MODEL RAILROADING BASICS 101
Developing Operations on your home layout.

By, Norm Logan
NMRA NCR Div 6

ARMCHAIR AGENT

Turning your layout into a working operating railroad business can be an exciting and eye-opening exercise. First you get to be an " Armchair Agent". Grab a tablet and pencil. We begin by writing down on paper notes about **YOUR** railroad's business. **Yes the business.** It's the business that drives the operations and the need for equipment and the tracks to take them there. You do not need a finished layout. You can do this **area by area** where your railroad moves equipment, whether real or imaginary. This way you can start railroad operations and your business will grow as your connections grow.

HOW DOES YOUR RAILROAD MAKE MONEY?

First, we start with our LOCAL CUSTOMERS. Think of one town on your layout. Does this town have a name? Give it one for location. Now for the fun. Write down each industry that you service with your railroad in that town. For each industry answer these questions:

a) what inbound railcars and type does it need for supplies?
b) what outbound railcars and type
does it need for finished products?
c) what outbound railcars and type
does it need to remove waste or by products?

Next we think of TEAM TRACKS, tracks used to off load cars by "near rail" customers. These may be customers down the road that you are NOT MODELING. What? Not modeling….**yes, no room on the bench work**….but can still ship and receive. TEAM TRACKS are simply tracks with a dock or road beside them. For each industry answer these questions: i.e.: Lumber yard

a) what inbound railcars and type does it need for supplies?
Box cars(parts) flat cars(machines, tree cores), coal (heating)
b) what outbound railcars and type
does it need for finished products?
Box cars (finished lumber) Blk head flats (finished lumber)
c) what outbound railcars and type
does it need to remove waste or by products?
Sawdust hi top hoppers, Gons (scrap bands)

Wow, got a small layout? Well this offline industry already needs 6 cars to keep the lumber business going. What about the Paper company? Textile? Coal? Oil? Furniture? The list goes on and on. You can see that this is a very handy piece of trackage for any railroad. And this is just ONE TOWN. Wait, can one team track ship cars to other team track and send supplies to another offline industry? **Yes!**
You can see how the connections are going and going even without adding more models to the benchwork!

BRIDGE TRAFFIC

Yes, I know, you want to run long coal trains. This is called Bridge traffic. These are trains going from one end of the railroad to the other end. These can be Coal, Rock, Ore drags, a long string of mix freight, or an intermodal train….you know, those well cars with boxes, modern stuff. To make these operational you need a place for them to go. This could be a freight yard, a coal mine, a steel mill, or an OFFLINE industry. Yep, there I go again. But this time it's not a team track, it's a LONG TRACK or a STAGING TRACK. These can be hidden or open. Many times, they are part of a staging yard that will represent a faraway town, yard or port. This is wonderful thing to add to your layout if you don't already have one. Or, if you have one didn't know what to use it for.

Many layouts have a "RETURN LOOP" with a passing siding. These passing sidings could also be used for these STAGING TRACKS.

INTERCHANGE/TRANSFER

Other track that you can add is an Interchange track. Interchange track link one railroad to another. Maybe you model NS. With an interchange track to CSX, you now can pick up cars from CXS and drop off railcars from NS. Yes, you are way ahead of me….that where team track and bridge traffic can go. With Interchange tracks you have really expanded your business. AND, you need to buy CXS area cars that come on to your railroad from their OFFLINE businesses. Many times, these interchange tracks are connected with a "DIAMOND" or track that cross your railroad. You can model this by installing the "DIAMOND", but the track curves in and parallels your railroad. Be sure to leave room for 5-8 cars. In many operating sessions, these cars are the IN BOUND cars that are to be delivered. Some of the cars that are switched on your layout will be returned to this Interchange track. Yes, this is a BIG TEAM TRACK. Some layouts use a track or two in the STAGING TRACKS as Interchange tracks. I.e.: track one CXS track two MSR.

TRANSFER TRAINS are very much like Interchange trains. However, they are used for the short haul. Transfer move cars from yard to yard. You may have a main yard, but trains from this yard can send cars to the Intermodal yard, or another railroad yard that is nearby. On my layout, I have a government security yard called the BOAT YARD. Cars are held for border control from USA and car come in and held for inspection from CANADA. This way I can connect to CN, CP, CO CR. You can see that I have created Transfer Trains that can turn into Interchange trains to move cars to Industry and Team tracks.

PASSENGER SERVICE / ERA

OK, you should be almost out of paper now. Your business has really expanded, but maybe you want more? Passenger service– moving people from station to station. Passenger service can also have operation. Depending on what **ERA** you choose. Yes, passenger service over the years has changed as using the auto instead of the Passenger train in getting passengers, mail, and goods from town to town. This is where the ERA part come in. From 1930's to 1970, the Passenger train was in some places the only way to ship goods and people. Baggage cars would hold mail and goods and stop from town to town. Buy switching cars and picking up cars, goods could be shipped. Thus, if you have a station you may need a STATION TRACK. Yep we are back to the team track stuff. So, each town had a STATION for passengers to wait for a train. A STATION TRACK for loading passenger bags, other goods, and mail into baggage cars. A TEAM TRACK for other offline industries and customs to use. And lastly a FUEL TRACK for off-loading coal and gas/oil for the town.

Also, there was a coaling tower to load coal for steam engines as well as a water tower. Many times, there was a track beside the coaling tower to **spot** (move to a location) a hopper car to unload coal.

Stopping for passengers, servicing a steam engine, and switching baggage, mail, or milk cars took time and good train handling. This can also add operation to your layout. Or, you just run Amtrak. You stop and pick up passengers and leave.

REPAIR IN PLACE [RIP] and CLEAN OUT

Many people forget that your biggest industry is YOUR railroad. Your railroad will need supplies, parts, and work area to repair railcars of your railroad and other roads. This area is called **RIP** or Repair in Place. Cars are inspected before they are released to run on a train. If something is broken or not safe, the car is sent to the RIP area for repair. Therefore, you need a **RIP TRACK** to hold cars and equipment that are being repaired.

Railroads also have a **CLEAN OUT TRACK** to sweep out Box Cars so that they can be used for loading.

Like the TEAM TRACKS, **RIP** and **CLEAN OUT** tracks are close near the yard area. Some yards even have **FUEL TRACKS** for reefer car engines.

Don't forget your railroad's **TEAM TRACK** to off load your own supplies.

FUEL AND MAINTANCE

Fuel and engine maintenance have always been a major factor of cost to any railroad**. Having an area to fuel engines and do safety maintance** is an important part of operation. This area is located at one end of the yard.

Railroads also fuel and repair engines that come to your railroad paid for by other companies. This can also be part of railroad operations by removing engines from their train and moving them to the fuel rack.

Developing Operations P3

Ok, now that you have an idea of how railroads make money, let's take a look at your railroad and layout.

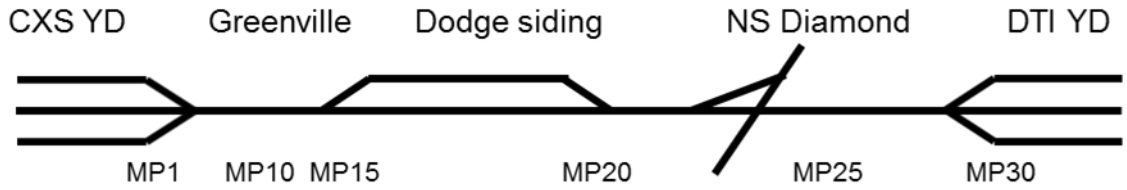
HOW DO RAILCARS/TRAINS COME ONTO YOUR RAILROAD, AND GO TO OTHER RAILROADS?

A) Do you have any Interchanges? If not, can you add one or two?
B) 1) Do you have storage tracks that could be interchanges?
C) 2) Could you have tracks in a yard that could be interchanges with another railroad?

MAKE A STRAIGHT-LINE DRAWING OF YOUR LAYOUT.

We now need a way to send each car to a loading / shipping or off loading and shipping area. We do this with a map of your layout. Start by drawing a line from left to right.

A) Name all towns or stopping points. Use maps to help.
B) Show the where the yard is on the drawing.
C) Show passing sidings.
   1) how many cars will it hold with engine and caboose?
D) Show DIAMONDS and interchange tracks
E) Show / name where all industries are.
F) Develop a **MILE POST system.** – This helps new operators find where they are on the layout system map. This will also help the DISPACHER for your Layout. Some people use **SMILES** to help with this. It is small scale miles i.e. 1yard = 1 SMILE. Or you use your imagination to make up the distance from on town to the next. Train operators my not know where GREENVILLE is on your layout. But if it is **MP20 (MILE POST 20)** they can count and find it.



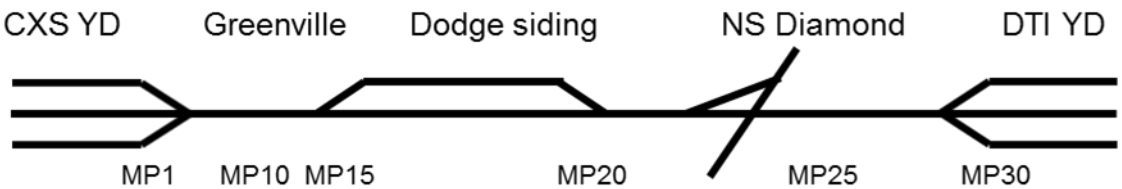
HOW DOES YOUR LAYOUT **FIT ON EARTH** N/S E/W?

A) What big cities can you ship to? When car get to the CXS yard will they keep going off layout to the east coast?

B) Are you near ports or large terminals? When cars get to the DTI Yd will they be sent to FORD MOTOR COMPANY? or the Detroit river front?

5) **IF YOU RUN A TRAIN** TO SERVICE YOUR CUSTOMERS:

A) i.e.: going EAST: Which industries have "Trailing points"?
B) i.e.: going WEST: Which industries have "Trailing points"?
C) is there a "Run- a- round" Track?
D) Interchange Tracks?



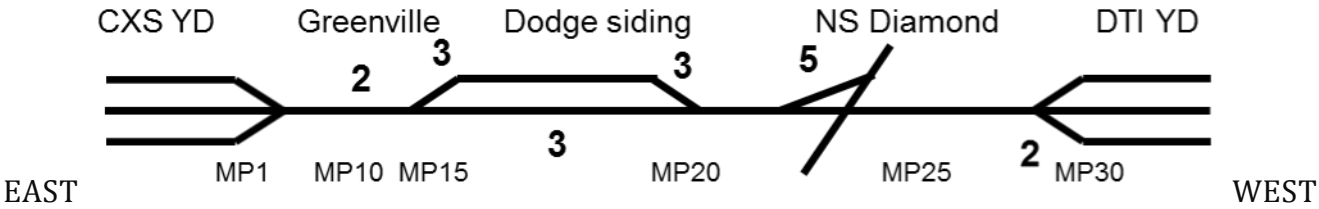
EAST WEST

6) {Check on the Layout} **HOW MANY CARS** WILL EACH INDUSTRY HOLD?

A) Be sure to **check the Railcar** types for each industry as the **length** is different for each one.

B) Be sure to have **"clearance room"** to move Railcars through switches in the industry **"PLANT".**

"Clearance points" can be painted on the tops of rail ties. This helps operators to know where the **safe point before the switch is**, to leave railcars.



7) **BUILD A TRAIN** AND SWITCH TOWNS/INDUSTRIES.

A) WEST BOUND from CXS Yard. to GREENVILLE…to Dodge siding .to NS Diamond …> to DTI yard. Did everything work OK? Were there derailments? Buildings with no "clearance room " for Railcars to get by or under. Dead spots of track? Do you need passing sidings? **If there are problems fix them now.**

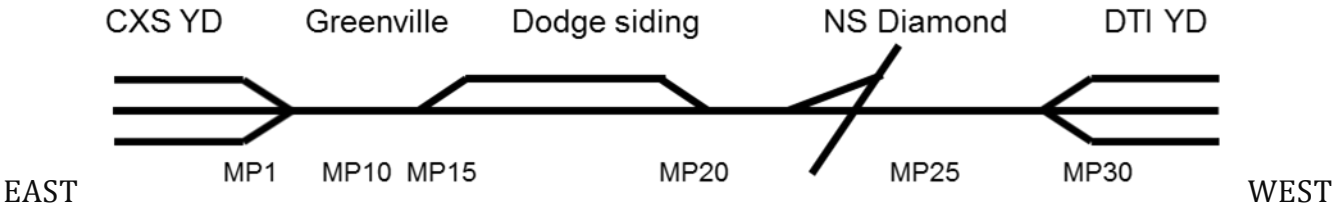
B) Build a train and run it the opposite way. Check the same problems as in A).

BEGIN WRITING TRAIN ORDERS FOR CREWS. (WHAT JOBS DO THEY DO?)

A) Write train orders for all services your railroad on 3x5 cards.

B) **Try not to make Orders to complex** or jobs that last for more than an hour.

Example using our line drawing:



201 WCD WEST bound Local Turn
MP1 **CXS YARD**
Get permission from Yardmaster to leave yard.
MP10 **GREENVILLE**
Switch team track, oil company.
MP 15 **DODGE SIDING**
Switch out coal yard, Flour mill,
MP 30 **DTI YARD**
Reverse train direction on passing siding
Head back to CXS Yard.

NAME / NUMBER TRAINS

Naming and numbering trains help to identify the type of train, the direction it is going and its importance in the lineup of traffic flow with the other trains. Passenger train always get priority over all other traffic on the main line. They are a TIMED TRAIN and must keep to a schedule. Other trains, such as coal drags, may just be stopped and left on a siding till needed. By using the following system, you can identify you trains and set a lineup of traffic flow.

NUMBER TRAINS

A) [4] digit 2002 Coal/ Rock/ Ore/ Coke
B) [3] digit 302 Local / Transfer / Service
C) [2] digit 22 Through Trains / Mix passenger
D) [1] digit 1 Passenger / Mail / Milk

NAME TRAINS

D) Direction of Train **N** North
E) From TOWN going to TOWN **JL** Jackson to Lansing
F) Put all symbols together: **1NJL**

Put the train number first, direction, going from A town to B town.

1 NJL= Passenger Train / North/ Jackson to Lansing

G) Or name Trains - "**The Jackson flyer**". Many railroads name and use numbering trains differently. However, this is an easy way to start.

10) **MAKE A LIST OF TRAINS** YOU NEED TO SERVICE ALL CUSTOMERS, SERVICES, RAILROAD SUPPORT SERVICES

This list will be the order of trains running during the OPS session. To make things run smooth at the beginning, start with trains that have little or no switching, then trains that switch. Finish the session with train that have little or no switching. This order of **TRAIN FLOW** will help get the **OPS** (operation session) going and free up the yards to build more trains.

11) MAKE A YARDMASTER **TRAIN BUILD LIST.**

Now we start to put ALL the pieces together and make our list of trains.

A) Take each **Train Order Card** and put them in the **RUNNING ORDER for the Operating Session. (OPS)**
B) Take each **Train Order Card** and make list of needed cars for each industry to be switched. I.e.:

201 WCD Local [1 unit] 2 boxcars, 1 tank, 1 flat, 1 hopper, 2 CV hopper, Cab
1 W Amtrak [1 unit] 2coach 1cafe

By the way, the [1 unit] means one engine and Cab is Caboose.

12) **RUN SOME TRAINS!**

You need to **RUN EACH TRAIN ORDER** YOURSELF. This is best way to check and see if there are problems in the operations. Questions to ask yourself:

A) No way to deliver all cars? Need **TEAM TRACK**?
B) Need a "Run a Round" track in the yard?
C) To many cars for industry?
  1) need overflow track. (to many cars for this industry in train. What do we do with them?)
  2) cars to long for tracks.
D) Engine keeps stopping on switch.
    1) Fix all electric problems.
    2) Rewire switch.
E) Need to add **"Run a Round**" track on the main?
F) Need to add **INTERCHANGE TRACK**?
G) Need to add **STAGING TRACK**?

13) HAVE A **SMALL FIRST OPS** SESSION

OK, you have checked each TRAIN ORDER. Now we need to put it all together in real time with more than one train going at a time.

A) Pick 3-4 friends to come to an OPS session.
B) Run ALL trains (10 trains for a 4-hour session)
C) Have a "Pie and coffee" time after the session
D) Write down problems
    1) Listen to advice on how thing may be changed for the better.
    2) Make a list of "easy" fix and project fix.
E) Fix all track problems that were noted.
F) Fix all electric problems that were noted.
G) Fix all Car/ Engine problems that were noted.
    1) Wheel Gauge …have NMRA gauge?
    2) Couplers (height, springs?) .have tools?

14) **HAVE FIRST FULL OPS.**

You are ready to have your first Operating session. Let everybody that is coming to OPS session know that the **PRE OPS MEETING will start at what time? 7p?** You need to know that **crew members will arrive 15 to 20 minutes** before that meeting. To get everybody on the same page, put together a list of information for **YOU TO REMEMBER** that will help each operator to have a good session and run your railroad in the way you envisioned it. Read off each idem in a **PRE OPS MEETING** before the session begins. This will save MUCH time answering questions about "HOW DO I DO THIS?" "HOW DO I MAKE THE ENGINE WORK?"

A) Prepare notes for an opening meeting.
    1) Welcome – (Welcome to the Michigan Southern 1970's)
    2) Where is the bathroom?
    3) System of Operation
        a) Jobs , two-man crews?
        b) Posted Train OPS sheet? Train order cards?, Timetable and Train order?
        c) Switch lists? Car cards? Tacks?
        d) Radios?
        e) car handling – how to I uncouple equipment?
        f) how do I use the "controller"?
B) **No food/ drinks on layout**
C) Please run trains IN Order
    1) post a list of the order of trains?
    2) Clock start for Trains: **12:30a - 201 NJL?**
D) Use **mini post–it** for RIP cars
    1) Coupler height / swing
    2) Wheels gauge
    3) parts falling off / damage
        a) B end is brake wheel end
E) Have a pad to write stuff down. Don't hover, **just help and have FUN.**

15) **Pick an END TIME** for OPS session [10p? 11p?]

A) Have a Post Ops "Pie and coffee" time.
B) Ask for review of today's OPS.
    1) Take notes
    2) Don't forget to write your review!

////////////// HAVE A GREAT OPS! //////////////////