 1042	f 830	n 1240	38	A	A Siding		8	n 819	f 249	f 102
f 1057	f 906	n 1252	43	B	B Mine		4	n 807	f 237	f 1247
Ar 1142	Ar 942	Ar 128	58	SC	Silver City	PW	10	Lv 731	Lv 201	Lv 1202
Lv 1202		Lv 148						Ar 711		Ar 1142
f 1232		n 212	68	D	D Siding		6	n 647		f 1112
f 1258		n 231	76	E	E berg	W	8	n 628		f 1048
f 116		n 245	82	F	F ton		6	n 614		f 1030
f 216		n 309	102	G	Dixie Jct		6	n 550		f 1000
Ar 234		Ar 323						Lv 536		Lv 942
Lv 254		Lv 338	108	MB	Mount Bertha	PSW	12	Ar 521		Ar 927
			108	--	C&S Interchange		30			
f 312		n 345	111	H	H Siding		6	n 514		f 918
					Paradise Jct		0			
							8			
					Muttonsberg		7			
					Paradise City		6			
Ar 327		Ar 359	117	BD	Black Diamond	CPS TW	Yard	Lv 500		Lv 900
			117	--	Durago Jct (D&RGW Interchange)		40			
					Durango via D&RGW					
			120	I	Truck Loader		3			
			122	J	Mine 19		18			
7:22	3:27	4:59			Schedule Time			5:00		
15.9	16.8	11.6			Avg Speed (S/Hr)			11.6		

Symbols used in Time Table:

Ar	Time of scheduled arrival	P	Telephone
Lv	Time of scheduled departure	S	Sand
n	Train does not stop	T	Turntable
f	Train stops when flagged only	W	Water
C	Coal	Y	Wye

Start simple. Running trains to a sequence with meets at specified locations is a good way to start. You can add extras as the crews get more proficient and experienced. Doing too much initially may kill the desire of others to participate. Trying to do too much at first will almost certainly result in chaos. Let your operations grow with the crew's numbers, experience and interest.

You can add a timetable eventually. The relevant timetable should be provided to all crew members at the start of each session. Just try and get them back at the end of each session or you will spend most of your hobby time making new ones! Don't ask why I know about this one. Make enough copies of them to go around. And, there can be several different ones used as needed. Put a number/date on the front as you need to make sure everyone is using the same timetable or you will be like a parade trying to march to different drums! Remember that real timetables changed from time to time. Having only one could make your operating sessions stagnant and uninteresting with time. Figure 1 provides a copy of one of several timetables in development for our last narrow-gauge layout. The first timetable for the new layout is still in work as the Super is slow at getting things done these days.

Real railroads all had rules that were published in a book. All operating personnel were required to have a copy of the current book of rules in their possession when on duty. Personnel were regularly examined to insure they understood all the current rules. You can model the rule book and provide one to each crew member. It would be best to keep it light, even humorous, so the rules are not seen as oppressive. Any strange quirk on your layout can be included for the benefit of crews, such as "stand only on your left foot and hold your mouth a certain way while trying to spot a car at Perkins Produce". An easy way to make a rule book is to get a copy of one from your favorite railroad, or any railroad, and copy/paraphrase the needed parts of it for your layout. Our rule book for the new layout, still in draft form, has my German Shepherd, Freida, as the Chief of Security for the Mountain Electric. The domestic manager is the Company President! You can have a bit of fun with yours, too. It should not be 100 pages long as are many real rule books. Make it manageable, and make it fun. On the Mountain Electric we have reworked a standard rule to say that "No Company employees may die as the result of work-related injury until after they see a Company appointed doctor".

Photo 1 has several timetables and a P&WV Rule Book shown. On the right is the printed rules from our last narrow-gauge layout. The master for the inside cover page of our old rule book is Figure 2. In the glory days of railroading, most timetables and rule books were about the size of a letter folded in half length-wise. This allowed them to be carried in a pocket. Now many are in book form.

Photo 1

To use a timetable effectively you will need to introduce the concept of time. Many layouts have the dreaded fast clock. Clocks were very important on real railroads and provide quite a bit of extra operational realism to layout operating sessions. But they can create problems as well. You should probably only add a clock after operating sessions, based on train sequence without time constraints, are

Head Office- 3 rd Floor, Woodford Building

33 Second Avenue, Denver, Colorado

IM Dead, Pres

TIC Miller, V Pres

HA Goodpen, Sect

BG Spender, Tres

AM Crooked, V Pres, Legal

Operating Offices- Passenger Station,

105 Main Street

Noo Roo Jct, Colorado

GA Paxon, Superintendent

IB Late, Chief Dispatcher

CHH Paxon, Rules Examiner

Lucifer, Chief of Railroad Police

Angel, Public Relations

Gabie, Garbage Collector

Railroad Surgeons

Noo Roo- Dr T Bones, 156 Main St

Black Diamond- Dr Butcher, 17 Third St

Rattlesnake Flats- Dr Quack- 29 1st St

Standard Time Clocks located at-

Noo Roo Jct

Mt Bertha

Seldom Seen

Railroad Watch Inspector

Noo Roo- IM Timely, 21 Main St

Figure 2

working well. Consider a rubber clock at first. This is a clock on which you can vary the rate. Or plan to turn the clock off when issues present themselves, and until such an issue is resolved. Remember that the clock can add a sense of urgency and considerable stress to what should be fun. Take care with its introduction and a clock will make your operating sessions very realistic.

Vary the roles of your crew members. Don't let the same individual always do the same job. This denies other a chance and limits learning and experience. It also can make that job boring after a while for the fellow that always does it. Share the work and the fun. One idea I have heard of is to have a job bidding approach, as do most real railroads. For layouts, the first to arrive for the session can pick his jobs. But, again, avoid the same crew member always getting the same job. Another policy employed on some layouts is to encourage each crew member to rotate through all the jobs.

Does your layout need a dispatcher role? This is a function of layout size and complexity as well as the number of crew members. Other issues to consider include the train control system you will be using and the availability of communications.

Manual train control on real railroads historically used a train sheet which is often modeled as a train graph. A train graph is based on the timetable and merely plots the station and time relationship so you can see which train should be where and when, and all points where trains will pass and meet. Extra trains, and late trains, can be plotted on a copy of the train graph using a colored pen or pencil. The train graph just allows the dispatcher to readily see where trains are at any given time. There is much written about how to make and use a train graph, so we will not go into that here. It is a subject in its own right. A very good source of this information in exacting detail is the Bruce Chubb book, *How to Operate your Model Railroad*. Chapter 8, deals very well with making and using the train graph and is recommended reading. I can't seem to find a soft copy of the train graph we used on our last narrow-gauge layout to show you. But Figure 3 is a rough train graph we have been tinkering with for running on the early constructed part of the new layout.

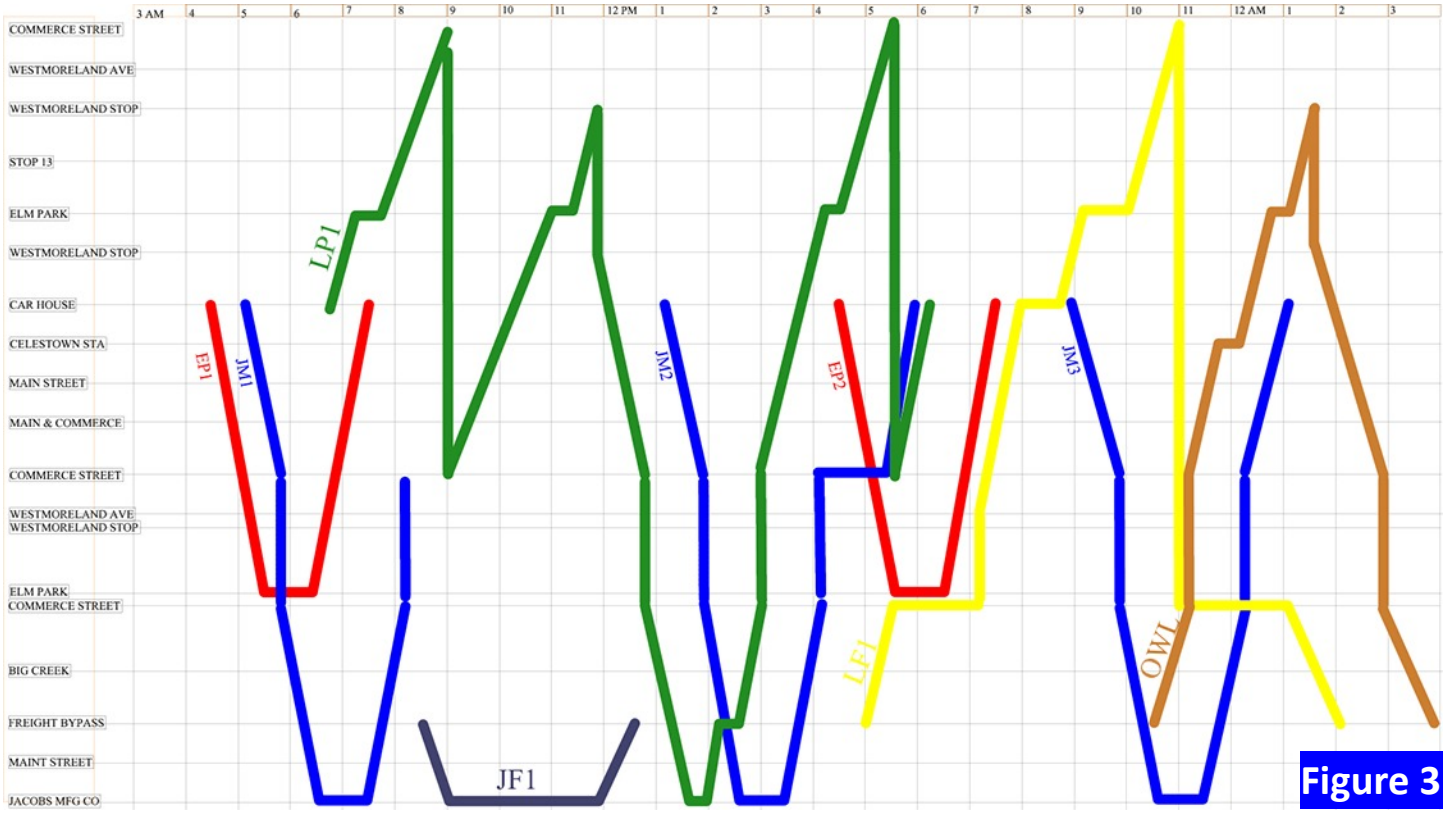
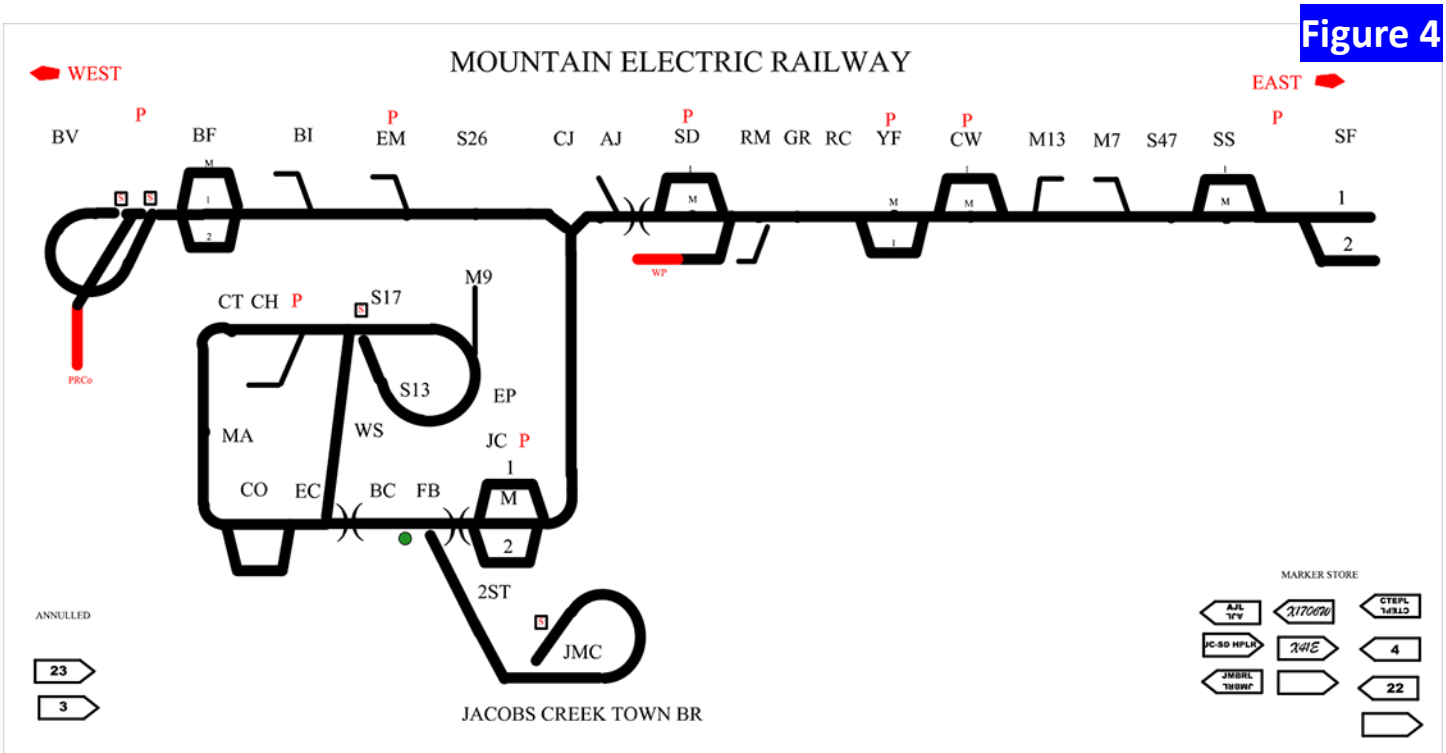


Figure 3

Another alternative train control aid we plan to use on the Mountain Electric is a train control panel. This concept we borrowed from others and consists of painting a thin sheet of steel with your track plan. Not all your tracks need to be included; just those tracks subject to train control – the main and passing sidings. Small markers, like in Monopoly, are made up of styrene or wood with magnets glued to their backs. These then can be moved along the painted track plan to indicate where each train is located. We have used the train graph in the past on our previous layout, and are switching to the painted steel train control panel in hopes of simplifying the administrative work for the dispatcher.

Figure 4



The draft of the artwork for the new train control panel for the Mountain Electric is included as Figure 4. Controlled tracks are in wide black lines. The wide red lines are interchange tracks that the Mountain Electric uses. The narrow black lines are uncontrolled sidings that could be used to meet two trains if needed. The green dot between BC (Big Creek) and FB (Freight Bypass) is a remote signal indication. A signal is located at this point on the layout to control passenger cars headed for the Jacobs Creek Town Branch. An electric staff control system in in effect on this branch and used only when freight switching is needed on the branch. We can foresee crews forgetting to return the staff switch to normal which would continue to hold cars at the signal unnecessarily. Having this signal indication on the dispatcher's panel will alert him to a crew oversight, and he can take action to rectify the error and keep traffic moving on the line. And, you can see the areas where the markers for annulled trains and for the storage of markers will be located. The markers are large enough that a four-digit train number can be written on it using a grease pencil. We have built a model of an ex-British Columbia freight motor numbered 1706, as it was on the actual British Columbia Electric. We need room for the "X" the "1706" and either a "E" or "W" depending on the train's direction of travel. All this will be needed when the freight motor powers an extra train. If the Mountain Electric carshop crew were not the lazy buggers they are, this car could have been painted and renumbered into the Mountain Electric 400 series with other freight motors and the markers could have been a little smaller. But, come to think of it, we also have leased Illinois Traction System motors with four-digit numbers as well. One thing to note is that the vertical scale of the track diagram is such that markers can be placed on the main and on sidings, one above the other, as required to show their position for a pass or meet. And some regular trains have their train symbols permanently written on the markers. They are written right side up and upside down so the marker direction may be turned as needed to show train direction and still be easy to read.

For more modern railroading, the train control panel concept can form the basis of a neat manual CTC system. With signals at passing and meeting points, signal control switches can be included on the train control panel. The dispatcher can then set signals to control the flow of all trains. This really reduces the need for a communications system. There are no special rules for extra trains, etc., and all your layout trains just obey the signals as is the case with CTC systems. One problem is that the dispatcher needs to know when trains pass certain locations. This may require some detectors along the track and indicator lights on the panel. A second issue is that unless turnout controls are also included on the train control panel, train crews will need to throw them as they go. Some early CTC systems used this same approach to avoid the need to remotely control all the turnouts. Most modern CTC systems do have dispatcher-controlled turnouts though.

Having an older manual train control system is best implemented if there is some sort of a communications system between dispatcher and trackside. This avoids the need to shout across the room. A simple phone loop will suffice.

The role of dispatcher can be seen as a hard job by some layout crew members, and they may be reluctant to take it on. It can require a little more knowledge and experience than just operating a train if the layout is complex. Assigning a crew member to the dispatcher job for his/her first time justifies a limited activity session. Just annul some trains and slow/eliminate any clock to introduce new/reluctant crew member to the dispatcher role. You can do this on a small crew night/day. Having an experienced helper for the "trainee" dispatcher is good idea.

Plan ahead to have appropriate car types and numbers, room for switching and spotting, and to accommodate siding lengths.

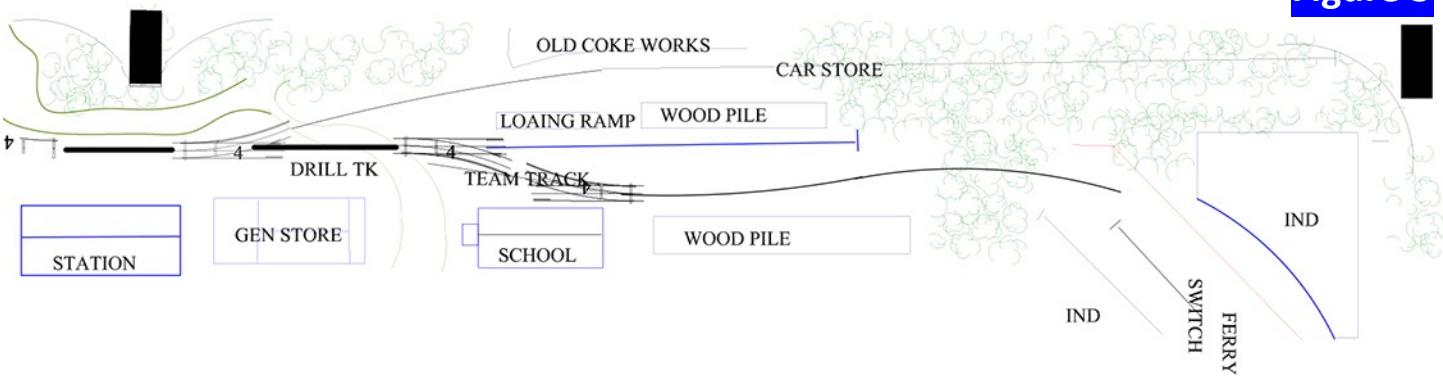
Your operational design needs to take into account the available car types and numbers. You can't have much of a coal drag if your car fleet is all intermodal cars.

You can't operate a layout effectively if it has every foot of track occupied by standing cars. Put excess cars in storage/staging, or move them off the layout during operating sessions. Have empty tracks for making up trains in yards. Remember a yard is a place to switch and classify cars and make up trains; not a place to store cars. On the prototype, car storage was done on disused country sidings and other places where they were not in

the way of railroad operations. On the Mountain Electric we will have such a storage track at a now disused coke works at a place named, funny enough, Old Coke Works. See Figure 5. The most efficient yard is an empty yard, as that means the yardmaster has moved the cars out in trains as fast as they have arrived. Usually, any cars stored in a yard were there only in anticipation of very near-term use. Yardmasters talked to traffic department personnel and, if they saw a need for a certain type car in the near future, they made arrangements to obtain them and parked them in a yard so they would be ready for eminent use. Cars not needed in the very near term were sent to long term storage. Coal cars during the summer and grain cars outside grain harvest time are examples of cars often going into long term storage.

CAR STORAGE AT OLD COKEWORKS

Figure 5



And, there should not be a car parked at every industry on your layout. At any point in time, many industries, probably most, had no cars present. Granted, a few, mostly large industries, seem to always have cars: some just delivered, some being unloaded or loaded, or some awaiting pick up by the servicing railroad. Few industries get a car every day. Some receive a car once a week, some once a month, or, if a seasonal industry such as a food canning plant, it might only get cars for two months of the year and none the rest of the time. Once a car was spotted, several days were needed to unload it. When unloaded, the railroad would be advised the car was ready for pick-up. It may take a day or longer for the railroad to call and pull the car. Copying this sort of pattern does much to add realism to operations. It also will provide empty places at industries to avoid the need to remove a car every time you need to spot one there. Setting out and picking up cars are independent rather than interdependent events. A car arrives at an industry when a shipper sends that industry some goods, or when the industry requests an empty car for loading. A car is picked up, pulled from the industry, only when the industry is done with it – either it has been unloaded and ready for return to the railroad as empty, or it is loaded and ready to forward to the consignee. Occasionally, cars were actually held for longer periods of time when an industry found that paying the daily demurrage was a cheap way to warehouse their goods. And, quite regularly, a car would arrive for an industry, but could not be spotted there as the siding was occupied with cars either for that industry or, for some other reason, in the way. Sometimes a road or track was under repair or some other construction underway, and the siding was temporarily impassible by trains. Sometimes road trucks or trailers were parked at loading docks and blocking the siding. The siding might have been used by the railroad to spot a bad order car until it could be moved to a better place for repair. In any such cases, the car would then be shoved into a nearby "local" track to wait there for an opportunity to move it to the intended recipient. This is a rarely modeled concept, but a very prototypical one that provides considerable switching interest and increased volume. Don't make setouts and pickups mechanical and routine events or it could get boring.

Make sure train lengths can be accommodated by passing sidings. It would be OK to add a train too long for a passing siding as an "extra" challenge once the crew has experience. This will require a saw-by maneuver to get the too long train past the other train. Such a maneuver will take time and could put those trains behind

schedule which is what happened in real life. But this is a complication you do not need when starting your operating sessions.

Freight Forwarding systems (with waybills) add much realism to operations. Implement them only after your crew has some experience with train operations, as associated paperwork can divert attention from train running and can cause unneeded early frustration. Consider a two-man crew at first (an engineer/motorman and a conductor) when starting to use waybills. This will allow one crew member to run the train and the other to work the paper. Prepare crew members for freight forwarding. This would be a good topic for one or several of the none operational work/social sessions. Make sure crews know where industries are located, what cars go to which industries, how to read waybills, and how waybills are filed and used. Usually, waybill systems have racks or pockets to hold waybills, and their use need to be understood by all before starting. For example, will there be a "priority" pocket for urgent movements? Using the initial two-man crew would be a great training approach to begin freight forwarding. It will also give you and the crew time to fine tune the system for long term use.

Many see the paper associated with freight forwarding as an annoyance rather than fun. And, fun it what it is supposed to be all about here. Real railroads were very paper intensive. Much paper had to do with freight charges and billing which, of course, is no concern on a layout. But much other paper was needed to keep track of freight cars as well. Railroads were not always successful in keeping track of their cars even with all the paper. Once when young, I was weary of a job I currently had in the Air Force working as an engineer in methods and procedures. I applied for a trainee trainmaster position with the Southern Pacific Railroad. Working for a railroad was always my childhood dream, and this was a flight of fancy in that direction, I guess. The SP sent me to the Division Point at Lafayette, Louisiana for a week of evaluation. While there, and shadowing the Assistant Super, one task we had was to sort out a box car of drums that had gone missing and was found as the 2nd car in a 150-car long string of stored, supposed empty, boxes on a siding, in a swamp, and in the middle of nowhere. Rather than shift all those cars, with their stiff bearings, and probably rusted to the rails, which, when moved, would likely result in an untold number of derailments, and several fights with local rattlesnakes, to get the errant car out, he just had Southern Pacific Motor Transport, the line's motor truck subsidiary, come and unload the car into some trucks and deliver the goods. So much for all that paper helping steer that load! Well, the economy was tanking at the time, and the SP decided to not start any new operations managers that year. They offered me a job as methods engineer at the San Francisco HQ instead. All I could see ahead with that offer was much the same as I already had with just a switch from the smell of kerosene to that of heavy oil, so offer was declined. My chance to play with real railroad paper passed me by. I now need our freight forwarding system on the Mountain Electric to act out my childhood fantasy. We had a nice freight forwarding system operating on our last narrow-gauge layout, and you can see waybills stashed in Photo 2. We learned a lot from this first system, and have many ideas to streamline the paper and make the system more effective and interesting on this new layout. Block movements of car, cars all from one shipper and


Photo 2

destined to the same consignee, is an example of where substantial streamlining can apply. On thing we noted last time is that you can end up with a fist full of waybills that makes for more work than is necessary or wanted.

Adding special trains for variety/challenges as the crew gains experience will enhance and diversify operations. Winter weather means snow removal trains, extra power to shove through drifts, and reduced train length; special trains such as excursions, political campaigns, shopper's specials/holidays requiring extra coach(es), football games, fraternal order and union picnic specials, stock rush extras; etc.; work trains, track outages for repairs; are all ways to add variety to operating sessions once the crew has the experience to deal with these extras. Don't let operations sessions get routine and boring. Keep experienced crews busy and challenged. Be careful a new operator does not get overwhelmed though when trying to challenge others.

Operations is an exciting extension to just building and running your layout. It will work well for you, and your train friends, if you prepare and follow some basis common sense guidelines.

If you live the South anytime between 1918 and the late 1970's you may have seen these signs. Harrison Mayes started placing these signs around the Appalachia area back in 1918 all the way into the 1980's. Since I model part of that area in 1947, I thought this would be something unique and a bit of real history. Sign is double sided with two sayings just like the real ones.

Many more 3D items for freight cars, locomotives, signals and a few surprises on our Website.
https://modelrailroadresource.com