A Car Blocking Strategy for the Mountain Electric

By George Paxon

Editors note: All figures referenced are in the article, however, because of the many figures and the fact that the author refers to them through out the article, you may download a small PDF of just the figures to make it easier to follow along. Click here to view/download.

Things on the Mountain Electric are starting to look up now. The portion of the old layout we moved from its old home is slowly getting rehabilitated. New benchwork has been built, other new track is getting laid, and overhead wire is getting strung. The extension to Belle Vernon is up and running. The DCC system is re-commissioned. Tasks to finish off some of the above are still very much in work. But, at this point, our forward thinking is turning from just mundane construction tasks more and more to operations. Soon the Mountain Electric can get seriously rolling.

One issue recalled from many years of operating sessions on our last narrow-gauge layout was the problem encountered with car blocking. As most of you know, car blocking is the process employed by prototype railroads to shuffle cars into a logical order when making up trains. This is done so that when a train leaves a station or terminal it will be in such an order to make dropping cars along its journey faster and easier. Model railroads have the same problem. And our problem can even be worse due to our shorter distances, shorter running times, and the dreaded fast clock that makes time literally fly. We actually have less time for online switching than our prototype friends, I believe.

On our last layout, some of the more seasoned regular operators were quite good at making up trains in the proper order. This was mostly because, like prototype railroaders, they knew the railroad and knew how it needed to be switched. But, since we had our operating sessions every other week and sometimes only monthly, there was much forgetting. And a new fellow had no idea at all. The result was generally poor switching efficiency, delayed trains, and operational snarls sometimes beyond imagination. With little to no help, the blocking process had a very long, flat learning curve. And, it had a much steeper forgetting curve! Real railroads have train procedure manuals of a zillion pages which document, among many other things, exactly how each train should be blocked for efficient operation.

On prototype railroads, such blocking is mostly done in yards by switching crews who are usually told by the yardmaster exactly how to order the cars. A paper form, called the switch list, was often used to convey this information in the good ol' days. Computer printouts these days would eliminate the need for a yardmaster to work out the details and handwrite the form as was once done.

On smaller roads, backwoods type railroads that we particularly like, where track is little more than two streaks of rust in the dirt, the business is rarely sufficient to justify dedicated yard switching crews. Yardmaster, trainmaster, or maybe the General Manager might make up a switch list. Train crews report early and spend an hour switching cars to get their train in order. The crew can then depart for an efficient trip over the road. Arriving train crews may also do some switching to get cars in order for a following train. Sometimes train crews received no advanced help and were just handed a fist full of waybills and left to work out the switching needs, fill in their own switch list, and block their train.

Train crews also do some blocking on the road. This occurs because dropping off and picking up cars as they go along can somewhat scramble a previously well blocked train. This is particularly a problem when the train must deal with facing point, as well as, trailing point turnouts. When a reasonable town or siding is reached, and the schedule of other trains would permit, the train crew may take the time to re-block their train to save even more time later as they continue on their way.

A prototype yardmaster would not need to refer to the train procedures manual for info on blocking trains. He has been doing this task 8 or more hours a day, 5 or 6 days a week for usually many years. He knows his stuff. Train crews along the line are equally skilled. Train procedure manuals are really training manuals and could be studied by eager new operating personnel. But most new operating personnel just worked with experienced conductors, brakemen and yardmasters and learned their trade on-the-job by doing the work over and over. We suspect the biggest use of the blocking instructions in the manual is by some new management sort, with little practical experience, for criticizing someone suspected of doing it wrong or taking too much time.

We could write train procedure manuals for our model railroads, too. Some articles in model literature suggest doing that. But we don't think they would be of much use. Model railroad crews would not have time nor desire to refer to such procedures. And crews certainly would not take them home to study them. And even if they did, the material would be forgotten by the next operating session.

We certainly do not need more things to remember or things to look up when operating. Eliminating any sets of codes, look-up tables, lists, instructions, manuals or unnecessary paper is a desirable objective when setting up our operations. As it is, we have car cards, waybills and train orders that keep us busy; but these are essential for realistic operations. Although we are trying to emulate real railroad operations, we still are, after all, doing this to have fun: it should be less like work. A simple, understandable and minimal paper approach would be most helpful for our layouts to assist with blocking.

Looking For What Others Have Done

As usual, rather than plowing ground that already has been well worked, it is good to first search to see what others have done before us. Often their handiwork is sufficient to provide much information and help needed. Our model fraternity is good at sharing, helping each other, and building on what has gone on before. And since I'm lazy, I prefer to pinch someone else's idea rather than think up one on my own anyhow.

A serious search through the bowels of our filing system found quite a few articles published in the model press over the years explaining how the big boys do blocking. Some articles dealt with adapting the prototype procedures to layouts. Most of these would result in mountains of unwanted paper.

An interesting approach was put forward by Dan Holbrook in the July 1987 edition of *Model Railroader*. The article is titled "TIBS, The Train and Industry Blocking System" and starts on page 91. We have studied, pondered and tinkered with this article for some time to work out how applicable and practical it might be for our Mountain Electric layout. The approach assumes a waybill freight forwarding system is already employed on the layout. This is a valid assumption and applies to us. Finally, we concluded the basic ideas behind Dan's system could be made to work well for us. But we did have several issues with the approach as presented and made some adjustments.

Dan's blocking approach assigned each car to a particular train, specified the blocking order, as well as identified delivery customer, consignee, and location. And the approach resulted in several new sets of codes that needed to be used with paper look-up tables to operate the system as intended.

Assigning a car to a particular train is probably more suited to larger layouts and more modern railroading than is ours. Large prototype yards often had and have classification tracks designated for specific trains or traffic. Several tracks might be devoted to cars going to the same destination. Specific tracks might be the switching location for particular types of shipments. A track may be allotted to cars going to a particularly large customer. Drag freight traffic, such as coal, scrap iron, crude oil, empty cars, etc, might go in one track while priority freight, such as livestock, automobile parts, piggy-back or container cars, loaded reefers, etc, might go into another. Trains then would be made up from cuts of cars based on train capacity, scheduling needs and by class of traffic. When a train was being made up, cuts of cars could be moved from classification tracks to the departure tracks and further blocked into trains. This type car blocking favors, or even requires, large yards and longer trains.

Smaller railroads or smaller yards rarely had the luxury of designated tracks. Each track could be used for several destinations or for several classes of traffic at different times. And departure and classification tracks were often one in the same. This is more like most of our layouts. We run fewer trains, shorter trains, and often there is more mixing of classes of traffic as well as fewer destinations to be serviced on our smaller lines. So we get by with smaller yards.

In the olden days, that we certainly model, there would have been less need to move cars in specific trains. Of course, even then, there could be coal drags, livestock and reefer blocks. But with smaller trains, more single car customers, smaller customers, we suspect the mixing of classes of traffic was greater than it is today, particularly for way freights. This is certainly the case with our Mountain Electric. We have decided that designating a train for cars is not required for our version of the system.

Having a coding system that indicates the consignee for a car seemed to us redundant to data already contained on the waybill. Why does the blocking system need to tell you the car needs to go to some ambiguous and impersonal code that stands for the Smiths Potato Chip Factory at Crap Flats? The destination lines on the waybill tells you the same thing in plain English. It seems to me that our blocking system just needs to arrange the cars in order, taking into account the destination, the direction (facing or trailing point turnout), and the order in which some cars are best switched. This should be sufficient to get the job done. Car switching order is particularly important when there are several customers on a siding, which is common on our layouts. For an arriving train, a group of cars can be cut off and shoved back into trailing point sidings at a destination. Then the loco can run around the train and shove cars into the facing point sidings. Any outbound cars can be pulled while doing the set outs. The loco can then return to the running track with the pulled cars, collect its remaining cars and caboose, and continue on its way to the next destination. As above, we see no need for the consignee as a part of our blocking system.

We are not meaning to belittle the work Dan has done previously in thinking up the system for his use. His approach was novel and very well presented. He was probably trying to do some different things, and probably do more than what we have in mind when overlying his system on the Mountain Electric. Therefore, our changes make the system better suit us.

Square Peg-Round Hole or Making the System Fit

With these simplifications, we will use an alphabetical code to ensure cars are blocked in proper sequence for our destinations – towns and yards along our route. For us, blocking code **C** will place all cars for Belle Yard together. Code **D** will block cars together for Belle Industrial Park. And the blocking sequence is direction dependent. On the Mountain Electric the ascending sequence **A, B, C, D, E,** etc, is for an eastbound train. And… **E, D, C, B, A**, descending**,** would block for a westbound train.

Using the alphabetic code provides for just 26 destinations with one character. In the event you need more, just go around again starting with **AA** after **Z**.

Determining exactly what is a destination is somewhat arbitrary. You can label certain parts of a general locale with its own code as well. This can help divide a complex destination into smaller destinations. At our Celestown, there is a small industrial area known as East Commerce that has two sidings each with two industries. We assigned it an alpha code, **M**, of its own since because of its location it needs to be switched separately from Celestown proper.

On the Mountain Electric we already have call signs for each town, yard and stop. This is our primary coding system and useful in communications as well as on paperwork such as, train orders, timetables, etc. In studying the problem of developing a blocking system, we can see where we could have improved and streamlined our system further. Had we named our towns, yards and stops with alphabetic discipline, we could have made the task of overlaying the blocking strategy much simpler. We use the alpha codes, in alphabetic order, to block cars by towns, yards and stops. Had our towns, yards and stops been assigned names in

alphabetic order to start with, we could have one code for all uses. Our towns, yards and stops on the completed main line of the Mountain Electric, in linear order, are PRCo XCHG, Belle Terminal, Belle Yard, Belle Industrial Park, Monessen Road Stop, East Monessen, CT Junction, and Jacobs Creek Yard. The call signs for these are **PX, BV, BF, BI, MR, EM, CJ,** and **JC**. The names could just as easily have been Adams XCHG, Belle Terminal, Corinth Yard, Dunkirk Industrial Park, Easton Road, Forde, Goode Junction, and Hillman Yard. This would allow call signs **of AX, BV, CY, DI, ER, FO, GJ, HY**, or even simpler: **A, B, C,** etc. The **A, B, C,** ,etc., when used also for blocking would coincide perfectly with both the call signs and the place names. It is a bit late for the Mountain Electric to change names and call sign to achieve this, but the idea is worth keeping in mind when designing a layout as it has merits for simplifying the system for you.

And, we have one other practical problem in fully using alphabetical discipline for our application that may affect you as well. We are overlaying our layout on real geography. Our layout is freelance; but we are using some actual place names to give our layout a sense of belonging and tie it to the southwest Pennsylvania coke and coal fields that we are trying to model. If you are free of such a restriction, using the alphabetic approach may suit you, simplify your coding, and save you some later complications.

But for us, we must assign a separate sequential alphabetic code, **A, B, C, D, E,** etc. to our towns, yards and stops to make the system work on the Mountain Electric. Our code assignments are shown in **Figure 1**. You might think this leaves us with the problem of needing a paper cross reference, such as a look-up table, which shows the relationship between towns, yards and stops; and the code; so operators would know what the codes mean. But rather than relying on a cross reference, we can use the information already on the waybill for all our needs. The code, included at the top of each waybill, is used only by the switching crew when blocking cars for a train. For example, the code **F,** for East Monessen, tells the blocking crew to put that car ahead of cars for **E, D** and **C** and behind cars for **G** in westbound trains. The code sequence is just the reverse in eastbound trains.

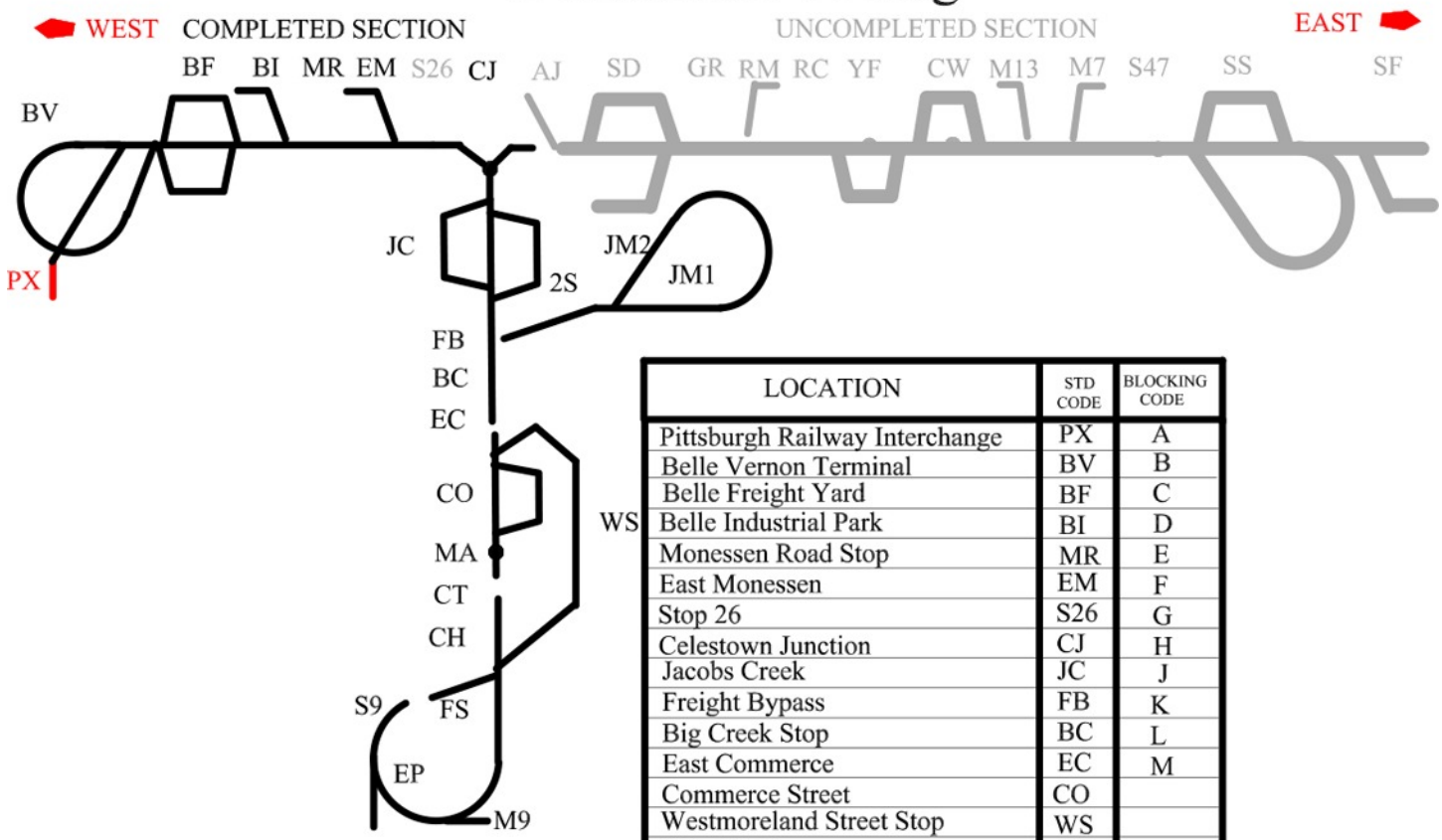
When the road crew is working the train, the waybill states in plain English the car is to be dropped at East Monessen. When the train arrives at that destination, the cars to be dropped should be just behind the locomotive, and next in line to be switched, if the system is operating correctly. Knowledge of the correlation between the code and place name is not required. The two data elements, in this case, **F** and East Monessen, may mean the same thing; but they are used for different purposes, at different times, and maybe by different people.

Keep in mind that the blocking code is really on the waybill only because our model crews have not blocked cars 8 hours a day/5 days per week for years. If they had extensive experience and could shuffle the cars in order by just reading the name of the destination and consignee there would be no need for the code. The alpha code just makes it easy for any crew member, no matter how experienced, to effectively block a train.

Once the train has arrived at a destination with several cars to be spotted there, it would be nice if the blocking system could help us deal with those cars systematically and efficiently as well. Doing so is the job of the second part of the blocking code, the numerical component.

At this point, we again needed to diverge from Dan's original approach. We had an objective of blocking cars in the order needed when several industries were located on the same siding. We suspect Dan avoided this issue by having only one industry on his sidings. We did not have this luxury in O scale. Our first trial approach was to use a single numeric code to designate both the siding number and the needed position on that siding. For example, if Siding 1 had two industries the numeric part of the blocking code would be *11* and *12.* Testing showed this to work just fine when the train was eastbound. But when the train was westbound, and the cars blocked in descending numeric order, the two cars for Siding 1 would be in the reverse order of what was needed for efficient switching. To rectify this, we split the numeric part of the blocking code into two parts. The first part was the siding number. This was followed by a dash (-). Then the second part of the numeric component, after the dash, was the position on that siding. Using the above example for Siding 1, the revised numeric codes became *1-1* and *1-2.*

Figure 1
Destination Coding



LOCATION	STD CODE	BLOCKING CODE
Pittsburgh Railway Interchange	PX	A
Belle Vernon Terminal	BV	B
Belle Freight Yard	BF	C
Belle Industrial Park	BI	D
Monessen Road Stop	MR	E
East Monessen	EM	F
Stop 26	S26	G
Celestown Junction	CJ	H
Jacobs Creek	JC	J
Freight Bypass	FB	K
Big Creek Stop	BC	L
East Commerce	EC	M
Commerce Street	CO	
Westmoreland Street Stop	WS	
Main Steet	MS	
Celestown	CT	Q
Car House Stop	CH	
Factory Alley Stop	FS	P
Elm Park	EP	N
Stop 9	S9	R
Ajax	AJ	S
Scottdale	SD	T
River Mine		U
Pinetown		V
Yough Ferry		W
Old Coke Wks		X
Mine 31		Y
Mine 7		Z
Somerset		AA
Somerset Frt Yd		BB
B&O Xchg		CC

This then actually results in a 3-part code. First is the alpha component as discussed above. Then the numeric component has two parts separated by the dash with the first part the siding number and the second part the position of the car on that siding.

The reason for splitting the numeric code and separately addressing the siding number and the position on that siding will become clearer shortly. We initially saw doing this as some complexity that we could live without, but after trials and testing, we could not find a better or simpler alternative. We are certainly open to ideas if anyone can come up with a better way to achieve our objective.

Using the ascending and descending order for the alpha part of the code provided an easy and convenient method to accommodate the two directions of travel. We wanted to use this same simple idea for the numeric part of the code as well. And it works well for the siding numbers. But it did not work for the car position on the siding because no matter which direction the train is traveling, the car order on the siding remains the same. Getting back to our example, with the two industries on Siding 1, the one furthest from the turnout always needs to be switched first and the industry nearest the turnout switched second. By splitting the numeric part of the code with the dash we can use the ascending versus descending order for the siding number, before the dash, but the position number, behind the dash, will not change with the change in direction.

Look at **Figure 2A**. For an eastbound train, cars for destination **N** will be blocked in ascending order and the train would *be Loco***,** *N1, N2, N3, N4* and *Caboose*.

Figure 2

TRACK NUMBERING

Figure 2A

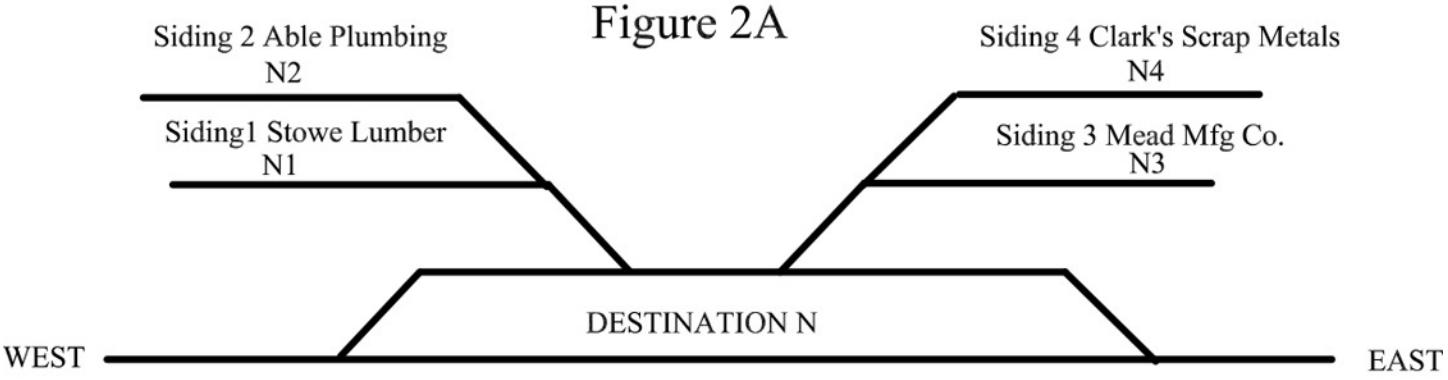
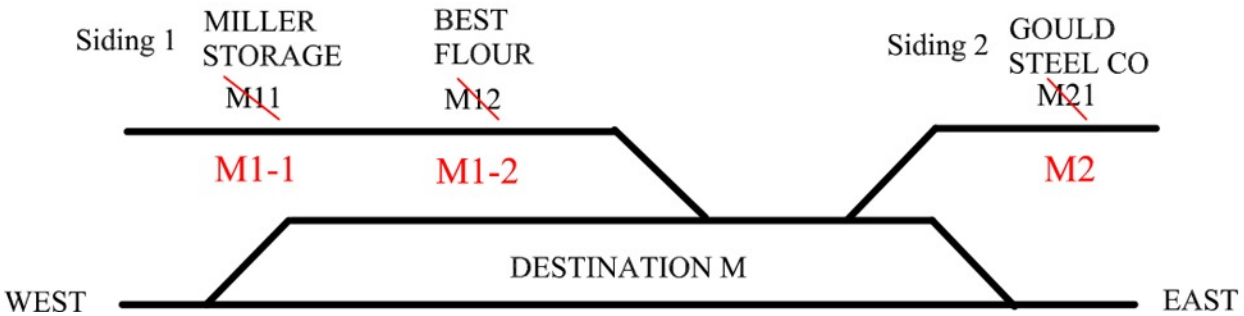


Figure 2B



The switching crew will have the cars for Stowe Lumber and Able Plumbing, code N1 and N2, just behind the loco and in that order. They can easily shove the cars for those industries onto each siding. After a run around, the next cars can then be shoved into Mead Manufacturing Co and Clark's Scrap Metal, block codes N3 and N4.

Now look at **Figure 2,** for destination **M,** where two industries are located on one track, here Siding 1. An arriving eastbound train blocked in ascending order would have *Loco, M11, M12 ,M21* and *Caboose* in that order. The cars would be set out first at Miller Storage and then at Best Flour. After a run around the remaining car could be shoved to Gould Steel Co on Siding 2.

But a westbound train would arrive at destination **M** blocked in descending order as *Loco, M21, M12, M11* and *Caboose*. First the car for Gould Steel would be shoved back onto Siding 2. But after a run around the cars for Siding 1 are in reverse order of what is needed.

Hopefully this explains why the initial idea of using a single numeric value for both the siding and car position of that siding would not work. By changing the makeup of the blocking code to the 3-part alternative an eastbound train for destination M would be blocked *Loco, M1-1, M1-2, M2* and *Caboose*. An arriving westbound train would be Loco, *M2, M1-1, M1-2* and *Caboose*.

And for **Figure 2A** an eastbound train would be blocked as *Loco, N1, N2, N3, N4* and *Caboose* with a westbound blocked as *Loco, N4, N3, N2, N1* and *Caboose*. Since only one industry is located on each siding in **Figure 2A,** there is no need for the position code so the dash and second part of the numeric component is not required. By having just the siding code in ascending or descending order but always keeping the position part of the code the same, the cars will be blocked in the correct order.

Note that in the initial number scheme for **Figure 2B** although there is only one industry on Siding 2, the code needed a 2-digit number, M21. This was to ensure that a car for Gould Steel would be blocked behind/before M11 and M12 cars to keep the number ascending/descending as required by train direction. Splitting the numeric component in 2 parts, adding the dash, and not applying the ascending and descending rule to the position part of the code, certainly increased the complexity of the scheme. But, by not changing the car position number after the dash,we don't need the 2-digit number when blocking a car for Siding 2 so we get some relief from complexity there.

When blocking an eastbound train for a destination, we start with the waybill with the lowest siding code and work up until all cars to that destination have been switched into order. For westbound trains, we start with the waybill with the largest siding code and work our way down. Cars for the same siding are blocked in position order as well, always an unchanging 1, 2, 3. In this approach cars are always arranged in numerical order, ascending for eastbound and descending for westbound, within each alphabetical group. And the cars are in the correct order for each siding with multiple industries. So, when actually switching the cars, you just deal with them in the order they are in the train by reading the industry name on the waybill and placing them at that industry, interchange, team track or wherever. The cars should be in the correct order to do that efficiently. Again, the correlation between the industry name and the code is unimportant to the train crew.

Adjusting the Layout to Accommodate the Scheme

To ensure the cars will be in an efficient order after blocking, you may need to adjust and coordinate your track numbering and coding scheme while setting your system up.

Single digits can be used for blocking codes where appropriate. And if sidings in a large town are greater than 9, you can use 2-digit numbers. In our Jacobs Creek Yard, we have a blocking code of **J11** for a coal mine. It is the only industry on Siding 11. Adjust your siding number scheme to ensure your cars will be

blocked in the order needed for efficient switching by your road crews. The value of the number in unimportant; they just need to be in order of ascending or descending magnitude to enable correct blocking.

And not all letters or numbers are needed or used. Both letters and numbers will be skipped when there are no cars for those destinations or sidings. We avoid the use of "I" and "O" for destinations as they can easily be confused with "one" and "zero" in the numeric component. You merely work your way sequentially through what letters and numbers there are for the cars that need to be blocked in either ascending or descending order based on the direction of travel.

It certainly does not matter whether you switch the facing point or trailing point turnouts first. Usually, railroads do what is needed to minimize switching time. Run arounds can consume quite a bit of time. The switching order would usually be selected to limit the switching to one run-around where practical. On the Mountain Electric our convention is generally to switch the trailing point turnouts first then run around and switch the facing point turnouts.

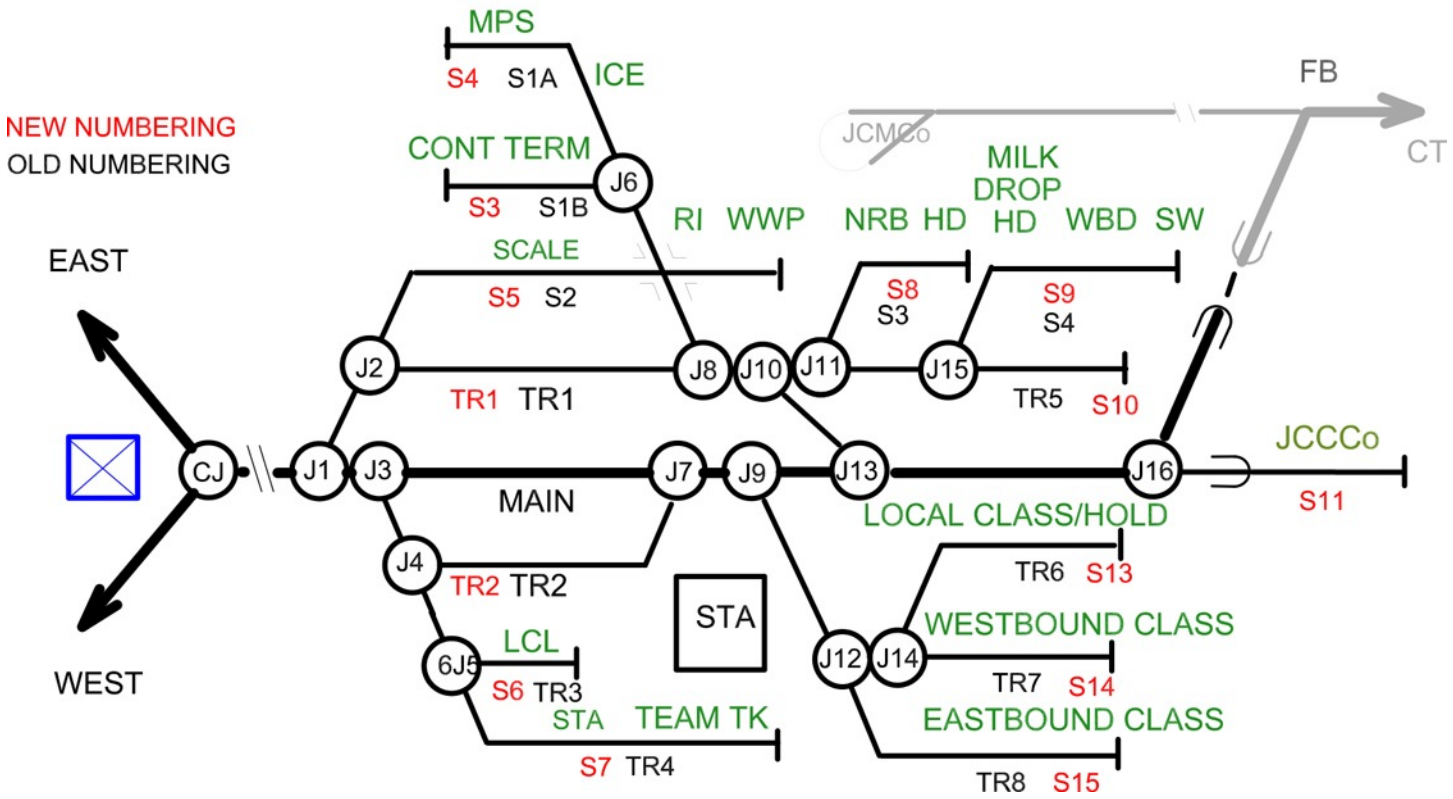
Note that in **Figure 2A** it does not really matter if either Able Plumbing or Stowe Lumber is switched first. But some systematic convention is required, so **1** and **2** are arbitrary assignments here. When nothing else is in the way, we tend to number tracks in sequence away from the main. As a result, cars for Stowe Lumber will get blocked first.

Prototype yards often numbered tracks in order away from the main track. At one time, the main was commonly in the yard center. Modern yards often have main tracks skirting yards so tracks can be numbered sequentially from one side of yard to the other. There were other number and naming schemes employed as well. Yards evolved over time. Some got bigger and some got smaller. Sometimes the track numbers were all over the place. Some tracks had names instead of numbers. Since we are using numeric order to establish blocking order for a given destination, we will depart from logical and more common prototype traditions and scramble our track numbers as needed to show the preferred switching order. We had already numbered tracks in Jacobs Creek and Belle Yard before starting work on the blocking strategy. So, we are now changing some of the track numbers we had already assigned to accommodate the blocking system. We also had made signs for the layout facia that identified sidings, and these require some changes. Doing this does not complicate the job of the switching crew. We are not moving industries, just fiddling with the track numbers to allow a sequential order for switching. Crews still read the industry name on the waybill and shove the car to them without reference to the blocking code, the track number, or any other data element. Other than for blocking order, our track numbers are more useful for maintenance and electrical schematics than for operations.

Each destination needs to be reviewed and track and siding numbers adjusted to suit the switching sequence. This will prepare your towns and yards for assigning blocking codes later. During this task, you can determine if 1, 2 or even 3-digit numbers are required at each destination. They can be different at each.

For example, our Jacobs Creek Yard is the midpoint for operations on the Mountain Electric. Even though the ME Ry is a shortline, Jacobs Creek Yard serves as a quasi-division point. Freight trains come from the east, west and south and terminate here. Cars are switched into trains to move further. Cars can continue either west or east or be taken south to Celestown or Elm Park. Some cars are for delivery to customers within Jacobs Creek. We renumbered the sidings to ensure a reasonable order in switching arriving trains. **Figure 3** shows the yard before and after the renumbering. The changes did not scramble the numbering terribly from what we previously had. The original numbering is shown in black, and the new numbers are in red. The new scheme does not really deviate all that much from our convention of numbering track out from the main any more than we deviated before. Previously, we had a mix of "tracks" and "sidings"; and with the redo, we tried to simplify that difference. Many of the changes result from that rather than a reordering for the blocking strategy. Old track number 5 has been renumbered to Siding 10, but does not have a blocking location assigned. Siding 10 is not a planned switching destination, but an overflow for any cars that should go to the local classification track, Siding 13. Siding 10 also is the caboose track or a place to park a work car. We did not number the Jacobs

Figure 3
Jacobs Creek Yard Track
Renumbering



Creek Coal Company siding originally, but now have, Siding 11, as it certainly is a switching location. You might notice on the left the sidings are numbered 5, 3 and 4 going away from the main. As our convention is to switch the trailing point sidings first, Siding 3 and 4 will be switched before 5, 6 and 7. Therefore, it was not practical to number old Siding 2 as new Siding 3 to keep the siding numbers in order. Such adjustments will allow you to have a well-functioning blocking strategy and a systematic and efficient approach to your switching. And we think getting the yard in order for the blocking strategy has made the numbering more logical than was the case with our first effort.

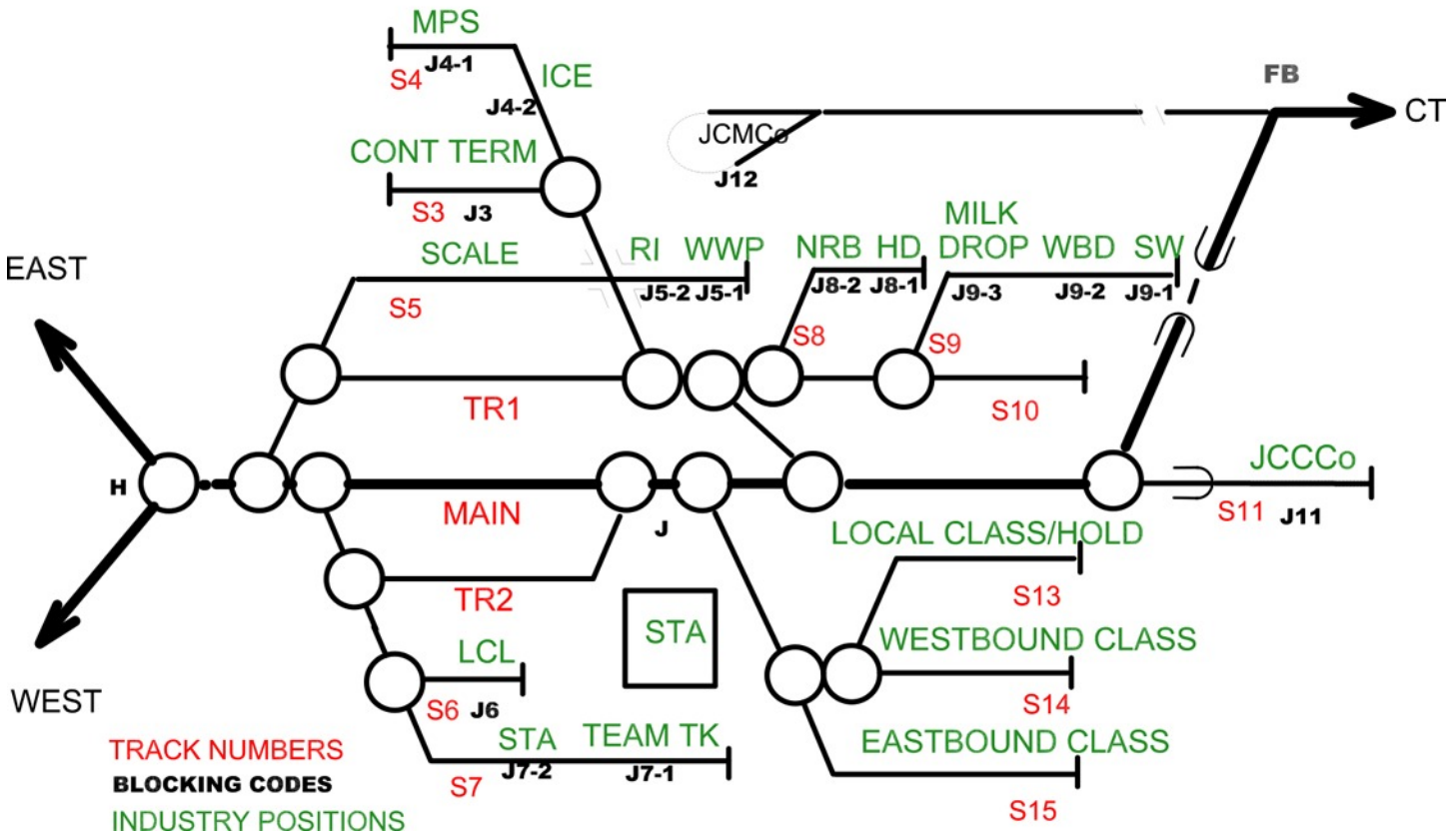
Figure 4 shows the schematic of Jacobs Creek after blocking codes have been assigned. You will note that the scale on Siding 5 does not have a blocking code. It is not a switching destination as cars are taken to and from it as needed for weighing only. In this vein, you might wonder why the icehouse on Siding 4 has a blocking code. As well as being a place where cars come and go as required to take on ice, it, unlike the scale, is a switching destination. Cars of ice and sawdust are shipped there during the winter to fill the building with ice for year-round use.

And the classification tracks, Sidings 13, 14 and 15 do not have blocking codes. Cars are placed there only because they have blocking codes indicating they are for local consignees, Siding 13, or are for movement west or east, Sidings 14 and 15. Although these three sidings have assigned use, they are loose assignments. These tracks also can be used as temporary parking spots when switching cars during blocking. In short, these are working tracks and not car destinations.

Our yards need to operate in several modes. When a "normal" operating crew is available (and probably none of us in the model rail fraternity should really be considered "normal"), the idea is for trains arriving at Jacobs Creek Yard to shove their cars into the classification tracks with local switching to occur later by an assigned switching crew. But when operators are few and far between, trains may need to do their own local switching. Therefore, even as a *terminal* yard, the blocking codes need to support efficient switching.

Figure 4

Jacobs Creek Area Blocking Codes

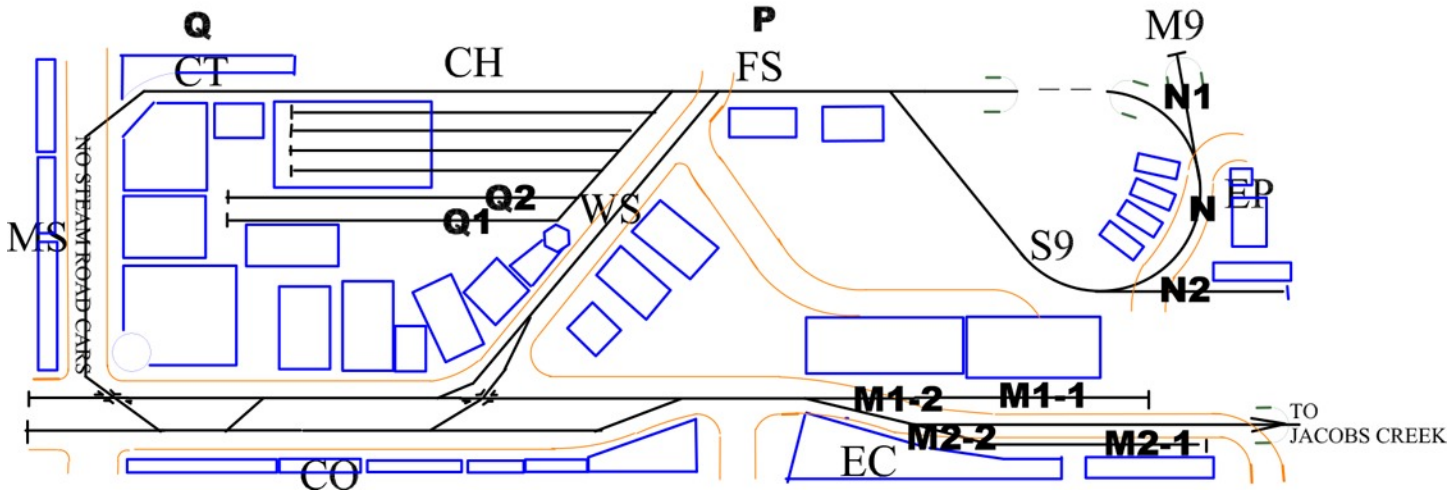


Sometimes you just want to operate your layout by yourself as well. The system needs to accommodate all such modes. We made up hypothetical train consists and tested by shuffling the cars on paper to ensure the blocking strategy could accommodate all the modes for trains arriving at Jacobs Creek from the west, east or south.

To further test the strategy, we analyzed the freight switching at the now finished Celestown and Elm Park area to work out the needed track numbering, and blocking codes, at those points. See **Figure 5**. With the sidings coded as shown, the system will work there. And we did the same with the Belle Vernon area to verify

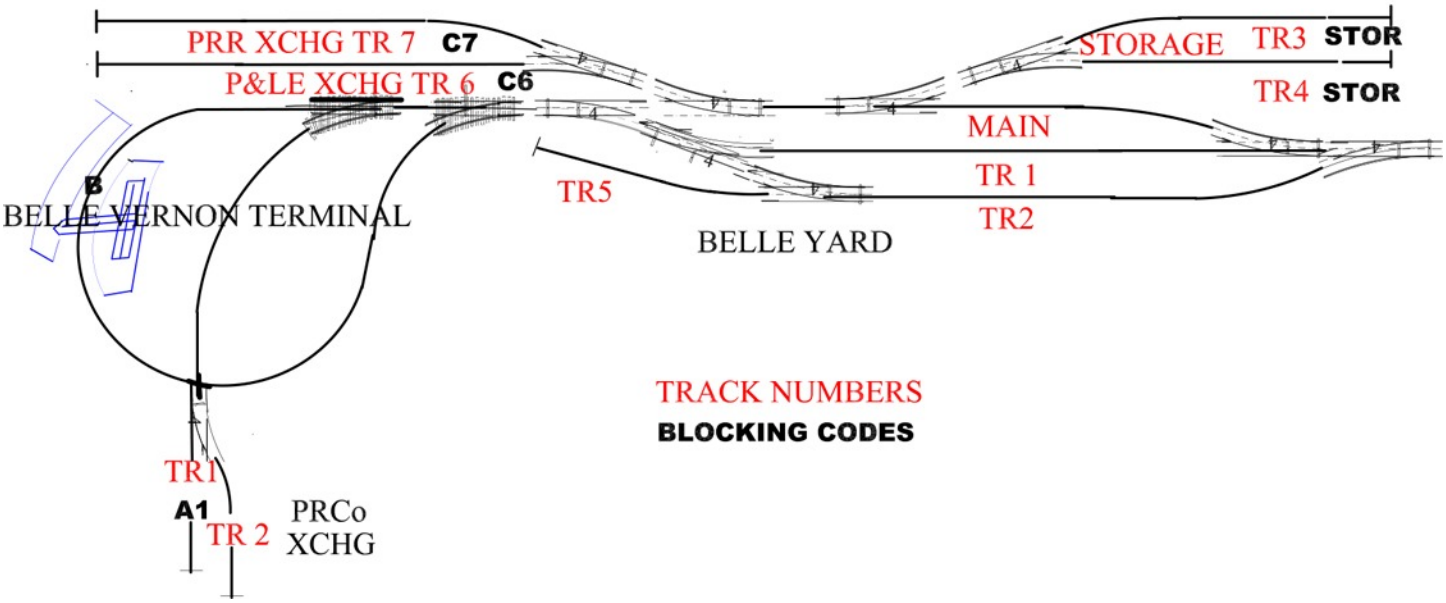
Figure 5

Celestown Area Switching Locations and Blocking Codes



it works there (see **Figure 6)**. As we continue to build new destinations and the layout creeps eastward, we will do the same track numbering, block coding and testing as we go.

Figure 6
Belle Vernon Area



At Belle Vernon you will notice that the storage tracks, Sidings 3 and 4, do not have blocking codes assigned, but the P&LE and PRR interchange tracks do. Home road cars arriving with a "**STOR**" blocking code (this will be addressed shortly) go into the storage sidings, 3 and 4, as space is available, but exactly where, is unimportant. If these sidings are full, the cars can be forwarded to other storage elsewhere on the layout. Waybills for off-line destinations via the P&LE and PRR interchange tracks will have the blocking codes for one of these interchange sidings as this is the final destination on the layout for these cars. From there, such cars physically, via the 0-5-0 switcher, go into off layout staging while they supposedly are routed to their consignees, or returned empty to their home road, somewhere off the layout.

Both Celestown and Belle Vernon are terminal locations to some degree and, like Jacobs Creek, somewhat unique in their switching needs. To ensure the car blocking strategy will work for a more typical *through* destination, we took a good look at Scottdale. Now Scottdale is not built yet. It will be the next major town modeled. But as the town had been designed, we did a fast-forward, assigned the blocking codes, then again tested with hypothetical train consists arriving from the east and west to verify the strategy would work as planned. The plan for Scottdale, with blocking codes, is shown in **Figure 7**.

Getting Waybills Ready for Blocking Codes

As mentioned at the beginning of this article, a working freight forwarding system is a prerequisite to overlaying this blocking system on your layout operations. Your freight forwarding system needs to employ waybills where the blocking data can be included. Such waybills need to include both the **to** and **from**, shipper and consignee information. Having both these data bits permits us to establish the route to be traveled and the direction of travel. Some simple freight forwarding systems indicated only the consignee which means the route and direction of travel could be more difficult to determine. We have not given this case much thought, but I suspect owning railroads. And, of course, there are all the forms that deal with delivery notification and verification, revenue collection, damages and shortages, etc. Modelers tend to lump everything into a single form called a waybill which is usually sufficient for us. The prototype also often had special forms of waybills for moving it could be made to work as well.

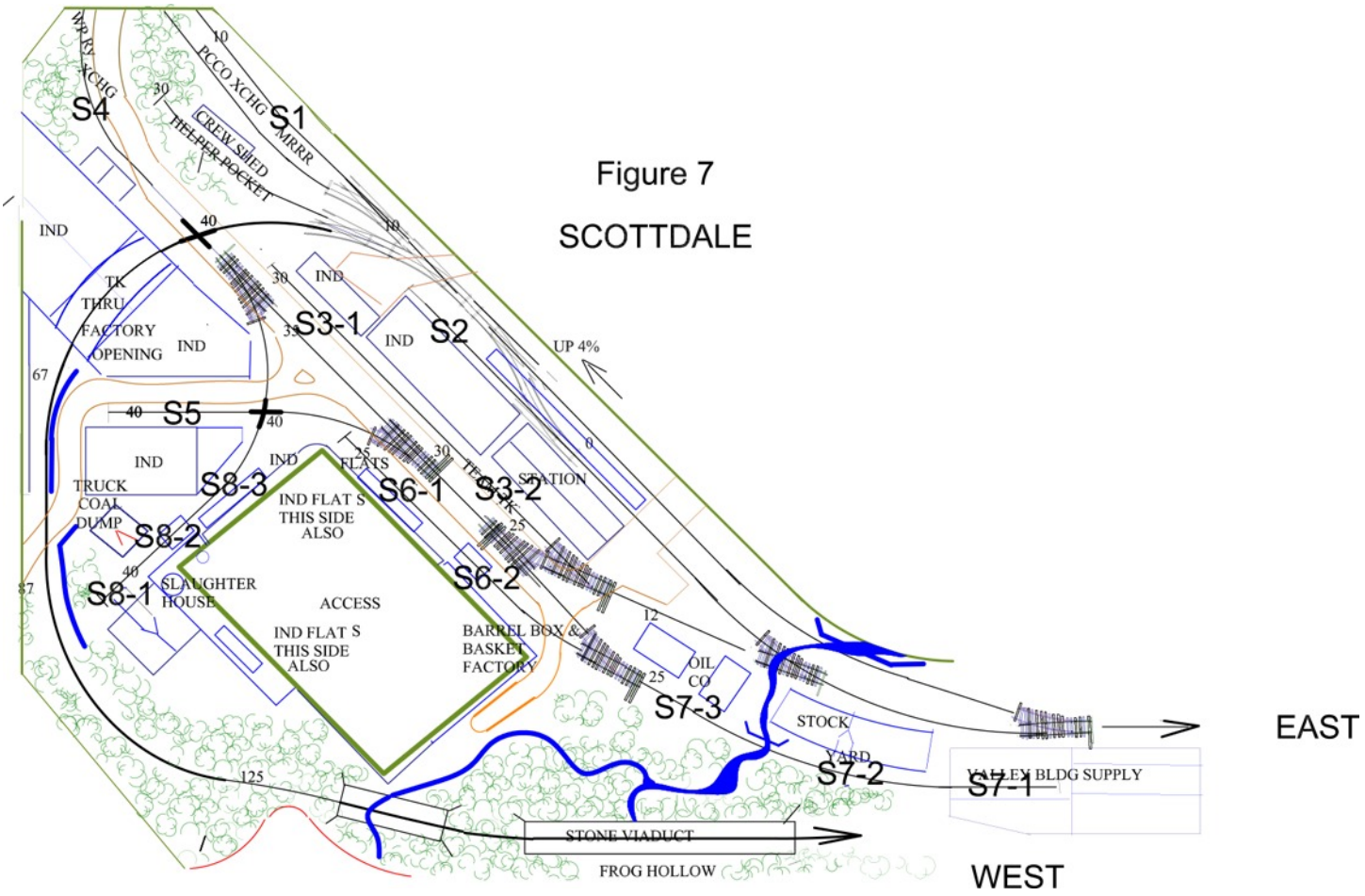
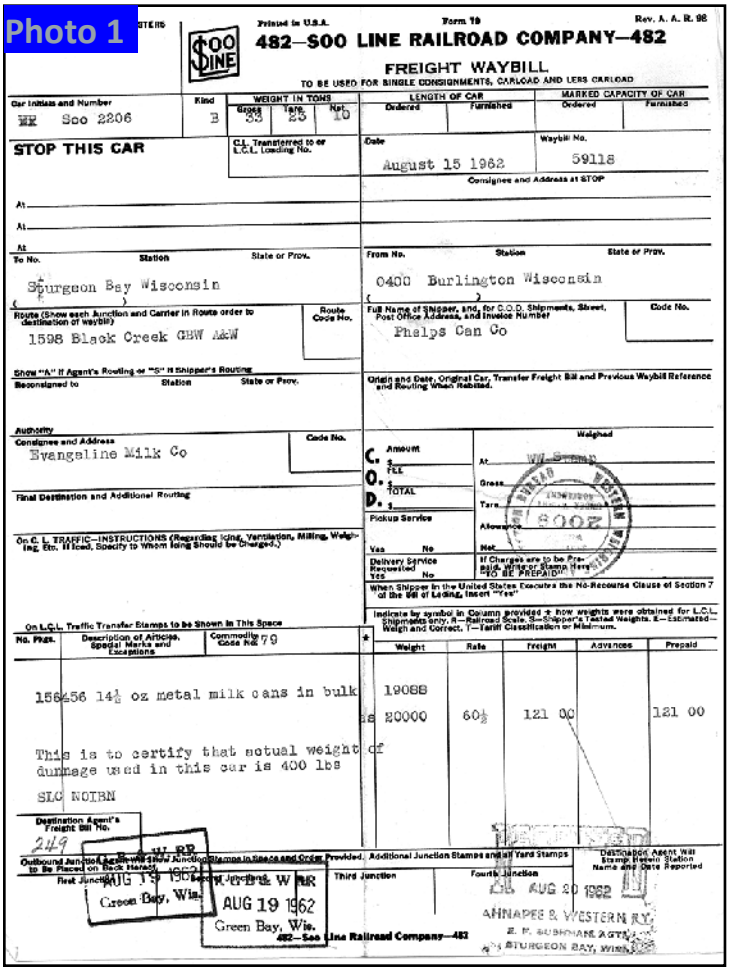


Figure 7

SCOTTDALE

Photo 1



482—SOO LINE RAILROAD COMPANY—482

FREIGHT WAYBILL

TO BE USED FOR SINGLE CONSIGNMENTS, CARLOAD AND LCL CARLOAD

Car Initials and Number: SOO 2206 | Kind: B | Weight in Tons: Gross 33, Tare 23, Net 10

STOP THIS CAR

Date: August 15 1962 | Waybill No.: 59118

To No. / Station / State or Prov.: Sturgeon Bay Wisconsin

From No. / Station / State or Prov.: 0400 Burlington Wisconsin

Route (Show each Junction and Carrier in Route order to destination of waybill): 1598 Black Creek GBW M&W

Full Name of Shipper, and, for C.O.D. Shipments, Street, Post Office Address, and Invoice Number: Phelps Can Co

Consignee and Address: Evangeline Milk Co

No. Pkgs.	Description of Articles, Special Marks and Exceptions	Commodity Code No. 79	Weight	Rate	Freight	Advances	Prepaid
156456	14½ oz metal milk cans in bulk		19088 lbs 20000	60½	121 00		121 00
	This is to certify that actual weight of dunnage used in this car is 400 lbs						
	SLC NOIBN						

Destination Agent's Freight Bill No. 249

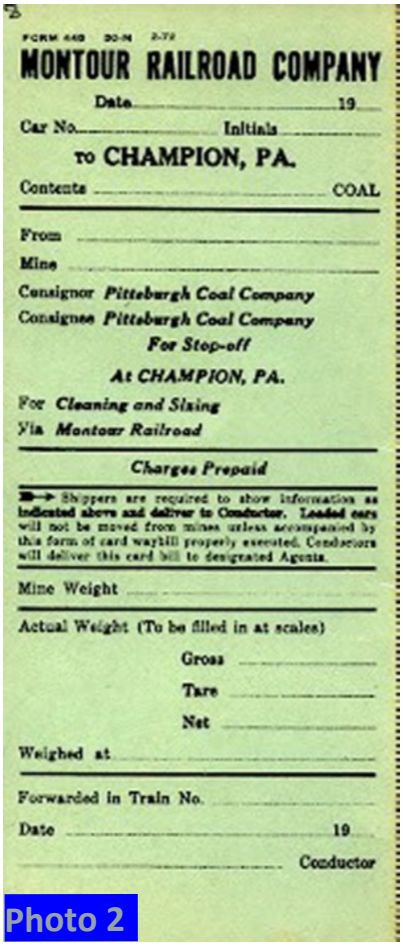
Outbound Junction Stamps to Be Placed on Back Hereof. Inbound Junction Stamps in Space and Order Provided. Additional Junction Stamps and all Yard Stamps

First Junction: AUG 19 1962 Green Bay, Wis. | Second Junction: AUG 19 1962 Green Bay, Wis. | Third Junction | Fourth Junction: AUG 20 1962 ANNAPEE & WESTERN RY. E. P. BUSHMAN AGT. STURGEON BAY, WISC.

Destination Agent Will Stamp Herein Station Name and State Reported

482—Soo Line Railroad Company—482

Actual prototype waybills were large, complicated documents. As well as shipper and consignee details, they needed to deal with weights, charges, rules, routes, legal and contractual issues, and other matters that really are mostly not of concern to modelers. When designing our waybills, we tried to inject just enough railroad flavor to make them realistic but still keep them simple enough to not overburden ourselves with extraneous details and work. An example prototype waybill is provided at **Photo 1**. Here the Soo Line, ARA code 482, in 1962, moved 10 tons of empty milk cans from shipper, Phelp Can Co, in Burlington, WI, to Evangeline Milk Co, at Sturgeon Bay, WI, for a charge of $121. There are many other associated forms used by actual railways. Their lot is a sea of paper. Some include Empty Car Orders, which move cars from storage, or wherever, to a shipper for loading; Empty Car Waybills, also called home route cards, that return empty cars to livestock, blocks of cars such as coal drags, dangerous cargos, etc. **Photo 2** shows a special form used as a waybill by the Montour Railroad to route a major customer's coal from mine to cleaning plant. The Montour was a coal mine switching short line in the Pittsburgh area. We tend to deal with these issues by color coding our waybills which works for us modelers and simplifies things.



MONTOUR RAILROAD COMPANY

Date ____ 19__

Car No. ____ Initials ____

TO CHAMPION, PA.

Contents ____ COAL

From ____

Mine ____

Consignor *Pittsburgh Coal Company*

Consignee *Pittsburgh Coal Company*

For Stop-off

At CHAMPION, PA.

For *Cleaning and Sizing*

Via *Montour Railroad*

Charges Prepaid

Shippers are required to show information as indicated above and deliver to Conductor. Loaded cars will not be moved from mines unless accompanied by this form of card waybill properly executed. Conductors will deliver this card bill to designated Agents.

Mine Weight ____

Actual Weight (To be filled in at scales)

Gross ____

Tare ____

Net ____

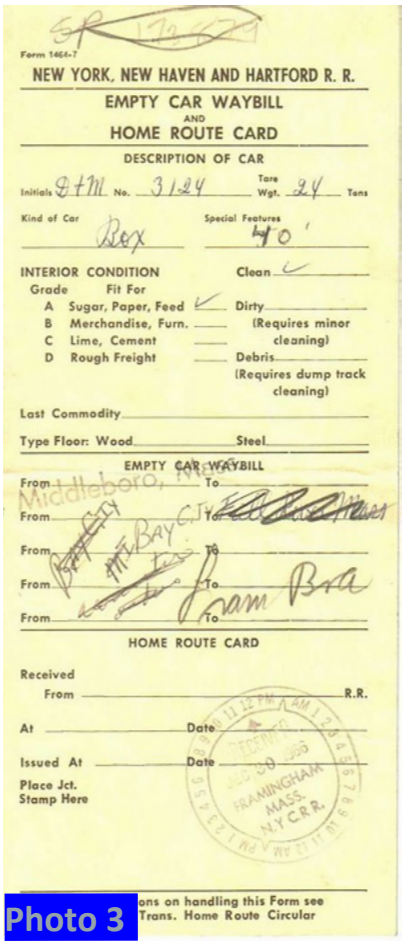
Weighed at ____

Forwarded in Train No. ____

Date ____ 19__

____ Conductor

Photo 2



NEW YORK, NEW HAVEN AND HARTFORD R. R.

EMPTY CAR WAYBILL AND HOME ROUTE CARD

DESCRIPTION OF CAR

Initials D&M No. 3124 Tare Wgt. 24 Tons

Kind of Car Box Special Features 40'

INTERIOR CONDITION

Grade Fit For

A Sugar, Paper, Feed

B Merchandise, Furn.

C Lime, Cement

D Rough Freight

Clean

Dirty (Requires minor cleaning)

Debris (Requires dump truck cleaning)

Last Commodity ____

Type Floor: Wood ____ Steel ____

EMPTY CAR WAYBILL

From ____ To ____

From ____ To ____

From ____ To ____

From ____ To ____

From ____ To ____

HOME ROUTE CARD

Received From ____ R.R.

At ____ Date ____

Issued At ____ Date ____

Place Jct. Stamp Here

FRAMINGHAM MASS. N.Y.C.R.R.

ons on handling this Form see Trans. Home Route Circular

Photo 3

Modelers, and some prototype railroads, use a tan or yellow color for empty car waybills. **Photo 3** shows a New Haven Empty Car Waybill to authorize moving the empty and tracking its journey back to its owner. Some modelers use pink for perishable shipments. Other modelers put color bands on waybills to denote certain categories of traffic or routes. These all work well.

Waybills for model use have had many variations over the years since the *operating* idea was first introduced by Ellison, Smith and others who were all pioneers in prototype-like freight movements as opposed to just running trains. The standard 3x5 card was used for early car cards and waybills, and still is by many modelers. Over time the waybill has evolved to a reasonably standard format, but in a few different sizes. Several firms provide blank waybills, and some other forms, which make implementing the freight forwarding system on a layout easier. Rail Graphics and Micro Mark both offer them. You can roll your own as well, particularly if you want them to look more like actual waybills or would like to personalize them for your railroad. Commercially available model waybills usually accommodate 4 movements. Prototype waybills only address 1 movement. A good compromise is to have an Empty Car Order on one side of the waybill to move a empty car to a customer for loading and a Freight Waybill to ship the load to a consignee on the other side for 2 movements. Also a Freight Waybill can move a loaded car coming to a consignee on one side and then an Empty Car Waybill on the other side to move the car to storage or back toward its owning road, again 2 movements.

An important objective of an Empty Car Order is to specify what sort of car a customer requires. Cars are ordered by customers in need of an empty by their *Mechanical Designation* to ensure they receive the correct type car for their shipment. We have simplified the codes for the type of car. The AAR has codes, called Mechanical Designations, for many varieties of cars. Some are 3 letters long to differentiate, by various equipment the car contains, or for particular loads the cars are designed for. An example would be a box car with the "XAP" designation that means it is equipped with special racking for certain automotive parts. Some of the more religious model operating types do use the 2 and 3 letter codes to be precise. We don't have enough cars to worry about the problem to that extent. On the ME Ry, our customers seem to be content if a box arrives with a roof. For our use, we are happy to go with a single alpha code for each steam road car type. Further complicating our car type designations is that we have both steam road cars and traction cars. Now traction cars usually cannot be interchanged with steam roads as they do not always comply with the AAR requirements for safety appliances, brakes, trucks, and they might have radial couplers, etc. Therefore, we also have a list of codes for traction cars as well. We simply add a "T" to the one letter AAR code to denote the car as traction only.

The Mechanical Designations we use on the ME Ry are as follows:

Car Type	Steam Road	Traction
Box	X	XT
Hopper	H	HT
Gon	G	GT
Tank	T	TT
Covered Hop	L	--
Flat	F	FT
Reefer	R	RT

Photo 4

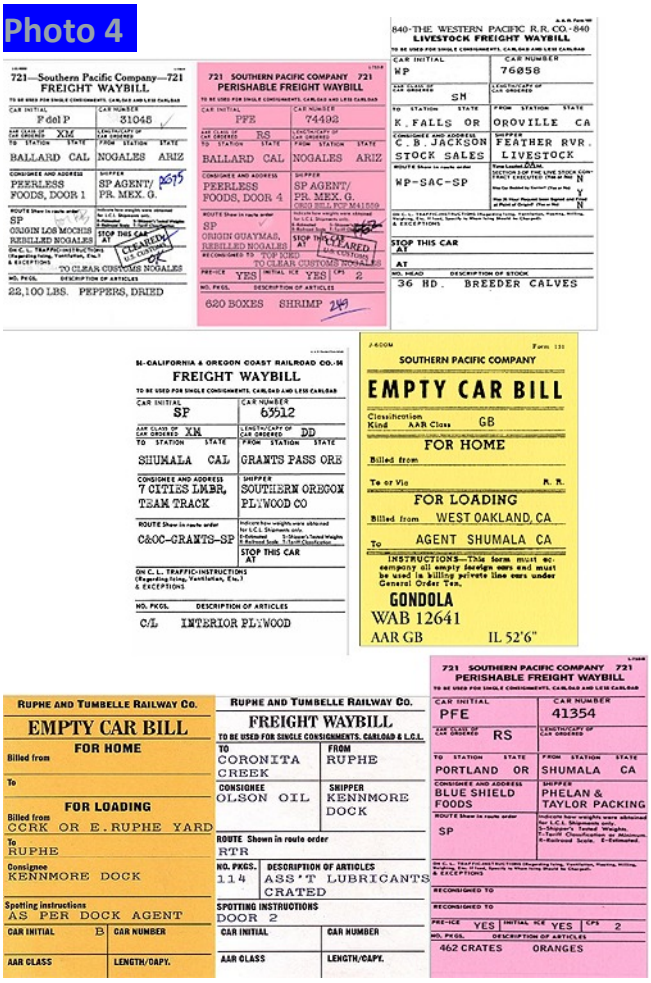
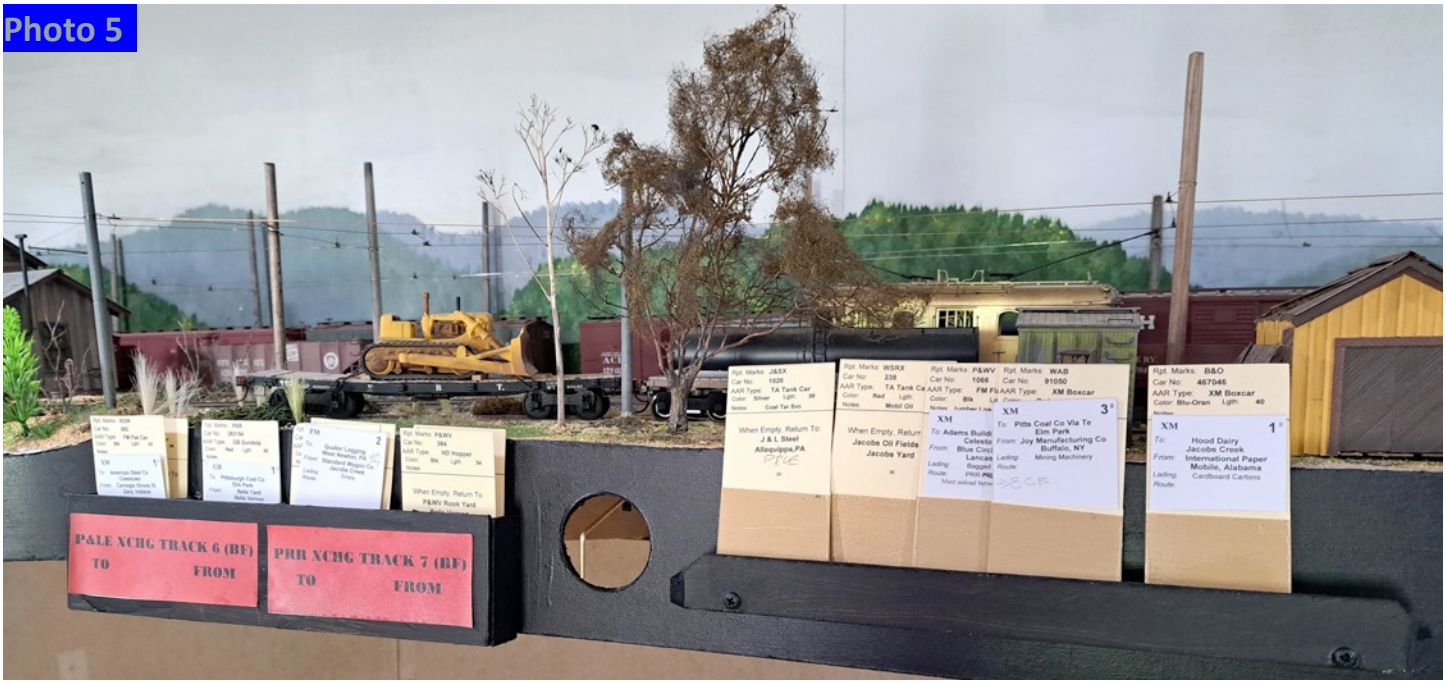


Photo 4 shows examples of several model waybill formats. By copying these from a Google search, we have "borrowed" from a few unknown sources, so we hope we do not offend any modelers responsible for their creation. They are well done and worthy of consideration. They are realistic, contain required information, but are not overburdened with unnecessary detail, and will be quite functional and effective.

We have been using Rail Graphics and Micro Mark car cards and waybills for some years on the old narrow-gauge layout. Many of our waybills were also generated by the *Ship It* software. This is a proprietary model rail car routing system. **Photo 5** shows our old waybills that slip into the car cards, also by Rail Graphics and Micro Mark. These car cards fold over and can be taped to form a pocket where the waybill is inserted. Once together they reflect all the pertinent data to include the car the shipment is moving in. They have worked well over the years. In setting up for the new layout, we decided to splash out and personalize our new waybills with some other details.

Another approach used by some is clear baseball card envelopes for the car card component. Clear printed labels are stuck to the front of the clear envelopes with the car information. But these envelopes are wider at 2-5/8 and do fit into our waybill slots easily. They need to fit easily to avoid over eager operators destroying them in use. If you have yet to make your waybill holders, you might consider the baseball card envelop option. You can just make your waybill holder slots a little wider, say 3-1/4 inch. We sourced a few of the baseball card holders for



examination. The plastic is quite thin, so I am not sure how durable they will be without testing them for some time. We have dismissed them from further consideration as they are too large for our waybill boxes.

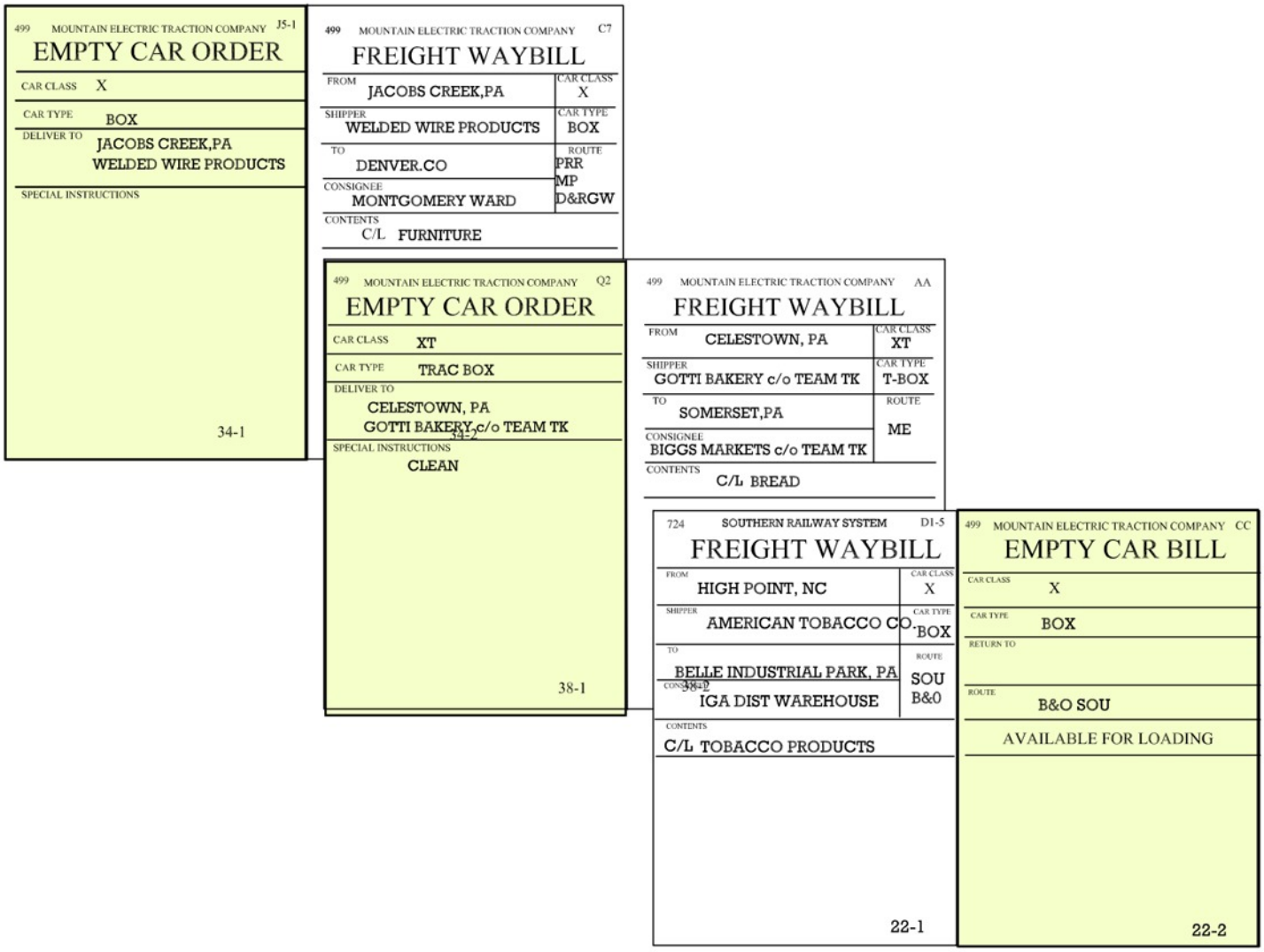
This then will mean our waybills will remain printed only on the top half of the card as they now are. In the examples provided of well-designed waybills, **Photo 4**, they are printed on the full card. Since these examples have the car number included, they may be for one-time use. Or the same car will be used for the same traffic over and over, I guess.

We wanted the name of the originating railroad and the AAR accounting code on our new waybills as are on prototype waybills. This code is a number assigned by the AAR that must be used on certain interline documents that designate the originating rail company. Finding a list of these codes was a project in its own right. We put out feelers on several Facebook groups to include the model railroad operators with no luck. Finally, after some Internet surfing, we found a list on a website devoted to modeling the Southern Pacific and copied this to our Model Railroad Planning file and used it as a source for the codes. Of course, some of my codes for traction lines had to be invented since they were not parties to railcar interchange in the prototype world. This is certainly true of my fictitious Mountain Electric where the AAR code "499" has been assigned. We invented similar codes for other traction lines such as Pittsburgh Railways and West Penn Railways with which we interchange. Our new waybills are much like our old, but have the added details as shown in **Figure 8.**

Most operating layouts include off-line shippers and consignees. They are very important, and such interchanges with connecting railroads are usually the greatest traffic source and destination on any layout as is the case with most prototype roads. Some layouts have several to many such interchanges. Matter of fact, if you do not have at least one such interchange, there would be no logical reason for your layout to have cars lettered for any railroad but your own. Staging yards often provide such interchanges, as well as, serving as connections to other divisions of your own line. The actual interchange with another railroad may well be at the other end of the staging yard. Such interchanges and connecting divisions have towns, yards, shippers and consignees that are not physically modeled. But they certainly exist in the freight forwarding system as we send shipments to them and receive shipments from them! For the sake of realism, we think it is better to send a car of furniture to Mongomery Ward in Denver rather than just to the PRR interchange track. The car may actually only go to the PRR interchange track at Belle Vernon, but for us, the car is on its way to Denver!

Figure 8

EXAMPLE NEW WAYBILLS



Waybills, to be ready for blocking system use, need to identify such interchanges as the **to** or **from** data. If you only have a single interchange with an off-line division or foreign line, just the division name or foreign railroad initials are sufficient on the waybill to establish the **to** or **from** point. The interchange is often shown in the "route" information on the waybill. If more than one interchange with an off-line entity exists, the waybill needs to note which one. For example, if our Mountain Electric had more than one interchange with the P&LE, a waybill note, "via P&LE XCHG Belle Vernon", would provide the necessary information. Of course, if you have two interchanges with the same railroad, each will have its own and different blocking code.

All your waybills should be reviewed to ensure the information thereon provides:

1. the shipper and his location when loads are originated on your layout,
2. the point where travel on your layout begins for incoming loads,
3. the consignee and his location when the car is for delivery to a point on your layout, and/or
4. the point where travel over your layout ends for either loads going to an offline consignee or empties returning to their home road.

From this data, you can work out the destination and direction of travel so you can assign the correct blocking code.

Sometimes multiple cars move from a shipper to a consignee as a group, a block of cars. Today, unit trains are a good example of such a shipment. And sometimes a block of cars goes to a shipper for loading, but can then go to multiple consignees from that shipper as individual cars. On the last layout we did this poorly, and the train crews ended up with a handful of car cards and waybills that were awkward and really unnecessary to deal with. This time around, we have decided to use block waybills for such shipments that will account for all cars on a single waybill. This will reduce the paper to one piece rather than the fistful previously.

In the real world, a similar thing occurred for coal traffic where I came from. Empty coal cars were returned to a yard after unloading by a consignee. The empties were just shoved into tracks reserved for such empties. When a mine notified the railroad they needed, say 25 empties to load on Tuesday, the Yardmaster made up an Empty Car Order without car numbers, only specifying the count of cars required and the class of cars required. The switching crew used the waybill to just grab 25 suitable cars from the empty tracks and move them to a classification or departure track so they could be sent to the shipper. The switching crew added the car numbers to the waybill. These cars were taken to the mine for loading as a single block of cars. The same thing would be true for most commodities such as pulpwood, sugar beets, grain, lumber, crude oil, fruit, produce, livestock, etc.

And we may be using confusing terminology here: ” block of cars” in the above context is different from “blocking cars”.” Block of cars” is a group of cars going to one place together. “Blocking cars” is the action of sorting cars into necessary order for trains.

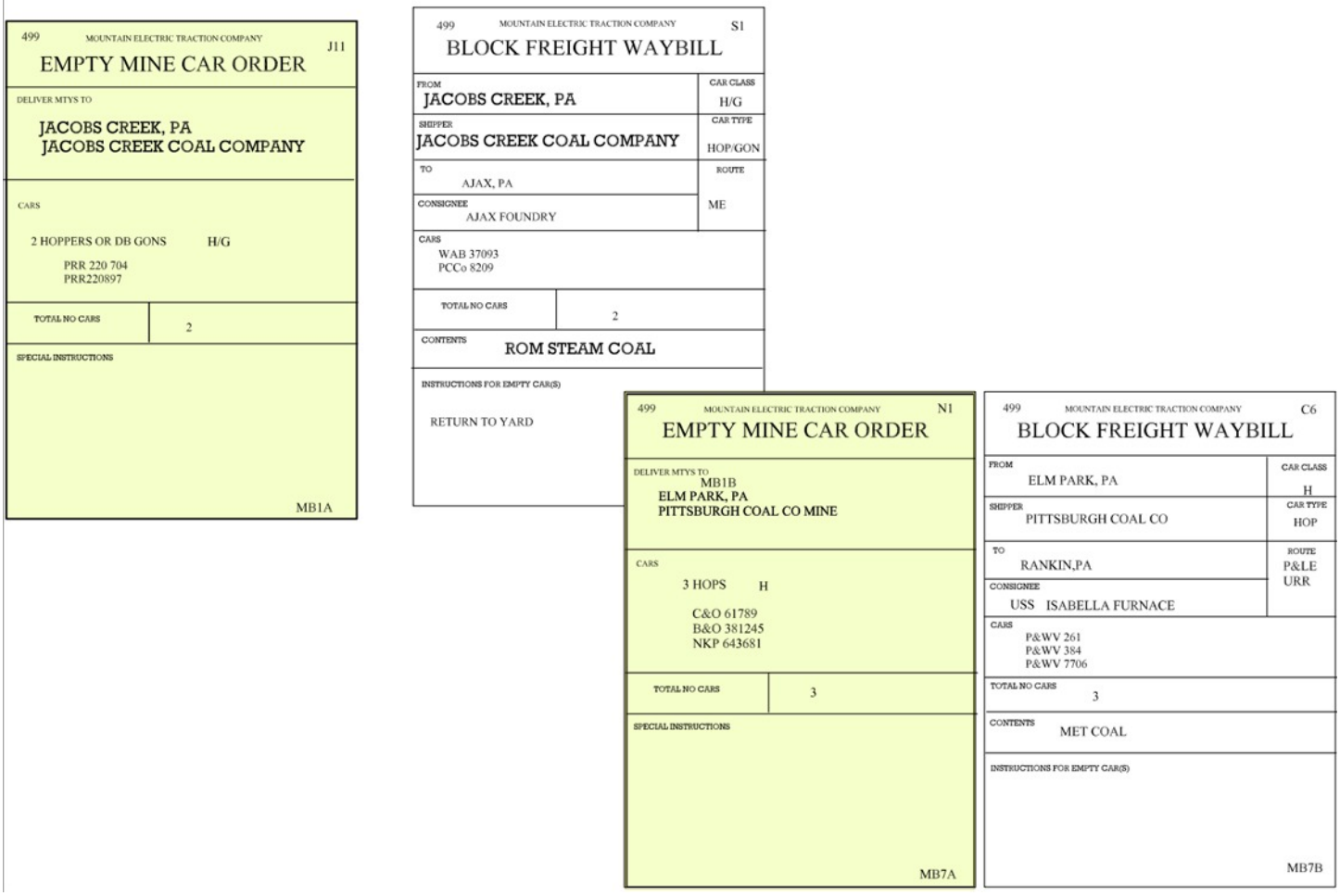
On our layout, we have many hoppers and drop bottom gons for coal service. Some of our cars are permanently loaded and others empty. This did not happen by design, but by accident: that’s just how we built them over the years. We have divided these and put them into permanent sets of cars, for use in our mine traffic. Waybills have been prepared with the car count, and with the car initials and car numbers included thereon. Because of our short trains, and even shorter sidings, we move only two or three such cars as a block to and from the coal mines on the completed layout section. Later mines will be able to accommodate larger blocks. These waybills can be selected at random, as are regular waybills, and used to direct a movement. The Empty Car Order sends the empties to the mine, and then then, on the other side of the card, a *Block Freight Waybill* sends loads from the mine to a consignee. On operating night, a block of empties will be delivered to a mine. Between operating sessions, the empty cars are swapped, via the 0-5-0 switcher, for the loaded cars prescribed on that waybill by car number. In the next operating session, the reverse side of the waybill will direct these loads to be picked-up at the mine and delivered or forwarded to the consignee. Car number changes are an obvious departure from prototype practice, but means we can have the car numbers pre-printed on the waybills so train crews do not have the additional paperwork associated with recording the numbers. It also provides a way to deal with cars that are either unloaded or permanently loaded. Crews won’t remember what car numbers they set out as empties in the previous operating session, so the trickery is not noticeable. The waybill system remains in control of cars by car number, and paperwork is eliminated.

What we have set up for car blocks will work for now. At this point, all cars in the block will go the same consignee from the mine. We are still mulling over this issue. We will try to develop a system improvement that can deal with a block of empties delivered to a mine, and then from one to several cars going from the mine loaded to several different consignees as happens in the prototype world.

We will have such car blocks for coal and crude oil shipments and will treat both about the same way. Coal also moves in single car shipments in other circumstances. When it does, single car waybills are used just as for all non-block shipments. **Figure 9** shows two movement coal block waybills. We are still working on our crude oil block waybills, as some of the tank cars have yet to come out of the paint shop. Crude oil moves from our crude loading facility (this was a subject of an earlier article in **OSR**.), to one of several offline refineries. Blocks of crude tankers will, unlike coal, always go to a single off-line refinery consignee. When the tank cars are ready, they too will be arranged in 3 car blocks. The nice thing about closed cars like tanks, boxes and reefers is you cannot see if they are loaded or empty as is the case with hoppers and gons. We will not need to fiddle the cars and do the between-session shuffle to have car number control with these tank cars.

Figure 9

COAL MINE BLOCK WAYBILLS



Adding Blocking Codes to Waybills

With the above tasks sorted, you can now add the blocking code to each waybill. We make our waybill up using templates. Each waybill is processed in the same manner and the appropriate code added.

Since we have only worked out the blocking codes as far as Scottdale, any cars headed for points beyond Scottdale just have the tentative alpha part of the blocking code. The full and correct blocking code will be added later.

One issue we pondered was a potential problem with blocking cars for Empty Car Orders. These cars could arrive at a destination from any direction since they could come from storage or interchange tracks at either end of our railroad as well as one storage location near the middle of our road, or they could be "captured" empties from most anywhere on the layout. After some thought and testing, we concluded the system would work for them as well.

Empty Car Waybills were another issue to consider. These apply after a load has been delivered to an on-line industry and the car emptied. The Empty Car Waybill is used to move the car from that industry, where it was unloaded, and may need to be treated differently depending on what sort of car it is.

If a foreign road car, it should be routed to the appropriate interchange to send it back towards its home road in the reverse of the route it took to get to the Mountain Electric loaded. For us, the blocking code is assigned for the applicable interchange. We do not store foreign cars on the Mountain Electric preferring to move them promptly after loading or unloading to a foreign road interchange as quickly as possible to avoid paying the per diem charges that will apply at midnight.

But, if the car is a Mountain Electric car, it could need to go to any of three different locations for storage, wherever space is available. For this reason, these Mountain Electric Empty Car Waybills will have a blocking code of **STOR**. A car with such a waybill will be moved first to the terminal at one end of the Mountain Electric in the direction the train is going. If there is no room for empty cars at the terminal, a consultation with the dispatcher can determine where space is available, and a second move can take it there. Moving the car to one of the terminals is a good first choice as most of our storage occurs at one of these two points on the Mountain Electric.

The car could also be a capture located anywhere on the railroad and confiscated for loading and forwarding toward its home road. When a car is confiscated, the Empty Car Waybill is temporarily superseded by placing an Empty Car Order over it in the pocket of the car card. The car can be delivered to an online customer for loading and then sent off to its consignee. When the car is unloaded again, the Empty Car Order is removed and the earlier Empty Car Waybill becomes effective again. Generally, the car is well off the ME Ry by then and not a problem for us any longer.

There is a school of thought among some operations gurus that empty cars should not be routed via waybills. In their way of thinking, when the shipment portion of the waybill is removed from the car card, the car should be able to find its own way back to its home road. We wanted to make sure the home route (the reverse of the route the car had taken when loaded) is obvious so we can send the car back to the correct interchange. And, on the prototype, Empty Car Waybills are used to return cars to their owner. Therefore, we have chosen to use them.

Of course, there are exceptions to most rules just to make life more interesting. Sometimes home road empty cars need to always go to a particular storage location. This occurs because the car is always sent offline via a specific interchange for specific loading, or it is associated with an industry at a particular on-line location. In this case, a blocking code could replace the generic **STOR.** We have a slide on-slide off milk container on a flat car, and a milk reefer, that routinely travel only between the dairy at Jacobs Creek and off-line consignees in the urban Pittsburgh area via the Pittsburgh Railways interchange at Belle Vernon. It would not make sense to send these cars to storage at Somerset at the other end of the railway.

Our new waybills are computer printed on light card. They are sized to fit into the car card pockets and our current waybill box slots. They can be cutout, folded and/or glued to provide the two-sided details. When a different color is required on one side such as for empties or an incoming perishable load, each side is printed separately on sheets of different color. A page numbering system is used with numbers at the bottom to keep all the waybill sides organized.

Our new waybills, shown in **Figure 8**, are two-movement waybills with one on each side of the form. The first on the left delivers an empty box car and then ships it loaded offline. Technically, the left half of this first example is the Empty Car Order that was generated by the railroad when the shipper notified the Mountain Electric an empty car was needed for loading. The important information is the car type required, X, box car, and the location where the car should be spotted, Jacobs Creek–Welded Wire Products. Jacobs Creek destination is code **J** and Welded Wire Products is the second and last industry on Siding 5 (furthest from the turnout); therefore, the numerical component of the blocking code is **5-1**. You can see the complete blocking code, **J5-1**, at the right top of the Empty Car Order. The right half, on the back of this example, is the waybill documenting and authorizing the movement of the car, once loaded, from the shipper to his customer. In this case the car is going off-line to a Mongomery Ward warehouse in Denver, Colorado, via the PRR, MP and

D&RGW and contains a carload of furniture. What is important to the blocking system is the car will leave Jacobs Creek and travel westbound to the PRR interchange track, which for us is at Belle Yard. We need alphabetic code **C** to denote the Belle Yard destination. And at Belle Yard the car needs to be switched into Track 7, numeric code **7,** which is the PRR interchange track**.** And since tracks in Belle Vernon Yard only service one customer, the code needs only a single numeric digit. The blocking code **C7** has been placed at the top right of that waybill. This is basically the way Dan did this in his approach, and it seemed good enough for us. Originally, we had the AAR code **499** both at the left and right top corner of our waybill. We just deleted the **499** at the top right and added the blocking code, **C7**, there in its place.

On the second waybill example one of our offline shippers, Gotti Bakery in Celestown, has ordered a clean car to ship a load of bread to a customer in Somerset, Pa. As the haul will be all the way via the Mountain Electric, the railway will use a traction box trailer. Since Gotti is not located on a rail siding, he will load the box trailer, Mechanical Designation XT, at the Celestown team track from road trucks. The blocking code on the Empty Car Order for delivering the empty box trailer is **Q2** for the Celestown team track. After loading, the waybill to ship the load has the blocking code **AA** as the track and position numbers at the yet-to-be-built Somerset are not yet known. The loaded car will actually go to Jacobs Creek Yard for classification and then get shoved out onto the stub of the east bound main track as that now serves as "every place east of Jacobs Creek".

The third example is for an incoming load, in a steam road box car, from American Tobacco down in North Carolina for delivery to the IGA Warehouse at the Belle Industrial Park. The blocking code for sending the load to the IGA warehouse is **D1-3**. There are 3 industries on the 1 siding at Belle Industrial Park and the IGA Warehouse is the industry closest to the siding turnout. On the other side of the load waybill is the Empty Car Waybill that returns the empty via the B&O and Southern as that is the route the load traveled. Our blocking code is therefore **CC** for the B&O interchange planned for Somerset.

In the prototype world, the car of tobacco products from North Carolina could arrive via the Southern and B&O in a Pennsy or NYC box car that had earlier been sent south loaded, was an empty returning north toward its owner, and had been confiscated and loaded when passing through North Carolina. This would mean that after unloading at Belle Industrial Park, the car would not need to go first east to Somerset then back south via the B&O and Southern. It could just be forwarded west to the Pennsy or P&LE(NYC) interchange at Belle Yard on the layout. When we select cars to pair with a waybill, we pick cars that come from the same area as does the load to avoid this issue. Some simplification of prototype happenings is necessary, and this is a good example of where it is needed. We have tried to build up our car fleet to suit our shipments and vice versus. For example, we have a brewery that always seems to need glass bottles to package their brew. So, we have a box car from the Muncie & Western Railroad. The M&W is a shortline in Muncie, Indiana that is owned by and services the Ball Manufacturing Company there that makes glass containers. The waybill ships loads of bottles from Ball at Muncie and the M&W box car is used for the loads. When empty, the car is routed back west to Muncie. Similarly, one of our customers, Wurst Bros Drilling, receives carloads of drilling mud from Utah. These shipments arrive in D&RGW and C&S box cars. Citrus fruit comes from California in Pacific Fruit Express reefers. Shipments and the car fleet just need to be coordinated to make the empty car routing work well.

And your layout can have bridge traffic: cars coming from one interchange and going to another interchange rather than to and from on-line customers. As a result, you should have both bridge loads and bridge empties to deal with. Empty cars are routed back to the owning road by the reverse of the route taken to move them when loaded. This way, those railroads that shared in the revenue from moving the loaded car have the burden to return it empty to its owner. To accommodate this, you may get empties from Railroad A and need to deliver them to Railroad B. An Empty Car Waybill should be on the reverse side of the waybill that authorized the loaded bridge traffic movement. In theory, half the car movements on any railroad are loads and half are empties. Modeling this often-overlooked feature of prototype railroading can really increase the number of cars movements on your layout without the need to increase the number of cars. As a side, most prototype railroads went to much trouble to reduce the number of empties from the theoretical half to a more profitable number by

developing back loading traffic. To make this bridge empty traffic work on the layout, the waybills for loaded bridge traffic, after the loads from Railroad B are delivered to Railroad A for example, could be turned over and placed in a designated waybill slot at the Railroad A location and held there for several operating sessions. Then the waybills for these empties can be pulled to route the empties back to Railroad B. Of course, these empty cars can be confiscated and loaded by any of your suitable on-line industries that have products that need to be moved in the *general direction* of the railroad owning the car. This is another interesting bit of prototype railroading to add operational interest and variety to any layout.

But sometimes all the best efforts of mice and men are insufficient to bring order to chaos. We have a 6 dome Roma Wine tank car bought on a whim for some unknown reason. We had no idea how we could make that car work in the scheme of things on the Mountain Electric. Finally, we decided we could shuffle it back and forth as bridge traffic between the PRR, P&LE, B&O and P&WV interchanges (more below), and in so doing we do not need to pair it with a shipment to/from one of our online industries.

The car blocking order is not intended to dictate exactly how all switching must be done. Flexibility is required and provided. Sometimes crews will see a need to switch in another order. This can occur particularly when the cut of cars to be switched is unusually long. A road crew may elect to grab some of the cars and spot them first rather than pushing and pulling the whole cut of cars through many turnouts and several sidings. They can then return to the running track for the remainder of the cars and spot them. This will result in a change in the order that some cars are spotted, but the blocking strategy will support this.

Another point to note is that the strategy does not dictate precise sequential switching order all the time. The strategy allows common sense to prevail. At our Scottdale, when eastbound a cut of cars for Sidings 1, 2 and 3, can be grabbed from the train, and shoved first into Siding 3, then 2, then 1. This will be faster than grabbing only the car(s) for Siding 1 and switching then onto Siding 1, returning for the car(s) for Siding 2, and switching it/them, then going back for cars for Siding 3……The strategy is intended to make things efficient for you – not perfectly easy for you. Some thinking is left to be done!

If you have quite a few cars on a large layout with many industries, adding all the blocking codes can be seen as a formidable task. But it does not need to be done at one time. Probably the first task would be to work out your alpha codes for destinations. The numeric portion of the code can be done track by track, destination by destination, and over any length of time. As soon as codes for destinations are sorted, the waybills can be updated with the alpha portion of the blocking codes. Once started you will begin to see some benefits as cars will appear at destinations in an efficient order for switching. Eventually, all trains will benefit from the strategy.

Other Outliers and Oddballs

All systems struggle and sometimes stumble with exceptions. There are always weird and wonderful issues that crop up and don't seem to fit the mold. This makes system design more difficult and frustrating. Often to resolve the issues just some creative thinking is required. We have a few of these and deal with them as follows:

1. Our blocking strategy deals mainly with *towns* and *yards* where cars are placed and pulled. *Stops,* on the other hand, have no sidings and are mostly associated with passenger operation. But raw milk collection, empty milk can return, and LCL drop-off and pick-up are freight tasks that can occur at *stops* as well. Way toward the back end of our priorities list is a potential project to work out a system for controlling LCL freight using the waybill system. For this reason, we see a need to treat *stops* as we do *towns* and *yards*. Destination codes are provided for *stops* that could have this traffic.

2. Some destinations have just one industry on one siding. We deal with them by using a blocking code of **X1** where **X** is the alphabetical code for that destination. Similarly, where there is no siding to be switched,

but a blocking code is required possibly for LCL freight; just the destination code, such as Monessen Road, code **E**, is used.

3. How do we deal with a set-out at a facing point siding where there is no local run around facility? There are two alternatives for this:

The car can be kept in the train and set out at the next destination that has a double ended siding and an appropriate place to park the car. The waybill for the car would be put into the "Pick-up" pocket of the waybill box at the set-out destination. A train with spare capacity moving in the opposite direction can then pick up the car and take it back to the correct destination and switch it to the consignee. This may result in the car sitting idle for a day or even more and was a typical event in older prototype rail operations.

Secondly, the crew will hopefully notice that the car will be impossible to switch at the intended destination when reviewing the cars in their train before leaving the starting terminal or yard. The crew can then plan to switch that car in front of the locomotive at the last double ended siding before reaching the intended destination so it can be shoved into the correct siding when the destination is reached.

Railroads use both these alternatives. Shoving cars ahead of a locomotive for some distance at road speed is frowned on by some railroads. Some roads probably have required practices addressed in their procedures manuals we discussed earlier that tell crews how to deal with this issue. Other roads leave the choice to the discretion of the road crew. On the Mountain Electric our procedure is to use the second alternative when the car is perishable or of a priority nature and use the first alternative when there is no urgency to the delivery.

As we use a pink waybill for perishable and priority shipments, the color should attract the attention of the crew and allow them to plan the move well in advance to ensure the perishable or priority shipment arrives at the consignee as soon as practical.

4. Jacobs Creek Yard presents a unique problem. The rule that eastbound trains are switched in ascending numeric order and westbound trains are switched in descending order does not exactly work here. Trains from both the east and west enter Jacobs Creek Yard from the same end and probably pull into the same track. The approach to the yard forms a "Y" (see **Figure 3)**. On those occasions where arriving trains need to switch the cars, as opposed to just shoving them into the classification yard tracks, the westbound train is probably best switched by breaking the train behind the last car for facing point sidings, setting those cars onto a parallel track, grabbing the cars for the trailing point sidings, and spotting them first. The loco can then return and run around the remaining cars and shove them into their facing point spots. The eastbound trains would be switched as normal.

5. Looking at the track diagram in **Figure 4**, you will notice a switching location with the blocking code of **J12**. The reader may wonder why this trailing point destination is not grouped with the other trailing point destinations. This is the loop at Jacobs Manufacturing Company, and it is switched in a unique way. A freight needing to go to Jacobs Manufacturing must do so with the permission of the dispatcher and at times to avoid interfering with substantial local passenger traffic. And there is actually no siding at Jacobs Manufacturing and cars are loaded or unloaded there while sitting on the main.

6. The Mountain Electric is basically an east-west oriented line. But the portion from Jacobs Creek to Celestown and Elm Park is north-south. We had to play around with different switching ideas to work out the optimum way to switch Celestown and Elm Park. Again, we did this by making up hypothetical trains of cars for destinations and switching the cars on paper. Cars headed south from Jacobs Creek are best blocked in descending order as are westbound trains. You might notice in the letter code assignment there appears to be an

anomaly with CT coded as **Q** and Elm Park coded as **N**. These two codes were changed to allow the cars to be switched more easily.

Note at Celestown that steam road cars are not allowed to operate on Main Street (MS) due to town ordinance (**See Figure 5**). A train arriving would be blocked in descending order as *Loco, Q1, N1* and *M2-2*. (Cabooses are not used between Jacobs Creek and Celestown/Elm Park.) On the way into town the car blocked M2-2 can be set out on Siding 2 at East commerce (EC) with train then continuing on to Commerce Street (CO). The loco will run around the train and via Westmoreland Ave (WS) come to Celestown proper and drop the car blocked Q2 at the station siding. It can then proceed up to Elm Park and set out the car blocked N1 at Mine 9 there. It would then return to Commerce Street via Westmoreland Avenue with any cars it had pulled, run around its train, and would be ready to depart back to Jacobs Creek.

7. At Belle Yard it is only necessary to block cars for destinations from Belle Yard to Jacobs Creek. Any cars going further would be re-blocked at Jacobs Creek when making up trains there.

8. Trains going north from Celestown, CT, do not require blocking there. At Jacobs Creek the cars will be shoved into local, west or eastbound classification tracks which will roughly block them. They will be thoroughly blocked while being made up into trains to go further.

A freight forwarding system allows us to transition from just running trains to operating a model railroad. Having a strategy for blocking cars will make operations easier and more effective. And it will make running your railroad more realistic and less stressful. Using the alpha-numeric coding will mean all your operators can block cars effectively for your road crews. Switching along the way will be much more efficient and there will be less turmoil and late running trains.

And don't take all this as gospel or the last word. We are certainly not experts. We have modified this for our use and are happy with it so far. We suspect that further tweaking will occur. Certainly, we plan to try and develop an add-on for dealing with LCL freight like our milk and empty cans, etc. You may see the need to customize it further for your use as we have seen fit to do. Any ideas you have to improve or add features to Dan's approach would be of interest to many of us. We encourage you to provide your thoughts and ideas, as when working together we are bound to do a better job at most any task. But we do believe the basic approach developed by Dan is as good a system as exists out there, and it makes a great starting point for a personalized car blocking strategy. See if this will work for your layout. And share your thoughts with us in future issues of **OSR.**