Model Railroad Waybills

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Understanding Model Railroad Waybills and Operations

Waybills are sorted in this small office that accompanies a freight yard on a model railroad. Each car represents one car, each box one track. The operator will build new trains based on the destinations listed on the cars. Photo Credit: ©2010 Ryan C Kunkle, licensed to About.com, Inc.

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Real railroads move people and goods from Point A to Point B...so why do many model train layouts make them run endlessly in circles? There's nothing wrong with enjoying the view of a passing train, but if you want to increase your railroad's action, the easiest way is with operations that match the prototype.

Waybills

Waybills are forms used on railroads to help route each car from its point of origin to its destination.

They ensure that the loaded car will arrive safely in the right place at the right time and be handled properly along the way. Good railroad operations also mean getting the empty car to its next loading point as quickly as possible.

Picking up, moving, sorting and delivering thousands of cars from hundreds of shippers is a daunting task. Railroads employ armies of workers to not only move the cars, but track them and coordinate operations for the most efficient shipments. Fortunately, our model layouts are much smaller, the destinations fewer, and the customers less demanding than our

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prototypes'.

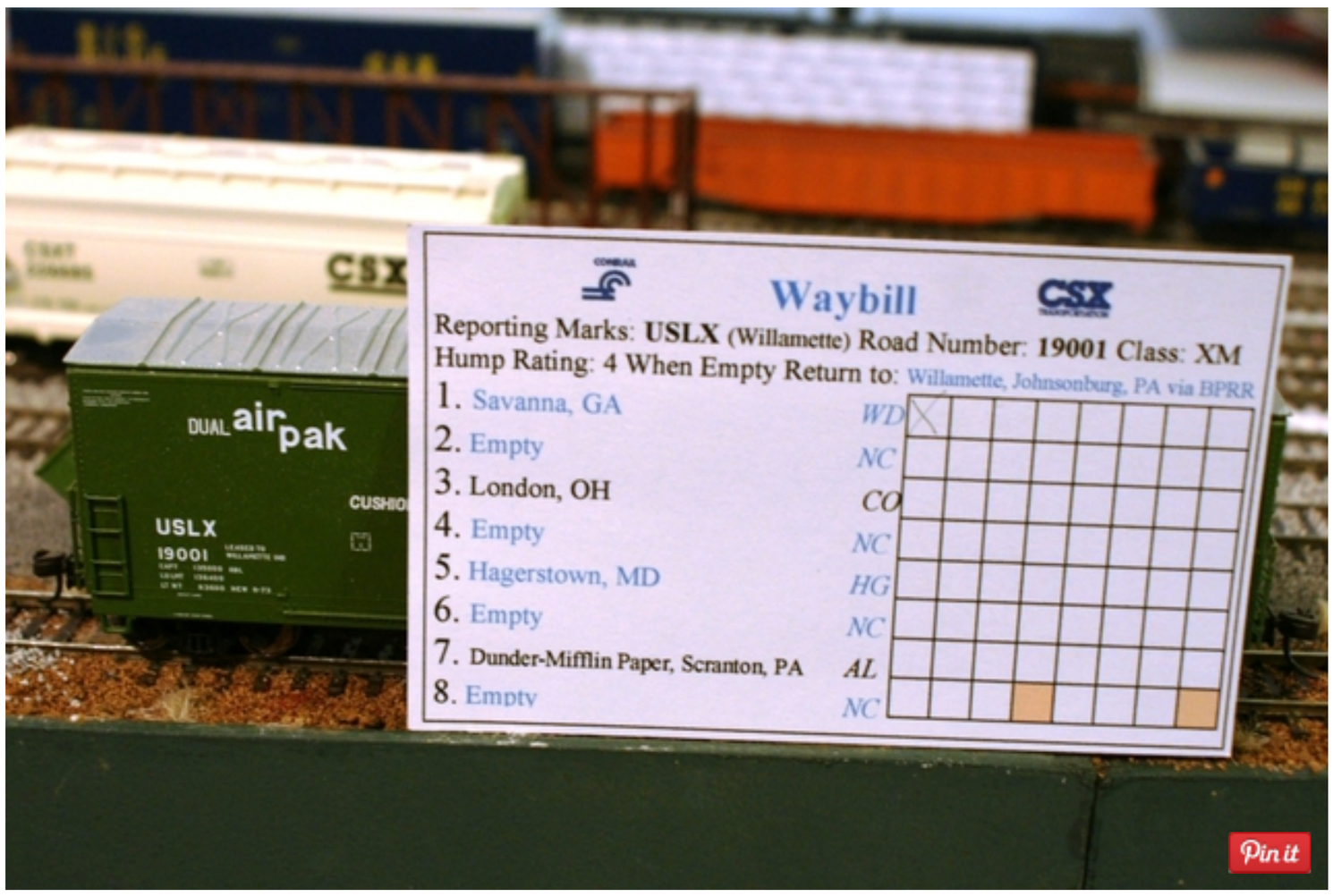
Even though there may be no profit to be had by improving your operations, replicating the prototype processes of moving cars with a purpose can add a lot of fun to your layout. In order to keep this work fun, most model waybill systems are designed to replicate prototypical car movement with the least amount of paperwork possible.

There are several systems out there, and even some commercially printed forms that you can purchase and use.

Others have developed their own methods. Whether you use prepackaged forms or come up with your own, adding a waybill system to your layout will revolutionize the way you look at the hobby.

For a better look at how these cards work in operation, follow a car on a model railroad as it moves through just one line of the waybill. Or, read on and get a better look at the cards themselves.

Waybill Basics



This waybill for USLX 19001 identifies and routes the car. Looking at the grid, it is now empty and its destination is Willamette Industries in on the B&P. The 2-letters next to the grid are a yard code to help operators unfamiliar with the layout. Photo Credit: ©2011 Ryan C Kunkle, licensed to About.com, Inc.

Regardless of which system you use, every model railroad waybill is going to contain at least two basic types of information:

1. Car Identification
2. Car Routing Instructions

Some waybills include additional helpful information, such as the last date the car was shopped or special handling requirements. More on that later.

Identification

This part of the waybill helps operators match the paperwork to the car.

Typical lines include:

1. Reporting Marks (ex. PRR)
2. **Road Number** (ex. 123456)
3. **Car Type** (ex. Boxcar)

Some modelers prefer to add more information depending on the level of detail they desire. For example, boxcars come in many different varieties. If you set up your system so that industries require specific types of boxcars, say cars only suitable for food-grade

shipments, then this information should be added somewhere to the car's paperwork to make it easier for operators to match the right car for the job.

One way to do this without much work is to use the AAR abbreviations for car classes in the "Car Type" description. "XF" instead of just "boxcar" means that this is a food-grade car. General service boxcars would be classified "XM." You can find a complete guide to AAR codes on the NMRA Operations Special Interest Group (OPSIG) site.

You can also add additional information, such as car length, height, door dimensions, capacity, etc. as necessary for the level of detail you want to achieve.

How far you go is up to you. And it is always possible to come back and add, or subtract, additional layers later.

Routing

Now that you've helped your operators identify the car, the routing instructions will tell them where to send it next. Just as in real life, there are many patterns that can develop here. Some cars move in very restricted routes, others can wind up anywhere. How do you recreate these patterns on your layout?

There are many methods of doing this, but the one you'll see here was first developed by Charlie Carangi more than 50 years ago. It is a simple system that requires only one card/per car (or even larger blocks of cars) and a pencil. One card can last for more than 64 sessions before it needs erased or replaced. If you run once a month, that's one update every 5 years!

Cars may have up to 8 unique destinations on each card. These can be online industries, or offline points represented by staging yards. A grid of 8 columns to the right of the eight destination lines helps track car movements. Reading from top to bottom, left to right, as a car reaches a destination, the operator marks an "X" in the box. The next operator will move it to its next destination on the following session.

Sound easy? It is. But read on to learn some more tricks to make your paperwork easier and your operations even more flexible.

Basic Waybills - Routing the Empties

This CP Rail flatcar is empty. It's empty routing (upper right) says "Home Rd shortest route" The car must be put in a train that will get the car to the nearest interchange with CP - or at least headed in that direction. It can not be reloaded online. Photo Credit: ©2011 Ryan C Kunkle, licensed to About.com, Inc.

When it comes to duplicating railroad operations, handling empty cars presents more challenges than you might think. There are several different ways that empty cars can be moved in the real world. Moreover, the rules for handling empties have changed over the years to protect railroads and shippers.

Per Diem

An empty car doesn't earn money so there is incentive to move empty cars to the closest

place that can use them for loading.

Historically, this has created some problems as railroads would keep better equipment from other companies on their line for loading.

One way to discourage this are fees for the use of equipment. These are called "per diem" (daily) rates. These specify that a railroad must pay a fee to the owner of a car when it is on their line. This encourages railroads to move empty cars back to the "home road" as quickly as possible.

Pools

In other cases, railcars operate in a "pool." These are agreements by which many railroads contribute equipment to a common pool of cars that can then be used by all participating roads at a more even rate. Sometimes the cars are owned by another company that is itself owned by many railroads.

Pools are commonly used for equipment that has seasonal demand peaks, special loading constraints, or for dedicated service between specific points handled by multiple lines. The most common example of a freight car pool is TTX Corporation, which operates the majority of flatcars used in intermodal and auto service.

Covered hoppers for seasonal harvests and dedicated routes for auto-parts boxcars are other common but less obvious examples.

Bringing it Down to Scale

Confused yet? Don't worry, you won't need an accounting department and a team of interstate commerce lawers to replicate the variety of empty movements found in reality. There are a number of simple ways to move your empties.

Dedicated Routes

The easiest way to return empties is through a dedicated route. This can take two different forms.

1. Cars can always be returned to a specific location for loading, such as an industry or staging yard.
2. Cars can be "Returned to Owner via shortest route." This represents returning an empty car to its home road. Depending on how your layout is set up it might mean different routings depending on its online location.

These methods require little thought on the part of operators and can be used to duplicate real traffic patterns. On a small layout with limited destinations, or for first-time operators, this may be all you need. If you want more flexibility, read on to learn about "open routing."

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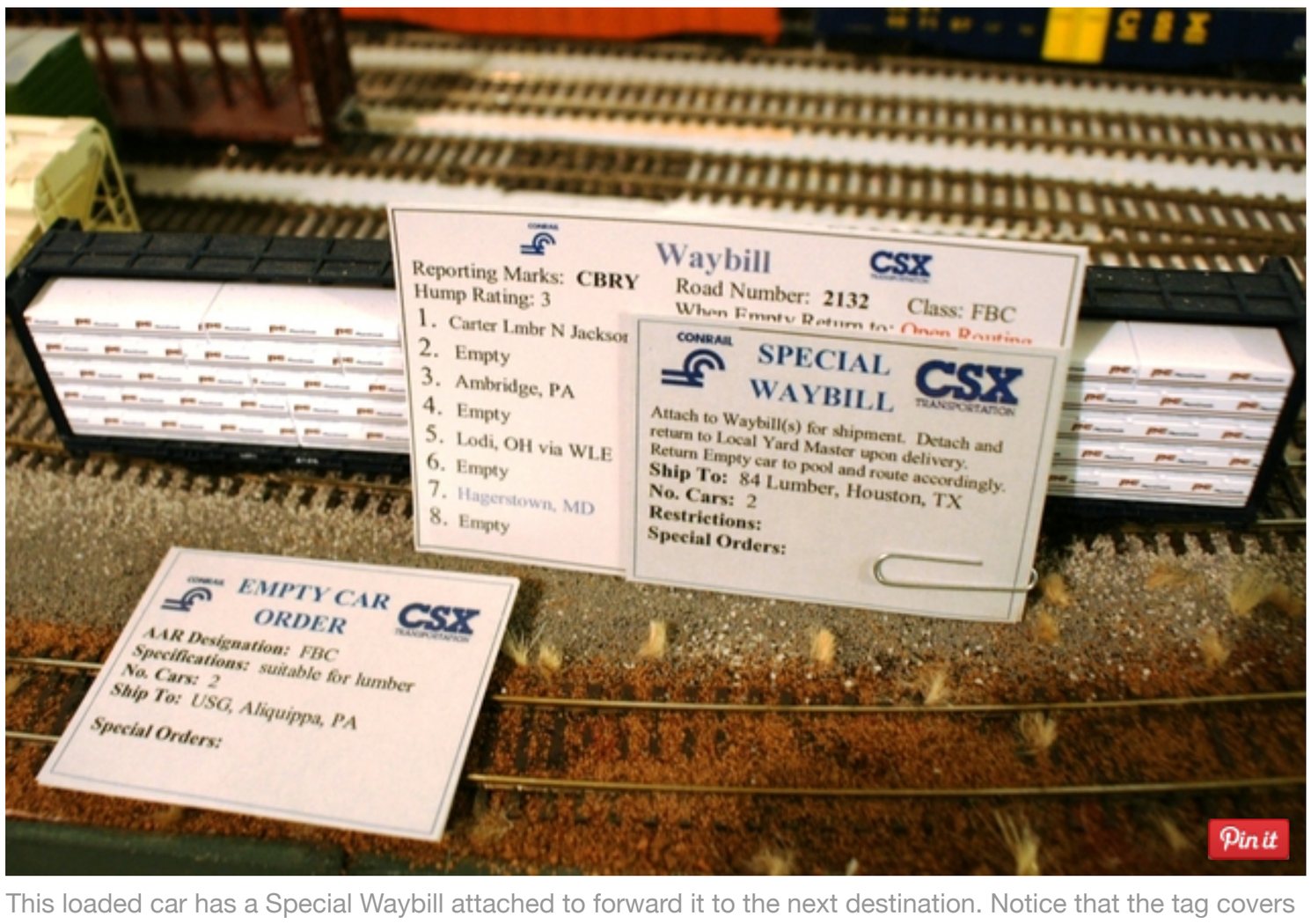
"Open Routing" Empty Cars with Waybills



This loaded car has a Special Waybill attached to forward it to the next destination. Notice that the tag covers

the normal routing box. The reverse of a similar card shows the empty car order part of the form. This order applies to two cars at once. Photo Credit: ©2011 Ryan C Kunkle, licensed to About.com, Inc.

Dedicated routes are an easy way to move loaded or empty cars over the railroad, but what if you want to give your operators more freedom and challenge while duplicating more fluid empty car movements?

Open routing allows operators to choose where to send the empty cars for their next loads. This method requires a little more paperwork and a better understanding of the railroad by yard operators. Some commercial card systems operate on a similar principle, using a card with a pocket for the car, and four-sided waybills for routing.

Using the previous examples, the same waybill card is used, with "Open Routing" printed at the top. This means that any "EMPTY" destination is at the yard operator's discretion.

This system works well for serving industries on your railroad requiring empty cars.

The Principle

A manufacturer ships finished goods in boxcars (you could get more specific, but we'll assume any boxcar will do) and calls the yard master at the local rail yard and requests a car.

The yardmaster searches the inventory of empties in the yard for a suitable car. If this shipper is a regular customer, a few empties may be kept on hand for faster delivery. If there is no car on hand, the yardmaster must call other yards to find one and have it routed his way.

The car is found and delivered to the local yard, then the shipper by a local freight. Once loaded, the local will pick it up and take it to the yard where it will be switched into a new train that will start it on its way toward Detroit.

The Practice

Now to duplicate this on your layout.

Car order cards are generated for industries. You can produce as many of these as you'd like and rotate them for varied operating patterns. These car orders are placed at yard operators' work spaces prior to the start of an operating session.

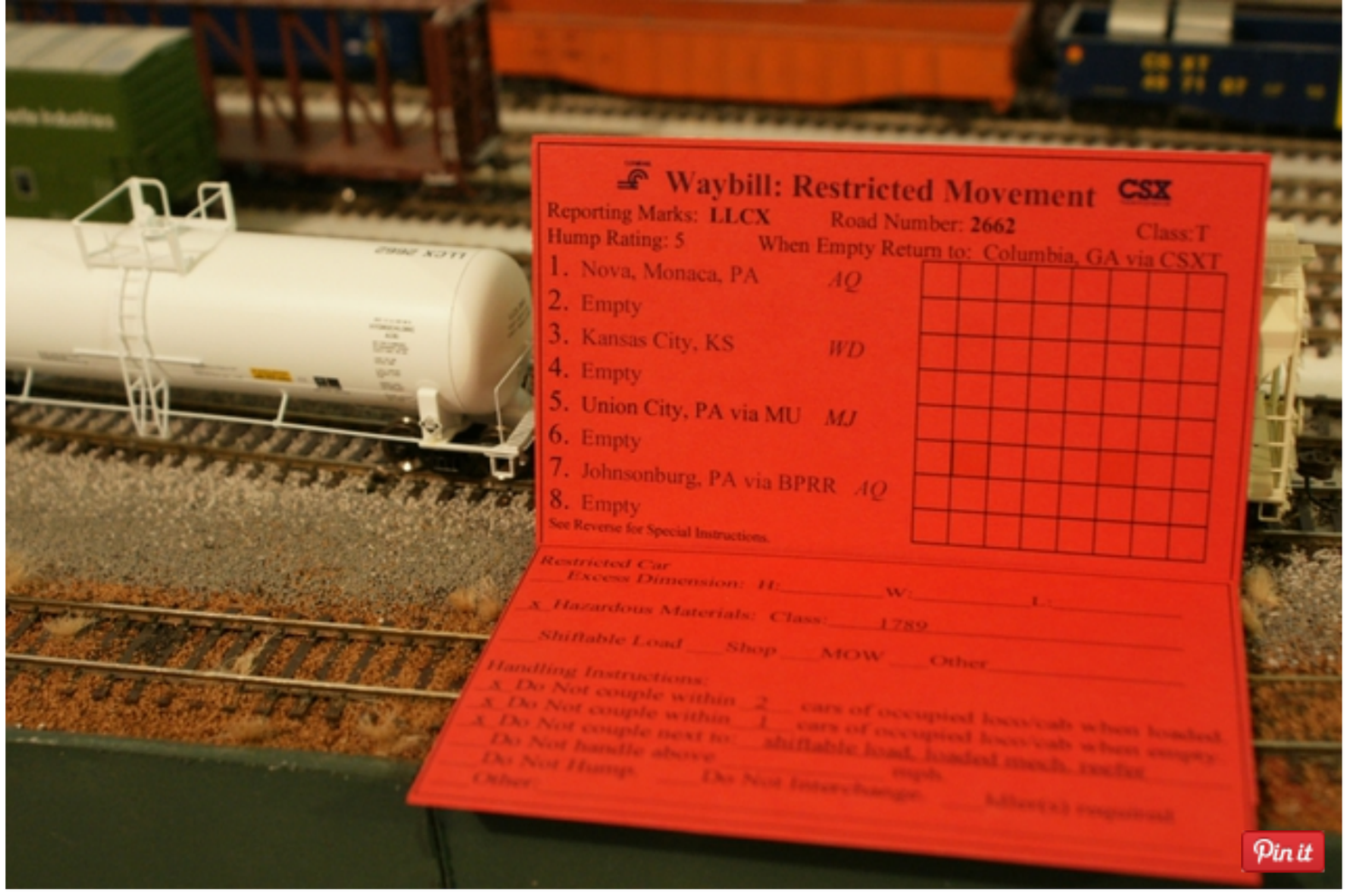
When they arrive, operators can quickly find out how many cars they need, scan the yard and then tell other operators what orders remain to be filled. Throughout the session, yard operators will talk to each other to confirm shipments. Eventually the empties will come in from around the layout. Empties are later forwarded by local freights to waiting industries. The car order is clipped to the waybill and sent with the car.

By the next session, those empties are "loaded" and the car card is reversed to reveal a new destination for the load. And the process repeats itself.

Yard operators will not want to keep large stockpiles of empty cars in their yard - they cost the railroad money but they also take up a lot of space in our compact yards. So there is incentive to work together to keep the railroad running. (Sounds fun, doesn't it?)

If a yard operator gets an empty car with an open routing but there are no standing orders online, he is free to route it offline to another location. Preferably, this route will take the car closer to its "home road" for loading. Follow car CBRY 2125 to see this all work.

Basic Waybills - Special and Restricted Loads



This tank car is a hazmat car and must be handled with care. The reverse side of the red card lists the specific restrictions for operators. There are many different types of restricted cars - each makes building a train a little more challenging. Photo Credit: ©2011 Ryan C Kunkle, licensed to About.com, Inc.

Railroads are called to carry a great variety of loads. Some require extra care in handling. Restrictions include using spacer cars, speed and switching restrictions and more.

The rules for handling these loads on the prototype have changed over the years. You may choose to add as little or as much as you feel is necessary to enhance without over-complicating operations on your line.

Like the waybills for standard cars, restricted car waybills contain identifying and routing information.

Any additional restrictions for handling can be added to the front or back of the card as seen here. You could also create a code to streamline the process. As a quick alert to operators, all of these restricted waybills are printed on a different color of cardstock.

Common Restrictions

Here are some common restrictions on loads and how they can be applied to a model railroad for more interesting operations.

Hazardous Materials

Different chemicals, fuels, etc. all require special handling. From a railroad operations perspective however, most have similar restrictions:

1. *Do not place next to locomotive, occupied caboose or passenger car.* One or more spacer cars are required between the load and occupied equipment. Some cars even require a spacer when empty, and may require more when loaded.
2. *Some hazardous loads may be prohibited from traveling next to other types of equipment like mechanical refrigerators, cars carrying foodstuffs, shiftable loads, other hazardous loads.*
3. *Do Not Hump.* This car can not be switched by being pushed over a hump in a yard. This is mostly reserved for explosives. Even if you don't have a hump yard, this is a caution for gentle handling.

Oversize / Shiftable Loads

Oversize loads like equipment, machinery, etc. are usually placed next to locomotives or the caboose for observation. They may even move in a dedicated train of their own. An oversize load may also include long beams or pipes that extend beyond the end of a car and require the use of an idler. Additional restrictions might include speeds, only passing trains in certain locations, and operating on specific tracks past structures or under bridges and tunnels with tight clearances.

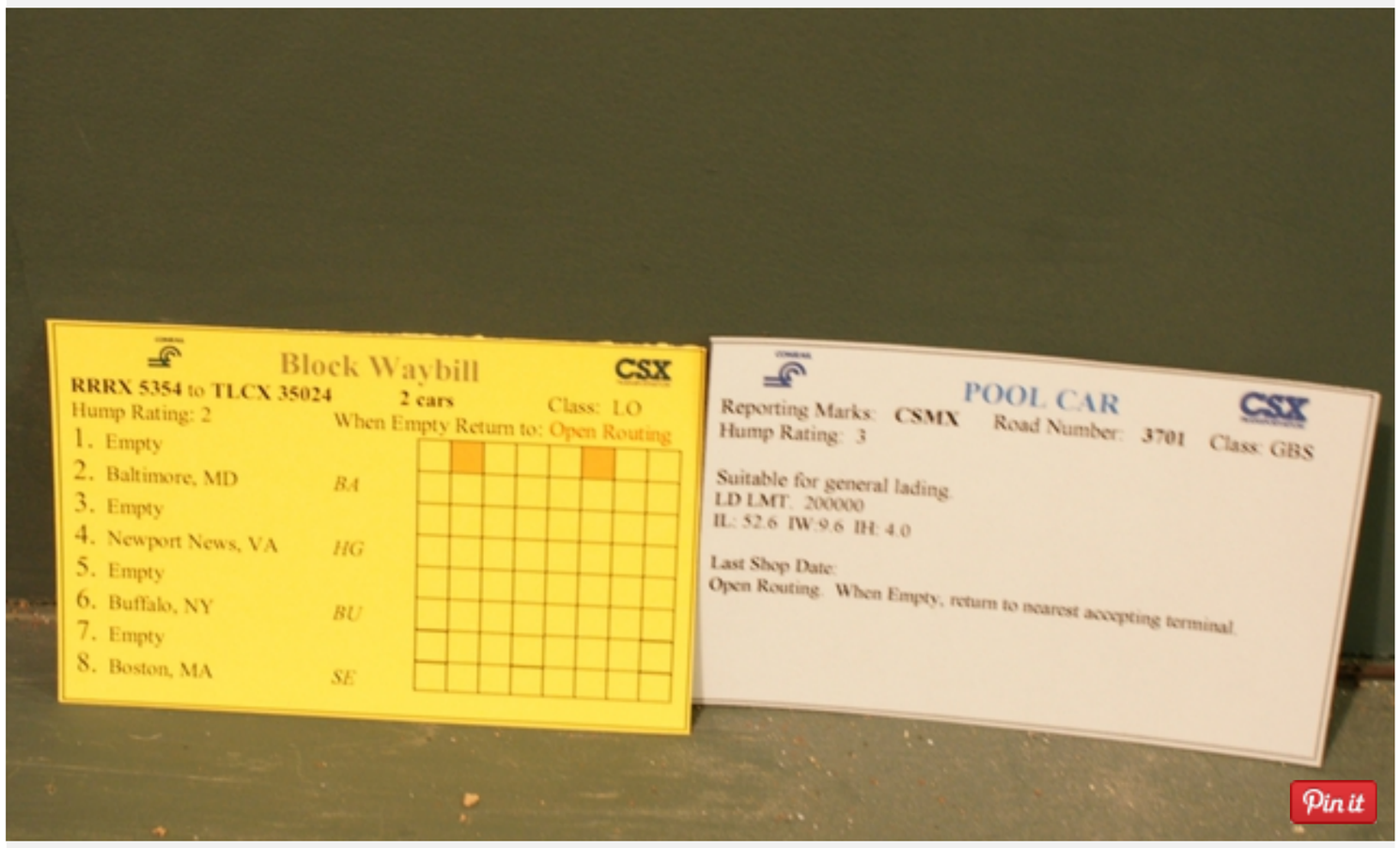
Shiftable loads are more common and can be handled in regular freights. These are loads that could shift past the ends of the car in transit, such as a load of pipe on a flatcar without bulkheads. These cars should not be placed next to locomotives, cabooses, or hazardous loads.

Maintenance of Way

Railroad equipment used for track maintenance, but also other in-house equipment like wreck trains and stores cars, can fall into several restricted categories. Some may carry hazardous materials, others, like cranes, are often oversize and have speed restrictions.

Typically, many of these cars are older and beyond their useful life in interchange service. They are captive to the railroad and are billed as "Do Not Interchange."

Basic Waybills - Blocks and Pools



Yellow waybills work for 2 or more cars. These cars always stay together. Pool cars can roam freely around the layout until needed for loads. The specific data shown on the front of this card is also printed on the back of "open routing" general waybills. Photo Credit: ©2011 Ryan C Kunkle, licensed to About.com, Inc.

If all of this seems like a lot, here are two ways to greatly reduce your paperwork without limiting operations. As with the Restricted Loading cars, it is helpful to operators if these cars are called out by different colored cards.

Blocks

Some industries will always require or ship multiple cars. You may even have entire unit trains going between the same destinations. Why write out a separate waybill for each car?

The same basic waybill used in the previous examples has been modified slightly to provide a little more room for identification. The first and last car's reporting marks and road number are listed, along with the number of cars in the block. It could be 2 cars or 40...but still only 1 card.

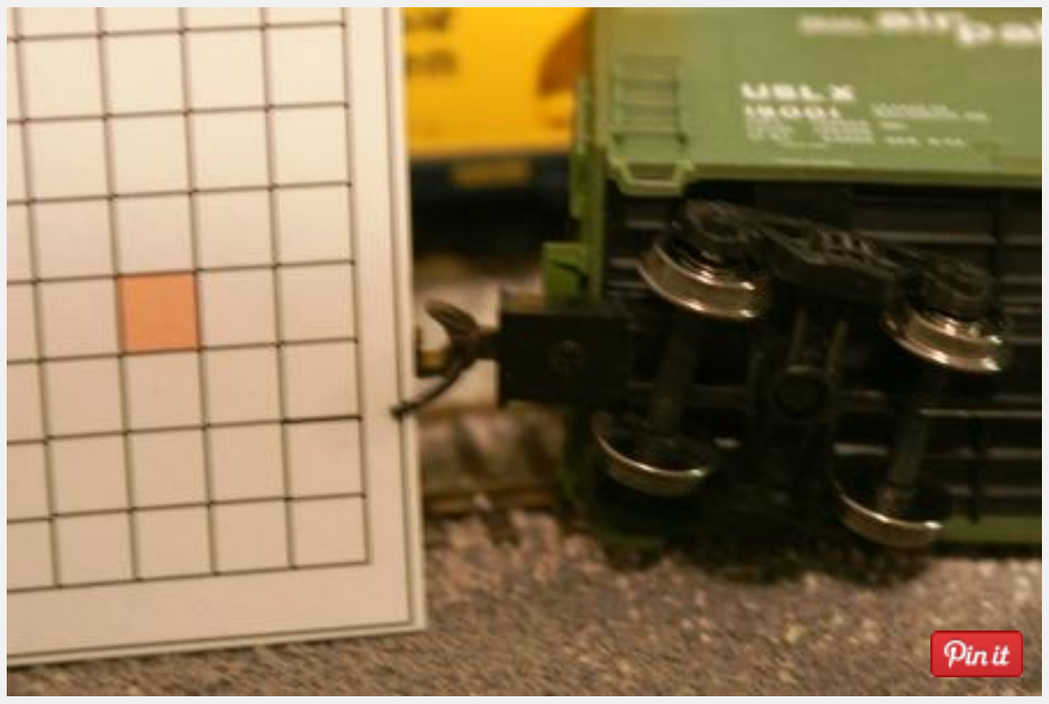
Pools

Freight car pools allow cars to roam without empty car interchange restrictions on a nationwide network. Intermodal equipment and autoracks are common examples. Other cars can be pooled as well.

For modelers, this is like the "open routing" scenario described in step 4. If you do not want to make specific destinations for the car, a simple card like the one shown here will serve just fine. The car is always considered empty and may be grabbed by any yard operator for a load if necessary. Once the empty car request / special loaded waybill is attached, it is routed accordingly. Then it goes back into the pool.

If the car won't be needed, it is simply forwarded to another destination. Yard operators will treat this just like other empties, but the setup time required on your paperwork is greatly reduced!

Basic Waybills - Beyond Car Routing



When a car reaches one of the two shaded destinations on the card, it is time to go to the shops for inspection and maintenance. Under normal use, that will be about once every 2 years per car. Photo Credit: ©2011 Ryan C Kunkle, licensed to About.com, Inc.

Waybills do a lot to make the railroad's operations more realistic, but that is not all they can do. With this written record assigned to each car, you have an opportunity to track more than the car's movement.

Maintenance

Cars can be regularly routed to a "shop" track for actual routine maintenance like cleaning wheels, checking gauge, etc. Depending on the frequency of your operations, you may want to make this one of the 8 regular stops, shade in two boxes in the grid as seen here to tell yard operators its time to put it in the shop track, or just make it a rule that the car is pulled from the layout when all the boxes are filled.

Going along with this, it is a good idea to create a dedicated track in your yards for shop cars so you have a convenient place to go and find the next batch every month. The same track could also be used for cars that have been separated from their waybills.

Note the date of the last shopping on the back of the card. If you find the rotation is too quick, you can simply put the car back in service. Not frequent enough? Add some more shop boxes to the schedule. By bringing cars in at different intervals, you set yourself up for a regular and manageable workload when doing routine maintenance. The trains will run better, and you'll have more time for fun jobs!

Hump / Drag Rating

Even with proper lubrication, some freight cars just roll better than others. This can create problems in yards and out on the line. This little addition to the waybill helps operators know what they're dealing with.

Test each car on a dedicated grade. Note how far it travels, and assign a number to each distance. A car with a "1" rating might travel 1 to 3 feet.

"2" - 3 to 5...

If your layout features a working hump yard, this code will help operators plan ahead to control the cars' descents into the class tracks. Even if you don't have such a feature, knowing how much drag cars have can be a help when determining which or how many locomotives to assign to the train.

Ownership

Do friends bring trains over to run on your layout? Do you actually interchange cars with another layout between sessions? If you do, noting the cars' owner on the waybill is one more way to keep track.

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