Welcome To The Wyoming Division Historical Society
Modeling the Union Pacific from Cheyenne, Wyoming to Ogden, Utah.

Lightweight Operations
**An evolutionary Approach to Heavyweight or Complex Ops**
By Verryl Fosnight
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By "heavyweight operations" is meant an operating method used on a model railroad to run trains in a very prototypical way. This requires a level of complexity in rules, paperwork, extra operators who do not actually run trains, and perhaps computer utilization that is impractical, or undesirable for a lot of layout owners—and perhaps for their operator guests. For a lot of us, especially for beginning operators, a textbook full of rules and procedures is so daunting as to deter us from even attempting to jump into "ops." Even if such intimidated potential operators may see the point to operating, they may shy away even from simple operations, because they do not know they exist. These can be called simple or "lightweight operations," and they can have a high degree of realism. That is, lightweight ops can be prototypical.

For model building and for operations there is room in model railroading for a range of from "just good enough" (to quote Tony Koester, I think) to "rivet counting," and neither extreme should be discouraged or opposed. After all, "It's your railroad…."

Joe Fugate, the publisher of this magazine, arrived at the following results in a survey of

How do you prefer to run trains?

Simple but realistic ops with no paperwork (Mother-may-I …)	50.05%
Roundy-roundly or just running trains to railfan is fine	18.55%
Timetable and train order with a dispatcher	8.48%
Track warrants, radios, and a dispatcher	7.82%
CTC system with signals and a dispatcher	6.32%
No answer	8.79%
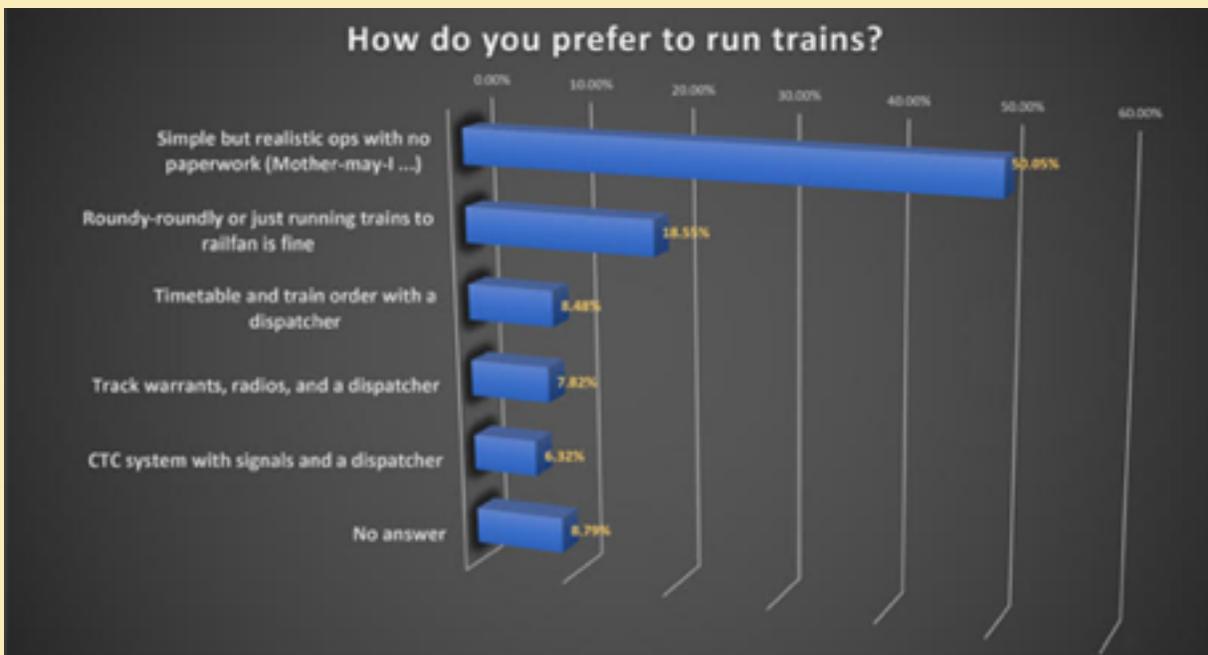
modelers about just how involved they want to get in the operations part of the hobby. A striking 50.05% of respondents showed preference for simple or "lightweight" operations. Only 22.6% showed a preference to "heavyweight" ops: TT&TO plus track warrants/radios plus CTC with signals combined. All three of these include a dispatcher and perhaps one or more tower operators to pass orders on to engineers. And 18.55% reported they were satisfied with the simplest sort of train movement on their railroads, so called round and round running. There is nothing wrong with such railfan running, but it does ignore one big prototypical aspect of modeling. That is the entire purpose of a railroad, to transport passengers and freight. Real railroads do this as a business to make a profit. Modelers who operate in a prototypical manner always include a car forwarding system to have this extra enjoyment instead of profit as a goal.

Joe commented also that the standard books on "formal" operations (my term) are aimed toward the heavyweight operators, and this raises the question of how do you progress from being a beginner operator to be a heavyweight operator, if you are too intimidated to get started? It seems that 50% of the respondents have few if any printed resources to refer to in a quest for either simple but realistic operations ops.

In this article I will demonstrate simplified approaches to heavyweight operations that I use on my layout that result in operation elements that are easier to set up and learn than those of heavyweight ops. These demonstrated methods are not the only way to operate lightweight, but they are an example on how to proceed. The goal of these examples is to maintain prototypical operation essentials, but with simplified methods. The rigid prototype rules used on real roads for safety are relaxed as is the paperwork. In fact, the goal is to minimize paperwork, even to the point of there being no requirements of operator produced paperwork during the session, so that even new-to-ops modelers are comfortable right from the start of their first session. The rules should be simple and easy to learn and apply. I will describe operations on my layout, the Wyoming Division of the Union Pacific in 1957. My layout is in a very small town in sparsely populated Arizona where I have few modelers and even fewer operators to draw from, and the Wyoming Division is so large that as many as 50 operators can run it. Therefore, I must keep ops simple to make them attractive to a crew of largely new to ops modelers.

Experienced operators may scoff at such lightweight operations that by design do not tax an operator's skills and concentration, because they do not require rigid and detailed procedures like used on real railroads. In lightweight ops such details as timetables, train orders, waybills, and the like are simulated by minimal substitutes or are even imagined or implied by the operators. And after all, the whole miniature layout is "real" only in the imagination; lightweight ops only push the boundary between real and imagination closer to the latter.

I am somewhat of a beginning operator myself. Complicated operations, "heavyweight" ops, do not appeal to me. I prefer to relax and not work hard at playing with trains, because I only operate about once or twice a month. And I tend to forget complicated procedures with such a sporadic session schedule, and it is not worth it to me to study and learn such details just to have them available to my memory two or four weeks from now.

I do, however, have the following experience:

- The Wyoming Division is a very large (3,750 sq foot layout with about 5,300 feet of HO track, and a double track main of over 1,000 feet that I built specifically for operations.

- It is my first layout.

- I host monthly operating sessions on it that draw 22 to 32 operators each month.

- I have hosted 5 "Wyoming Division Invitational Meets," which are 3 day meets
on Thursday my wife and I host an open house and clinic on my car forwarding system followed by a BBQ at our home

  - an op session is all day on Friday,

  - a second op session is all day on Saturday followed by a prime rib banquet in a local fine restaurant.

  - The first five of these Invitationals have been very successful; the sixth is upcoming, probably in February 2020.

  - Wives are encouraged to attend. My wife entertains them with activities around our resort town of Sedona; some

  - operate with the fellows.

- These invited operators are all very experienced and have seemed to be very satisfied with my "lightweight" operating scheme.

- For my monthly op session, I have an enthusiastic cadre of operators, but I keep the operations simple, since most of them are like me, not terribly experienced.

- The key operation goal for me is to keep my sessions simple (lightweight) because
  - I am not adept at heavyweight ops

  - I fear heavyweight ops, because I might look dumb (male ego)

  - I live in a sparsely populated part of sparsely populated Arizona, and "heavyweight" operators are scarce

  - My layout ideally needs 35 to 40 operators to fill all the jobs. With fewer operators, some jobs go unfilled, which is of no consequence.

  - Few of these operators are local; most drive 1 to 3 hours to get to the layout.

  - So, I have boxed myself into lightweight ops, at least until my regular operators and I learn more, but at this point there have been only two requests to make my operations more complex:

- About two years ago the operator who I have crowned the Passenger Superintendent started with my permission to run the four City trains (Cities of San Francisco, LA, Portland, and St. Louis) plus one or two mail and express trains by a timetable.

- We have recently started to use a limited number of FRS radios to enable the dispatcher to call selected operators on the layout floor to issue verbal train orders. We have always had a phone system which worked well to make On Sheet (OS) calls up to the dispatcher, but no one on the layout floor would answer a ringing phone from the dispatcher! This reduced the dispatcher to a Train Sheet clerk who only could record OS calls, and not actually dispatch by issuing train orders (TOs). Consequently, we usually operated without a dispatcher. However, about one half the time no one wants to dispatch, so we operate without a dispatcher who is not necessary.

Figure 1. This is 2 of the 9 upper level benches of the Wyoming Division, showing Dale Junction and the Dale Fill to the left and the Hermosa Tunnels to the right. Connected to the left bench at the far end is the Cheyenne bench, and at the far end of the right bench is Laramie. The east slope of Sherman Hill is on the left bench, the west slope is on the right one. The Sherman Hill summit is at the white station near the top center of the photo. The 9 lower level benches are concentric with these upper benches, and there are some "hidden" tracks on a third level to Park City, Utah and to Portland Oregon the OSL). This view is taken from just inside the west wall of the steel building. The ribbed east wall is 75 feet away. The building width is 50 feet.

will describe my operating scheme in detail as an example of lightweight ops. Those details can be adapted to many layouts. Your ops do not have to be complicated! I do not recommend that you adopt all the facets of my operations; pick and choose what fits your railroad, and your comfort level, or develop your own. Your strategy should be to become somewhat familiar with the way real railroads operate, or operated in your era, and then simulate those operations. For lightweight ops, those simulations may be drastic, even flights of imagination, but the whole layout is just that anyway.

I am sure the editor of MRH would like to hear from others who operate their layouts with lightweight ops. My method is not the only way to streamline ops. Use this as a guide on how to tailor your own lightweight ops.

The Parts of an Operating Scheme

Any operating scheme has three main components, train control, car forwarding, and a minor, but important, addition to your physical layout, fascia signs. I have made these as simple as I could while still maintaining the appearance and feel of prototypical ops. A fourth component is also needed—a crew, but like Field of Dreams, "If you build it, they will come."

From the above brief description of my layout, you may think that operations on it are complex, or heavyweight. We have a dispatcher with a phone network who keeps a Train Sheet, and we have added FRS radios to make select operators into temporary Tower Operators to take verbal Train Orders and pass them on to other operators. But I still claim my operations are on the simple side, largely because there is little paperwork and strict rules for operators to deal with. The rules I recommend are the same you would use for railfan running—those that protect the models and prevent derailments, plus the superiority of trains.

On my layout I do have a large variety of jobs, and some are complex, but this is because the layout is very large, so I can have a range of complexity in the jobs. Basically, I have four complex jobs (one staging yardmaster, two very skilled yardmasters, and a Trainmaster, who has to master the 66-switch Tortoise turnout machines on 13 panels, but other jobs vary from simple through freights to local freights that require a lot of switching at all spots along the route, including three unmanned yards. You probably have in mind a list of the jobs you would have on your layout.

Train Control

This is the first part of lightweight ops. Running trains depends on authority (authority to be on the main, move in a yard, etc.) Authority is granted by a dispatcher or signal by issuing clearance for a train to occupy track usually within or up to some physical limits or layout locations. But as owner you can simulate dispatching as you walk around to help and give advice, or you can delegate someone to do so. Your authority rules can be as simple as "don't let trains crash into each other," or "there is a hierarchy of superiority of trains, that is, 'superior' trains go first." This assumes you do not use a timetable.

For operations one must have trains, and a train is at least a loco and a tender for steam.
My railroad and era are the Union Pacific in 1957, so a train nearly always has a caboose except in yards.

The train crew is usually one person who is engineer (with a DCC throttle), and doubles as the brakeman to throw turnouts, and triples as the conductor to handle car forwarding. Car forwarding will be covered in the next section. Occasionally to help an inexperienced new operator start, a second more experienced operator will work with him, and together they fill these three jobs by operating together. I do not oppose this, although soon even a new man (or child) can do all these jobs alone. I prefer running more trains by use of single person crews, because doubling up necessitates fewer jobs.

UP in 1957 on its Wyoming Division operated by the rule book Rule 251D which is used with double track. That rule allows a train to operate per signal indication only with the direction of traffic fixed for that track. That is the whole rule! But I have only had automatic block signals (ABS) for the last two years; before that we ignored the signal requirement for nearly four years, and just watched ahead for trains that might obstruct the track your train was on, so that is a simplification of ops that can be made. I do have some single-track portions, a 60 foot section with a siding— the Harriman Cutoff up Sherman Hill, and the 186 foot long Oregon Short Line (OSL) with two sidings, and a 30 foot long Park City Branch which has no siding, but it has a 3-track yard and manual turntable at the end. But what follows accommodates all these track configurations.

The common types of authority used by prototype railroads to govern train movements are interlocking signals, Centralized Traffic Control (CTC), Rule 251, Track Warrant Control (TWC), Direct Traffic Control (DTC), Form D Control, and Yard Limits. A few roads still have timetable and train order (TT&TO) rules. If you look these up, you will see it gets

as complicated as you want, but the goal of this article is to first recognize prototype methods, and then to simulate them with simple procedures on the model layout. Commonly used systems for model railroads are:

- Centralized Traffic Control (a CTC machine manned by a dispatcher).

- Track Warrant Control (TWC) where a dispatcher gives verbal (maybe by radio) or written orders, perhaps by transfer from a Tower Operator to the conductor, and the physical boundaries of the authority (from here to there) are set with each order. A form for a written track warrant is shown below.

- Direct Traffic Control (DTC) is like TWC, but the railroad has permanent and pre-defined "blocks" in which train orders issued by the dispatcher apply. A train order can continue to give authority for one or multiple contiguous blocks.

- TT&TO is rarely used today on real roads. It is probably the heaviest of heavyweight ops for modelers, requiring a lot of study, memory, and paperwork.

- Yard Limits authorize a train to move at a safe speed within them. A yardmaster may direct movements in his yard, but the dispatcher still grants authority to be on the main in the yard (and to occupy the track beyond the yard when the train leaves the yard). But for simplicity the YM can grant such authority. In the absence of a YM, the train operator can assume this responsibility.

- On my layout I have the luxury of having a switch engine at all yards. The YM uses it, but if that yard has no permanent YM, the engineer can use it, leaving his road engine and train either on a siding, it one is available, or on the main if necessary.

- Protecting workers and stopped trains on the main is often necessary, and not necessarily just due to track maintenance. Because our model layouts have limited yard tracks, and because siding tracks are often not possible because of narrow benches, we often must pull and spot cars while our train is left on the main. If you have a dispatcher, that working crew should ask for track and time authority to work on the main. If you have no dispatcher, you do your work as if you asked for authority to protect you.

Track Warrant

No._____To:_____At:_____

1. Track Warrant No._____is void.

2. Proceed from _____to_____on_____track.

3. Work between_____and_____on _____track.

4. Hold main tack at last named point_____

5. Clear main track at last named point_____

6. Do not exceed_____MPH between_____and_____.

7. Protection as required by Rule 99 not required.

8. Track Bulletins in effect_____,_____,_____,_____,_____,_____,_____,

9. Other specific instructions_____

OK_____M Dispatcher

Relayed to_____Copied by_____

Limit reported clear at _____By_____

Figure 2. Sample Track Warrant—shown solely as a document to simulate

There are variations of the above authority systems by other names, and for heavyweight operations they require their own paperwork.

As a practical matter a lightweight operation may get by with:

• No CTC machine, and hence no dispatcher manning it.

• TWC seems to mandate written orders as can be seen in the example of a form above, so use of a track warrantsystem requires a simple (paperless) work around.

• DTC is the same as TWC, but with fixed authority sections of track versus flexible boundaries set by a dispatcher. For a paperless system and for simplicity DTC is recommended.

• Yard limit authority is easily worked out verbally between the engineer and the YM of each yard; no paperwork is required. (When we installed our ABS I made the signals entering each yard with a permanent YM set to a normally RED. An entering train must stop and ask permission of the YM to enter. When the YM is ready and has set the route through his yard, he presses a button to change the signal to YELLOW OVER RED, and the train enters. Thirty seconds later the signal turns back to RED. These "mother may I" signals force the train to obtain YM authority, but with no paperwork.

• Protecting workers or stopped trains may be handled by the stopped and working train's crew verbally communicating and agreeing with oncoming train crews who should yield, and ideally train superiority should influence the action. Again, no paperwork is required, although heavyweight ops would require a Form Whatever.

I have operated on layouts that have a "Tower Operator" writing such track warrants or other documents. That guy, and the dispatcher who ordered him to write and deliver the track warrant, and the owner seemed to be really having fun. The rest of us, who stood around waiting for these folks for seemingly long periods, were less enthralled. I think it had something to do with the 800 miles I traveled to get there and the expense of the accommodations while away from home.

There is a distinction between "authority" and "protection" for trains. Authority may be granted as noted above. Protection is safe operation obtained by train detection (knowing where the train is) and movement authority (telling the train how far it can safely go). This can be verbal or written or signals. The exact procedure depends on rules and communications between the engineer and dispatcher or other authority (another operator or layout owner). If the layout has signals, their purpose is to provide protection. But any type of protection for a model train can be simulated by verbal communications between operators, and a dispatcher or signals are not absolutely needed.

Granting that it would be very prototypical to use written warrants for authority, I do not have them on my DTC layout. Instead I issue a single 8 ½ x 11 sheet "Train Order" (TO) with each train that lists the locations the train is to travel to and through, and my TO also has simple directions that are common for all engineer/conductors on my layout. It is the Excel form below in Figure 3. It looks complicated, but it really is not. Each necessary Track Warrant is simulated by each line, and they are all on one preprinted sheet.

Operating a Train on the Wyoming Division

When an operator, an engineer/brakeman/conductor, first takes charge of a train, he calls the dispatcher to get authority to leave the yard and go on the main leaving the yard on his way toward the first location, but only IF THE LAYOUT HAS A DISPATCHER. The Dispatcher then starts a column on his Train Sheet for that train. If we have no dispatcher, which often happens, the trip is even simpler. He assumes his Train Order gives him authority to go on the main beyond the yard, and he leaves looking first to see if the tracks ahead are clear (or obeying the signals, since we have ABS signals). You could call it self-dispatching; he simply watches out for other trains and works out conflicts with the operator of the other train.

If there are signals (ABS on my layout), he minds them. If there are no signals, he watches the tracks ahead to make sure he does not collide with any other train. He also should watch the turnouts to avoid derailments as he approaches them, and he should also watch his caboose to make sure it comes along with the rest of the train. After he passes he should also return a turnout to the "normal" position if it has one, so other trains do not derail. But really, he does not need any of the suggestions in this paragraph. He would do them if merely running around the Christmas tree.

#	Stops	Road Crew Instructions for Each Location (Verbal listing of Array of 8 Columns to Right)	Direction	Engine No.	Coal/Fuel	Water/Sand	Pick Ups	Set Outs	Get Helper	Release Helper	Engine Change
	Locomotive Number: 4001	**NP-Portland Manifest West**									
	Train Order (p 1 of 1) Engineer:	Conducter:									
Start	East Staging Yard	Get train and clipboard with all cards from staging									
1	Cheyenne A/D (Depot)	Hostler gets Loco and gives new Loco & Card to Road Crew	R				✓	✓	Yes		
2	Tower A	Tower A Operator (TM) will help to Leave Yard									
3	Harriman Siding	Take only when directed by DS and Tower A Operator TM	R		Available						
4	Dale Junction	Change to left hand track per yellow switch panel in aisle	R->L								
5	Laramie	Change R->L track inside E Limit as enter yard	L->R		Available						
		Work at Ice Dock or Stock Yard as needed	R				✓	✓		Yes	Yes
6	Medicine Bow	No YM/Do your own work and Stock Yard as needed	R		Available		✓	✓			
7	Hanna	No YM/Do your own work and Stock Yard as needed	R		Available		✓	✓			
8	Rawlins-Sinclair	No YM/Do your own work and Stock Yard as needed	R		Available		✓	✓			
9	Wamsutter	No YM/Do own work FH & Stock Yard/Take siding per DS	R				✓	✓			
10	Table Rock	Leave Siding as directed by DS	R								
11	Rock springs	Continue to Green River to make pick ups and set outs	R		Available		✓	✓			
12	Green River	Pick up and leave cars for RS, GR, Westvaco in GR	R				✓	✓		Yes	
13	Westvaco	All Pickups and setouts done by Green River YM	R				✓	✓			
14	Granger	PORTLAND TRAINS TURN OFF ON OSL JUST PAST WESVACO	R		Available						
15	Evanston	No YM/Do your own work and Stock Yard as needed	R->L				✓	✓			
16	Curvo Overpass	Change L->R track	L		Available						
17	Echo	No YM/Do your own work per Cards	L->R				✓	✓			
18	Ogden E Yard Limit	Change R->L track at E Yard Limit	R				✓	✓			
		Deliver train to Ogden YM for him to take to staging	R								
19	West Staging Yard	OgdenA/D->Staging by Ogden YM & Staging YM					Clock Out:				

Key: Coal/Fuel/Water/Sand Available = Stop only if required to do so by Locomotive Card. not available, you should continue without stopping

Pick Ups ✓ = Check Fascia Boxes at location for cars you can pick up (going your way) and take them with you when you leave

Set Outs ✓ = Check your own Car Cards for cars to be left here, but move off spot cars on to spots first. Set out number written in.

YM or None? In yards with YM do work with him. With no YM do your own Car and Block Card work with switcher at that yard

Get Helper Yes = Do get helper from YM, Hostler, or Helper Engineer, receive instructions on how to run with him pushing, then leave--you do OS

Release Helper Yes = Stop per YM instructions to allow helper to leave your train

Engine Change Yes = Stop to change locomotive(s) per YM and/or hostler instructions

Phones In case of a problem or question, call Dispatcher. ALWAYS answer any phone to take orders for you or others.

SEE ABOVE EXPLANATIONS TO ENTRIES IN ARRAY BELOW

Staging Yardmaster: When this train arrives at your yard, you may use any cars from it for any other train.

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Figure 3. My Train Order on an 8 ½ x 11 Excel sheet. Each line of the TO simulates a written Track Warrant

Single Track Operations

The Wyoming Division is almost all double tracked. Single track bi-directional layouts need some way for trains to use the one track in both directions. A dispatcher with some way of communicating with the engineer is called for. The communication could be a CTC panel, phones, radios, or even walk-and-shout. But the dispatcher does not have to be a dedicated job in a remote location. It can be as simple as the owner walking around and watching for potential fouled sections of track. If the owner starts each engineer on his run, he will know to space trains according to the trains already on the main, so he becomes in effect a walking dispatcher. At a minimum, each engineer may need to watch the track ahead and be ready to take a siding or stay in a yard to yield to another train if required by the superiority of his and the other train. Or the other inferior train may be requested to yield. Again, that is self-dispatching. A few sessions with such ersatz dispatching may move the layout owner to initiate having a permanent dispatcher and an inexpensive set of Wal-Mart radios. Written track warrants may not be necessary right away, or ever.

You as owner can always increase the complexity of your ops as desired. You probably will set up some trains in advance of the session. Some complete trains with locos may be started on the layout to make all areas busy right from the session start. Others should be in staging or a yard at one end of the layout, ready to go at the very beginning, so your crew (your guests) do not have to wait for them to be assembled. These pre-assembled trains may be with or without engines. If you have a YM at the jumping off point, if might be a good job to have him hostle an appropriate loco. On my Cheyenne to Ogden UP layout we try to use Big Boys and Turbines up Sherman Hill both westward out of Cheyenne to Laramie, and eastward out of Ogden up the Wasatch Mountains. Then in Laramie and in Green River the heavy power is replaced with F-3 or GP-9 consists or Challengers or FEF's across the nearly level "bowl" of central Wyoming. The Big Boys and Turbines also take the point down the two slopes at the east and west ends of Wyoming; they must get back downhill some way. If needed for a 30 car PFE train between the summits, the Big Boys and Turbines may be used for these. As you can see, you can make all sorts of "operating department" rules to add interest without adding paperwork. One of mine is Big Boys and Turbines should be used primarily for Sherman Hill and the Wasatch.

Your staging YM can make trains all during the session, if he is good enough to keep up with demand. You do not want to make your guests wait too long for a train. The Train Order shown in Figure 3 is one of several preprinted

ones I made in a computer Excel workbook. Each tab of that workbook stores two blanks (east and west) for the following train types I use in naming trains.

Superiority of Wyoming Division Trains

As an example, here are the train designations or types that encode the superiority of each train into the train name used on the Wyoming Division. They are from highest superiority to the lowest

"Passenger"

"Special" as in "PFE Special"

"Forwarder" same superiority as a Special, but a through freight with more of a mix of cars, e.g., box, tank, gons, etc.

"Manifest" a through freight that has 5 or 6 head end cars to be switched in route. Thus, they often need to yield to most other trains if they are stopped to do their setouts and pickups.

"Local" a local freight that runs daily out and back to do pickups and setouts along a set route (Cheyenne to Green River and back—also Ogden to Green River and back)

"Drag" or "Extra" as in a coal drag, also a low priority and unplanned freight formed to clear congestion in a place with excess cars on spots. All three designations are equivalent in superiority, that is, at the bottom of the list.

Train Names on the Wyoming Division

Given the above list of superiority designations my train names have a root of "from-to-type-direction" as "LA to Denver Manifest East." Adding the Loco number completely names the train as in

"4001 North Platte to Portland Manifest West"

On my dispatcher's Train Sheet (TS) the trains are listed by locomotive number, which of course is unique for each loco. If the loco is changed on a train, the train number changes, so the engineer should replace the old number with the new number on the Figure 3 Train Order. This is the only place a pencil is needed by an engineer/brakeman/conductor. Concurrently, if you choose to have trains OS to a dispatcher, the change in locomotive number should be noted on the Dispatcher's Train Sheet. Again, you can get by without a dispatcher or his TS. I often do, if no one volunteers for the job.

With such a naming system each train has a sort of official name, but not the famous named trains of the past like the "Empire Builder." If some of these are important to your modeling, you can use them, but all must remember its rank in the superiority chain. I do use the 4 named "City" trains of Cities of LA, San Francisco, St. Louis, and Portland plus the Challenger for those famous passenger trains. But for freights, the "coded" names are easy on the memory, and they serve the same "marketing department" purpose as the real famous train names, with the additional advantage of real meanings that are helpful to you and your operators. Again, remember that you and your operators only work on the railroad a small fraction of the hours real railroaders work. There is at least a week and probably one month or more between sessions—plenty of time to forget details of your operating system.

I keep it simple—for me and for my more casual operators. But when you call the dispatcher and say, "Dispatch, this is 4001 North Platte to Portland Manifest West leaving Laramie," it sounds cool. Incidentally, you do not have to remember that name to call in an OS report; you can read it off the top of the Train Order sheet on your clipboard (see Figure 3). Better yet, you do not have to remember a bunch of train special names some railroad marketing whizz thought up.

One last note. Why did you bring that pencil to the session?

Simplify

Notice how each prototype feature of operations may be omitted, usually with a simulation of that feature. In the above discussion, neither OS'ing or a dispatcher is strictly required, but some sort of accounting of train location and control should be simulated. The goal of operations should be to be enjoyable and only as complicated as you, the owner, is comfortable and satisfied with. And that level of comfort may always grow, for you and for your crews, as each of you gain experience.

I do not bother with a timetable. The passenger timetable on the Wyoming Division is made by Bob Ellis, a genuine aficionado of passenger trains. I never have looked at it. I am sure my YMs are familiar with it; they must stay aware of when a passenger train arrives, so they can usher it through their yards to help it stay on time. When I am working a yard, it is enough for me if the passenger train operator notifies me 3 minutes or so before wanting yard entry clearance from me. He can do this by FRS radio or in their absence verbally. My mother-may-I ABS signals at yard limits facilitate this.

I justify not having a freight timetable because my understanding of UP was they pretty much ran as many trains as necessary to keep the very heavy transcontinental traffic flowing across Wyoming and over the bottlenecks of Sherman Hill and the Wasatch. Named trains were used as a marketing tool by the marketing department, but the operations department just ran trains and lots of them. I believe the next train close to the time of a named train on the timetable was given that timetable name. The many others were run as extras.

I do have one job where the operator runs extras always. We did not put a yard in Rock Springs, Wyoming. The real Rock Springs has a yard, but we used the space for numerous industries, to increase the amount of switching on the layout. With no yard, all Rock Springs traffic arrives and departs via Green River about 18 miles west. The Rock Springs job ferries all the cars between Green River and Rock Springs, and those trains are Extras. It is a road switching job, because that operator leaves the west Rock Springs yard limits and enters Green River at its yard limits about 8 feet away. This road switcher's main job is switching all 20 industries of Rock Springs. It is an approximately 100-foot-long switching puzzle with occasional trips to Green River.
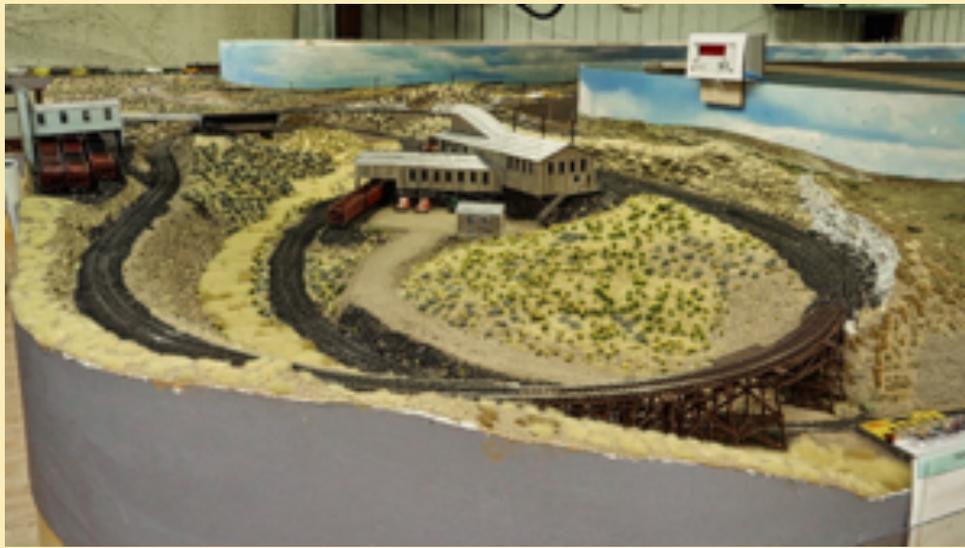
One of the two coal mine regions of the Wyoming Division. This is 3 of the 2 dozen mines around Hanna, Wyoming. The 4 track Hanna coal marshalling yard is to the lower right. This operator first is the coal agent who counts all the empty hoppers in his area. Then he makes up a train of loads to replace them, then becomes a crew to deliver them. Rock Springs on the lower level is the other coal drag job.

The Clipboard

Operators running trains on my layout carry an 8 ½ x 11 clipboard ($13.95 for 10 on Amazon) with the following cards or sheets:

- Train Order sheet of Figure 3 (or a similar one for other types of trains for either east or west directions). Recommended for your simple general instructions.

- Car Cards (I make my own simplified single move cards)

  - I do not use or recommend waybills for many reasons (not prototypical for anywhere except in the caboose, cumbersome, repetitive 1-2-3-4 moves, repetitive routing may need to be "re-balanced" for E-W traffic)

  - Single trick car cards are good for 15 individual moves; use for a bookmark when filled

  - Each line is a move. It is: From → To, loaded, or empty, or LCL

  - This promotes random moves like real cars do. Each move is made up by me unplanned when I come to it during setup for the session. This is equivalent to "turning" car cards, except it randomizes the car routes

  - Printed from an Excel file

  - Large, easy to handle, 4 to an 8 ½ x 11 sheet of cardstock

  - Since they are disposable, just make a new card when your inexperienced operators separate the car and its card. Little need to start a search.

  - Recommended—you need some form of car forwarding

General Procedure for Developing Simple Operations

This is the way to avoid paperwork or rules that you want to avoid. First, read in the "heavyweight" books and articles on how real railroads or your prototype road operates. Plan on simulating them by a simple work around, like my "Track Warrant authority-from-each-line-on-my-Train-Order" in Figure 3 simulates a track warrant as in Figure 2. Almost certainly you will write a short destination/instruction slip for each train you plan on running. This may be as detailed (and hard) as a list of meets (or other challenges) and solutions written in the order that they will arise. In the extreme case you will want to make a timetable. Or it may be as simple as one rule, "This train is inferior to x, y, and etc. trains, and it must yield the right of way to them." Such a rule is general and easy to apply if superiority of each train is included in train names or otherwise designated. That rule may even be only expressed verbally without printing it in a timetable.

- Block Cards for blocks of cars

  - Each card is good for many individual moves; use for a bookmark when filled

  - Excel file, 2 to an 8 ½ x 11 sheet of cardstock. Contains spaces for:

    - First car: road, number, color, type—box, reefer, hopper, etc.

    - Last car: road, number, color, type—box, reefer, hopper, etc.

    - Number of cars in the block including first and last.

    - From → To locations

  - Optional, but they are very handy for multiple cars to the same destination, so they save time in setup
  - Caution: they are easy to overuse—even a short block of 3 cars may not fit on the destination industry's siding

  - But they are ideal for long, through trains across Wyoming (e.g. PFE Specials)—loaded trains or returning empties enter the layout from staging, go across it, and leave it into staging with no stops except for icing

  - If you have coal drags, block cards may be handier than individual car cards

  - OR! Do you really need car cards for a coal drag? Each car and its load are equivalent to any other (unless you deal in graded coal). On my three Coal Extras, the operator fills out a form to note empties along his route (he is then the Coal Agent), then he assembles his train (as YM at the mines), then he enters the main (after calling the Dispatcher), then he picks up the empties and replaces them with loaded hoppers at each location. Finally, he returns the empties to the mines (again as YM). For that run, those cars are captive cars; there is no need for car cards.

- Locomotive cards tell the tonnage rating in cars, required stops for fuel, sand, water, and ash dumping

  - Color encoded for loco type (Big Boys are on red paper, diesels on yellow, etc.)

  - Laminated (use them "forever")

  - Optional, but tells engineer where to stop for coal, sand, water, ashes

  - Optional, but governs tonnage limit (in cars) for each loco type

The Car and Block Cards are described in detail in an article in the "Articles" section of my Wyoming Division web site at http://wyomingdivision.org/articles_pg1.htm   Suffice it to say here, they are simple with one move per line and 15 lines per card. They move cars randomly, they accommodate LCL ops easily, and have many other advantages over 4 Cycle Car Cards. They do NOT include waybills; no trainman cares what is in the car unless it is haz-mat. If you do not bill your customers, you do not need waybills. And without waybills, you do not have to "balance" car cards/waybills. Balancing is equalizing east bound way bills with west bound ones, so traffic from spots stays "balanced" east compared to west, even if all the cars and cards are not moved in a session—in other words, there is no necessary starting or stopping place or session ending time to make the cards come out right.

Waybills add realism, but only marginally, if the layout industries are well named and have signs on them to indicate their business.

Do you "Turn" One Stop Per Line Car Cards?

No, each move is added on the next blank as a new destination. This eliminates the 1-2-3-4 repetition of 4 Cycle Car Cards. If you could watch cars forwarded by single move cards in motion from above the layout, they would look like ants on a large ant hill, apparently moving randomly, and sometimes rapidly, sometimes haltingly, but like a chaotic swarm, but nevertheless with a purpose, as we suppose ants have. I think this is how real railroad cars in motion would look from above.

For a Large Layout Maybe You Need a List of Spots to Move Cars To

My Wycon Chemical just outside of Cheyenne receives trona (soda) and ships fertilizer. It would be silly to deliver a stock car of steers to it. To make it easier to route cars to a logical business, I have a 3-ring binder with a spread sheet listing all the spots east to west on the Wyoming Division. The columns of the multi-page sheet are color coded for 9 types of cars, flat, trailer on flat car, gondola, hopper, covered hopper, stock, tank, box, and reefer. In the cell for a location are the number of cars per type that are appropriate for that spot. The cells are blacked out if a car is not appropriate there. For a small layout with just a few industries such a list may not be necessary, if you can remember all of them evenly. But the Wyoming Division has 52 industries with 906 spots, so it is easy to overlook some and overutilize others. And if one seems to be overused, looking at the list can restore car destination randomness. The link to the page with the car spot form on it is http://wyomingdivision.org/articles_pg3.htm

But even with 7 copies of this binder distributed to various yards, they are only used for reference. No writing is required. There are multiple copies available, because anyone can mark a new destination for any freight car at any time. If a YM gets tired of looking at a car in his freight house, and he thinks it (or they) have been there long enough, he can pull the car(s) and remark them for a new destination. This adds to the randomness of car movements (and a pencil is needed). After all, real cars move from spots when the customer requests it be picked up, not at the end of the day or session and not all at the same time.

Locomotive Cards

The locomotive cards are laminated 8 ½ x 11 sheets, and they are optional, especially for smaller layouts where train lengths are limited by layout size, rather than the actual loco tonnage rating. On the Wyoming Division, if we cannot find a loco card, we just run without it. Examples of my loco cards are at http://wyomingdivision.org/articles_pg2.htm

Fascia Signs

The first thing I tell a new-to-my-layout operator is, "Every instruction you need to operate is on your clipboard or on the fascia signs. Aren't you glad you did not stay up studying last night?"

I believe that next to good track, wiring, and running locos and cars, the most important element of a model railroad for operations is the fascia.

The fascia should be the location of signs for the operator to give him all the information he needs to navigate around the layout without a handful of maps and charts. This is especially true for new to the layout operators who are most often befuddled by a layout they have never seen before that models an area they are not intimately familiar with. I express all this very natural and understandable befuddlement by the phrase, "Where the heck is Wamsutter?" (It is between Rock Springs and Rawlins, WY. Aren't you glad you asked?)

I certainly cannot expect operators, especially ones new to the Wyoming Division, to know the geography of the layout or the prototype. On my fascia you can find:

• Compass Star signs (on Sun Yellow paper)

  • with north always up (across the bench away from you)

  • west to your left no matter which bench or level you are on

  • east to your right no matter which bench or level you are on

  • These are all like a regular map.

  • To the left of each compass star is a list of the next 3 or 4 locations west of that spot on the fascia, and to the right is a list of the next 3 or 4 locations east.

• OS (on Hot Pink paper)

  • These are very close to where an operator should report by phone to the dispatcher to give him his train number and current location. This is how the dispatcher knows where all the trains are. It is 1957 and station agents had this job, and they used phones or telegraph, so we also use phones.

  • The signs are in 3 parts

- The left side is a triangle and inside it is the notice to report to the Dispatcher here.
- The bottom right least used rectangular section tells what to say to report the first time and each subsequent time thereafter

- The upper right section tells how to report. Different signs have one of the following

- how to report at a depot

- how to report leaving the main on a junction, or

- how to report returning to the main from a junction, or

  how to report leaving or returning to the main for a siding

- Yard and town maps tell operators where to pick up cars and make setouts (on Sun Yellow paper)
  - Operators need the maps to find the spots for setouts per the card cards on their clipboards and for those pickups mandated by car cards they find in the fascia pockets (boxes).

- Yard Limit Signs (on white paper) where a train enters a yard or leaves one.

  - Within Yard Limits an operator must run slowly to be able to avoid accidents, and

  - he should follow the directions of the Yard Master (YM).

- Current of Running Signs (on Sun Yellow paper)

  - They show where trains must change tracks

  - Generally, the current of running is right-handed on the double track mains

  - But 3 places trains must take a crossover to the opposite track, and one place there is an overpass where the west bound track crosses over the east bound track.

  - Hence there are two lengths of double track that require trains to run on the left-hand track, left hand in either direction.

- Yard Instructions (on blue paper in sheet protectors or laminated) are in the "Spots" binder, and that binder is stuck to the bench front with Velcro.

  - One set for each yard, unique to that yard

  - detailed, if you need it, or

  - to be skimmed only the Bold type if you are familiar with yard ops in general

  - I doubt if anyone ever looks at them, but the unsegmented document for all yards is handy to send out to prospective operators

    The above are just examples of fascia signs. Those on your layout will vary.

    You do not need to memorize or carry any of these items around as you operate. The fascia signs plus the 4 sets of cards on your clipboard are all the information you need to operate on the Wyoming Division.

    An effort should be made to have all the fascia signs placed in a uniform location. For my two-level layout the upper level fascia signs are on the fascia just below the benches. All the lower level signs are on the fascia above the tracks, that is the part of the fascia that shields the lights from operator eyes. One time at my first session at a club layout I looked and looked for half the session for a small town. Finally, from across the room I saw the name posted above the layout on a hanging sign; all others were below bench and eye level.

Summary: Amount of Paperwork and Rules

I have advocated in this article keeping operations of a model railroad simple. That requires minimizing both rules and the writing of paper orders. But I have shown examples of a lot of paperwork in my advocacy, and I have referred to a lot of rules. This may seem inconsistent, but nearly all of the written paperwork is done by the owner in setting up the session or setting up the layout to have sessions. Only a minimum of composing of paperwork or study of rules is required by individual operators, and almost none during a session. The papers needed to host a session can be 99% done before the first session by the layout owner.

The rules are easily digestible, because they are written on each Train Order sheet (Figure 3) in 7 lines and are therefore readily available for every operator. All other rules on the Wyoming Division are posted on the fascia.

There is one other set of markers on the Wyoming Division. There are 60 Tortoise turnout machines in the Cheyenne steam yard. To navigate a train out of Cheyenne onto the main and up Sherman Hill was very difficult—until I put numbered turnout posts on the Cheyenne bench. That bench is 74 inches wide, and it is only practical to access it from one side, so it is difficult to choose which of the hard to reach 60 Tortoise switch machines are used to set a route out of or into Cheyenne. The numbered posts identify the turnouts with their like numbered electrical switch on the fascia. A large overhead map of the Cheyenne steam yard with each turnout labeled with its number connects the turnouts and its electrical switch.

This is all the written rules for the Wyoming Division. Considering an operator needs to only refer to them in locations they are posted, it makes the rules simple.

As to paperwork, it is limited for all operators except the Dispatcher to these four: Train Order, Loco Card, Car Cards, Block Cards. There is nothing to write on them, except maybe the loco number in the space near the top of the Train Order. Doing so makes a simple train name to give to the Dispatcher when OS'ing to him.

My point about paperwork for lightweight operations has been, while the paperwork may be extensive, it should be nearly all done in the setup of the session. Paperwork that is required to be filled out during the session can be kept to a near zero minimum. And the paperwork that exists has been prepared by the layout owner in preparation for operating sessions, makes it common to all operators. These factors make the required paperwork simple and understandable, and much less onerous.

A final point is to encourage you to start lightweight ops on your own railroad. We have had several young boys as regular operators (no girls yet, but I am scouting) who operate just as well—or better!—than adults. These boys are as young as 10! See the article about kids and ladies on my web site at   http://wyomingdivision.org/articles_kids_and_ladies.htm

If they can do it, so can you!