Virtual Railroading

Computer Based Operations Using Railroading Simulators

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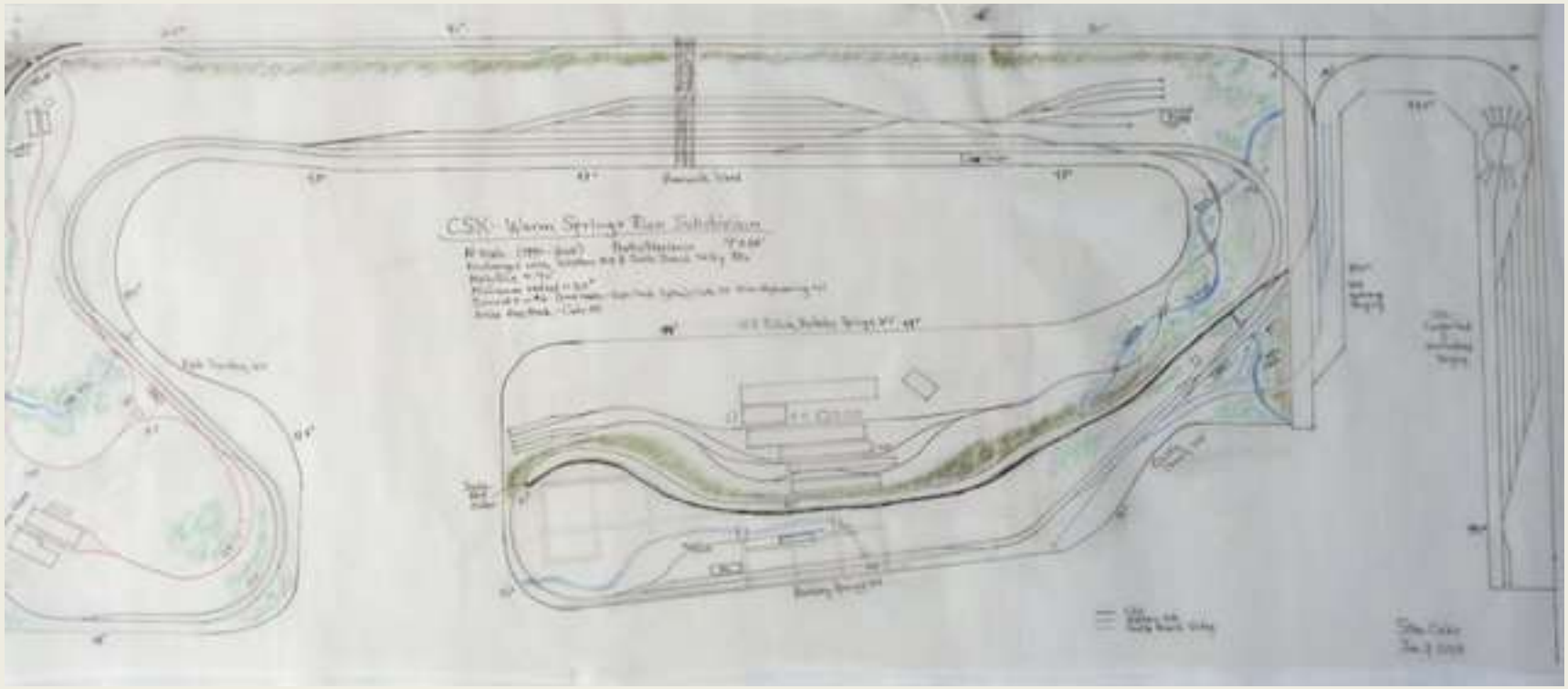
Overview

- Track planning methods for OPS
- Rail simulators history and overview
- "*Trainz Railroad Simulator*" and practical application to model railroading
- Prototype/layout study and OPS development
- NMRA requirements towards Chief Dispatcher AP using virtual railroading

Track Planning for Operations

- Traditional methods, prototype study
- Resources
  - John Armstrong, Tony Koester, OPSIG, LDSIG
  - MR Mags/Books/Prototype
  - Layout Design Elements
- Scenery and/or Operations
- Computer Aids
  - Static – 2d CAD diagrams
  - Dynamic – 3d CAD diagrams, simulators and operations
- *Experience using other people's layouts.*

Track Planning for OPS

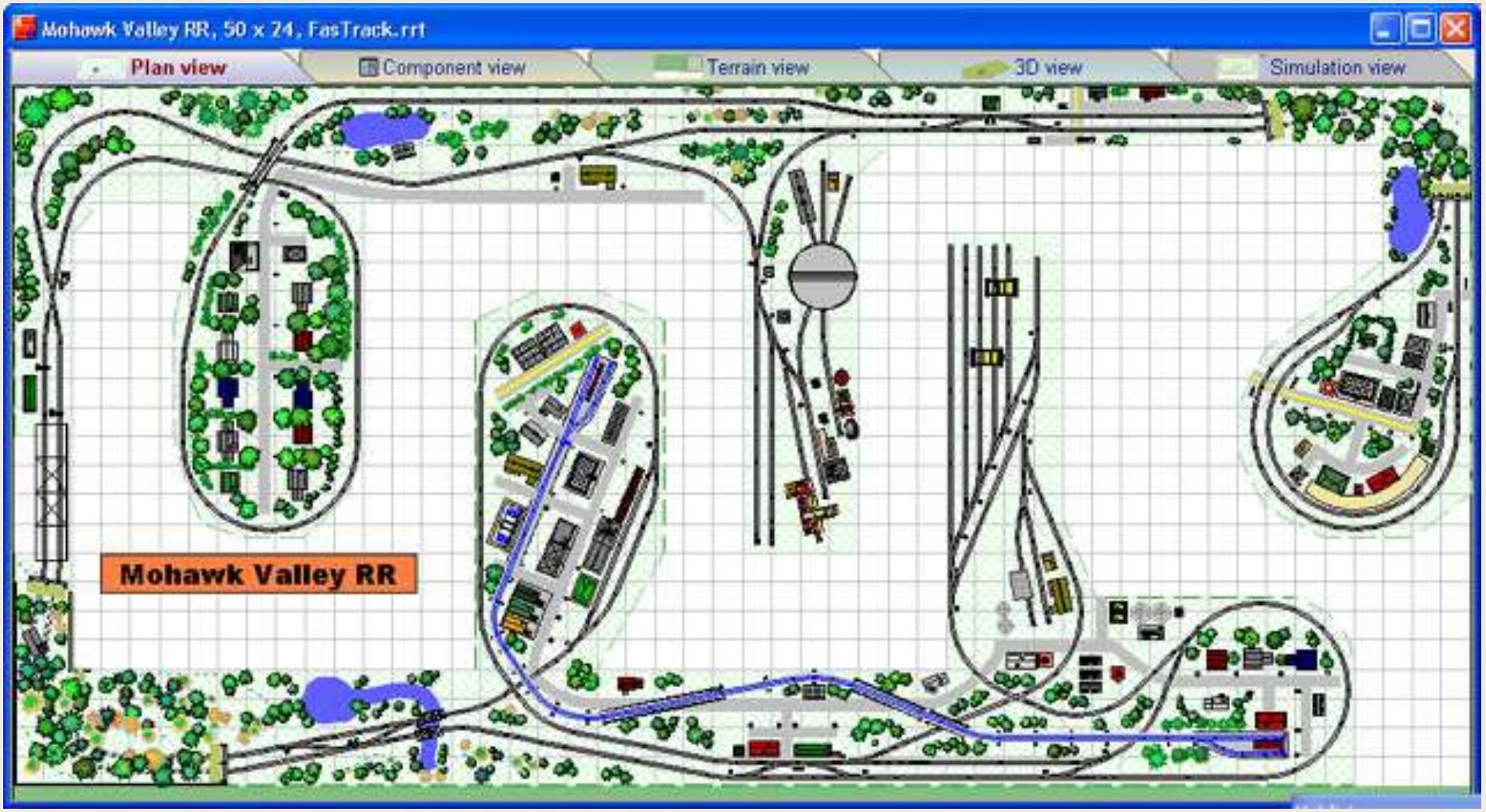


Traditional example using pencil and paper,
very time consuming and sometimes not accurate

Old School 2D and 3D

Ops planning is going to be limited to what you can imagine in your head.

RRTrack CAD



Typical computer based CAD track planning software allows a bit more fidelity with OPS mode but still limited to simply running consists in circles.

Planning for Operations - Goals

- Bridge the gap between prototype and model
- Timetable development
- How long do those “extras” really take?
- Industrial switching development
- Yard management
- Model railroad operations in it’s most basic definition is essentially a game
- ***Rail simulators support all these points and can be used as a tool to enhance our model railroading experience***

Railroad Simulators For Operations

It’s not just video games for kids.

Simulators Definition

- Commercial Simulators
  - Used for training and qualification of actual railway personnel. Focus on functionality with various levels of quality in graphics and interfaces. Not normally available to public.

Simulators Definition

- PC Simulators
  - Personal use. Glorified computer games with the “serious enthusiast” in mind. Mimics actual operations in the simulated environment. High graphics and physics performance with many “bells and whistles” (features) to enhance experience.

Simulators and Model Railroading

- Pros
  - Freeworld environments
  - No limits to space or detail
  - Easy to build layouts
  - Prototype route study, operations study
  - Be the engineer
  - Caters to many different interests
  - Several types of equipment, structures, routes
  - Unlimited potential (content creation)
  - Can be used in many ways like an actual model layout
  - It’s FUN

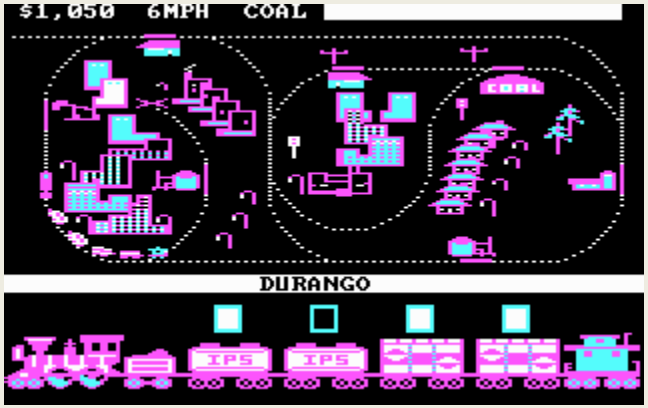
Simulators and Model Railroading

- Cons
  - Track placement not as accurate as CAD for LD
  - No benchwork or model railroad space specific tools
  - Requires steep learning curve to create AI based scenarios and custom content
  - Limited multiplayer options
  - Computer requirements for performance
  - Can be time consuming
  - Resistance to embrace this type of virtual model railroading due to the perception that it is just a video game for kids

History of PC Train Sims

Train sims have been around as long as computers. Most were either small switching exercises or railroad empire strategy/management. Some notable releases:

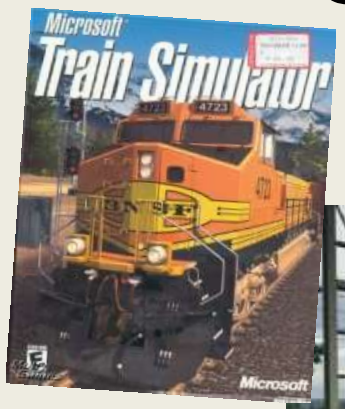
1983 “Trains” Commodore 64
1990 Sid Meier’s “Railroad Tycoon” PC DOS
2001 Microsoft Train Simulator
2002 Auran’s “Trainz Railroad Simulator” (TRS) – (active)
2009 Railworks/Railroad Simulator (“Train Simulator 2015 ”) – (active)
2012 RUN 8 Train Simulator – (active)



1983

1990

Commercial Train Simulators



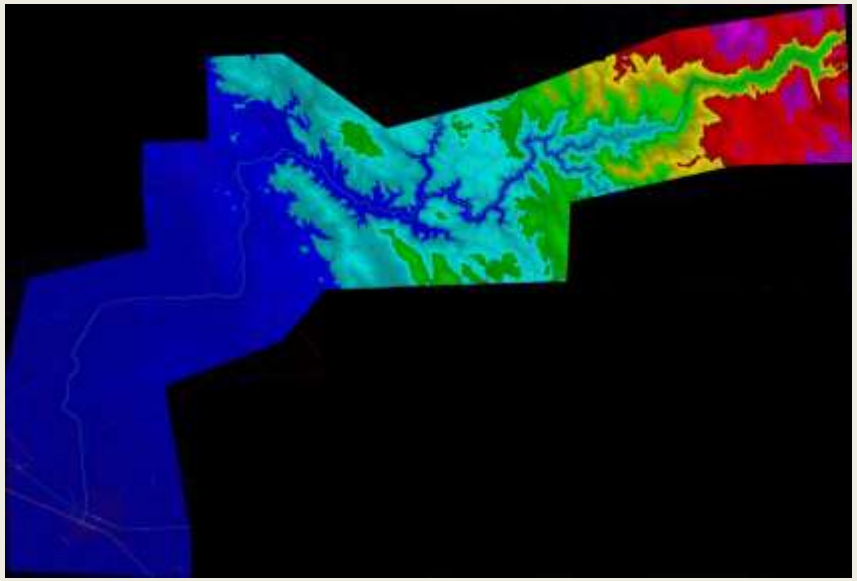
Practical Application – Trainz (TRS)

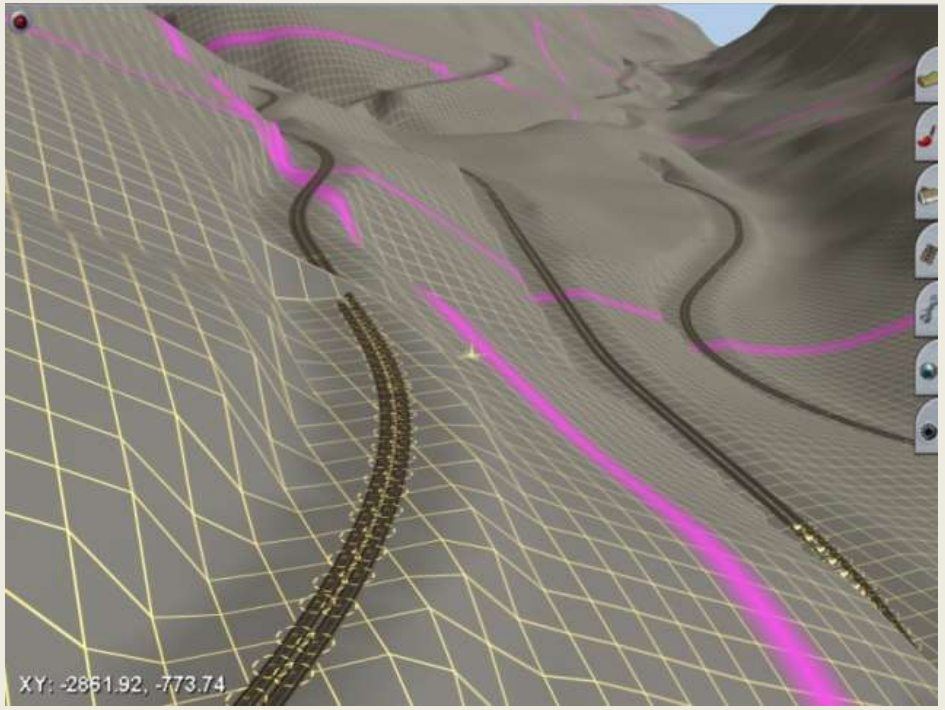
Surveyor Mode

- Route building
- Track laying, grades, turnouts
- Measuring tools
- Topography tools
- Prototype routes
- Camera views
- Operation sessions building

Digital Elevation Model

DEM import function allows use of spacial imaging data to create terrain in Trainz. Exact duplicates of actual prototype track layouts with topographical features can then be created in the virtual world. DEM data is available from the USGS.





Driver Mode

- Drive trains
- Switching cars
- View/Cam options
- Operations
- Rules for automated (AI) trains
- Signaling

DriverMode


QuickDrive
Environment
Environment
Consists
New train
Drivers
Commands
Control mode
CAB Mode
Weather type
Clear
Weather mode
No change
Time setup
07:09
Apply new time
Game rate
Time Rate is 4x
Unit mode
Imperial mode
Derailment mode
No derailment

Track Planning and Operations

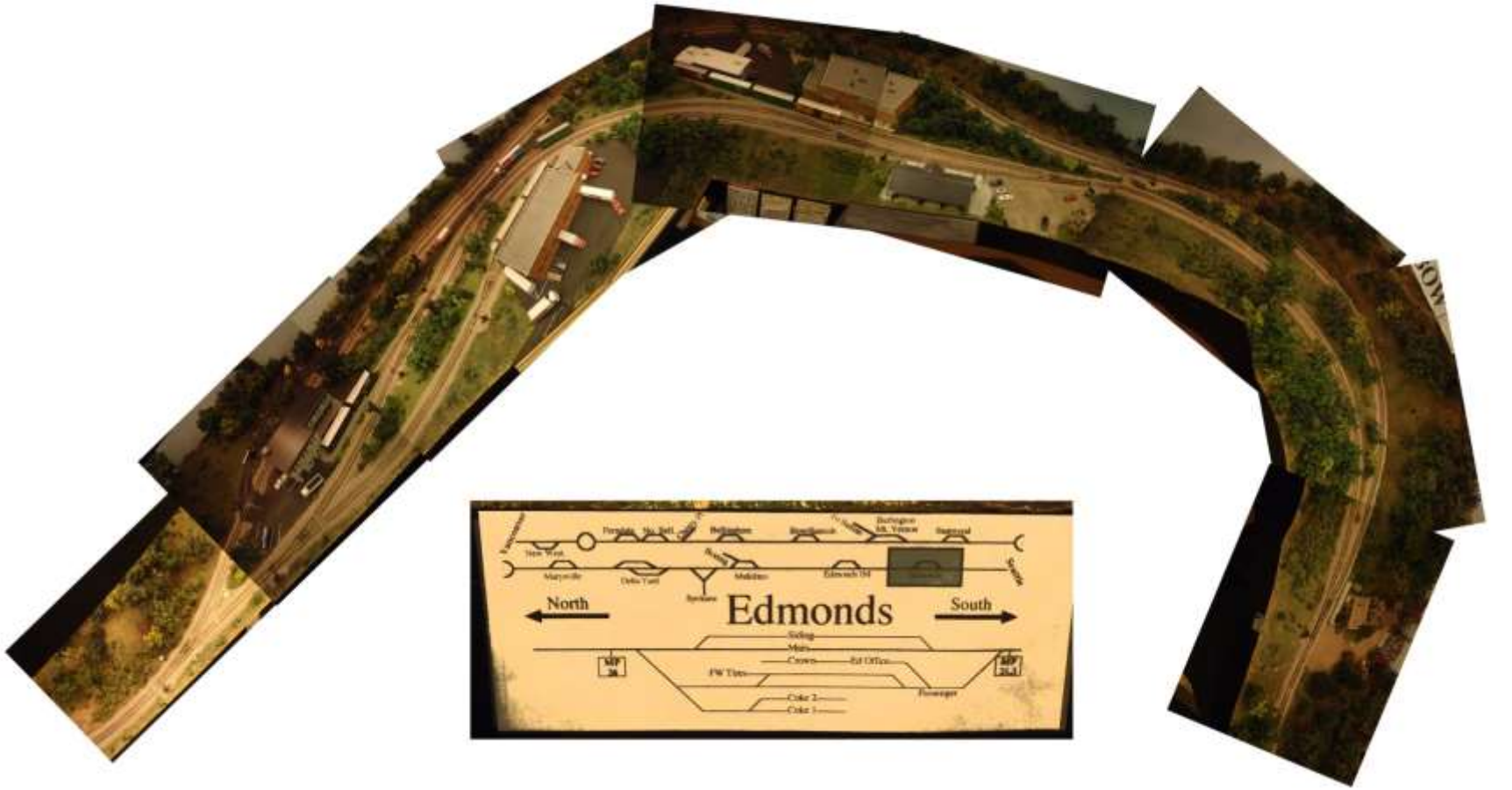
- Experimenting with scenery
- Fly bys on prototype routes
- Layout design element testing
- Try out switching moves
- Develop operational scenarios
- Signal placement and testing
- Practice driving with momentum
- Develop time tables
- Test car forwarding with car cards, switchlists or JMRI

passive

active

Track Planning and Operations

- BNSF Edmonds layout post ops study



How to go from butt kicking to massively efficient switching master

Track Planning and Operations

- BNSF Edmonds

Track Planning and Operations

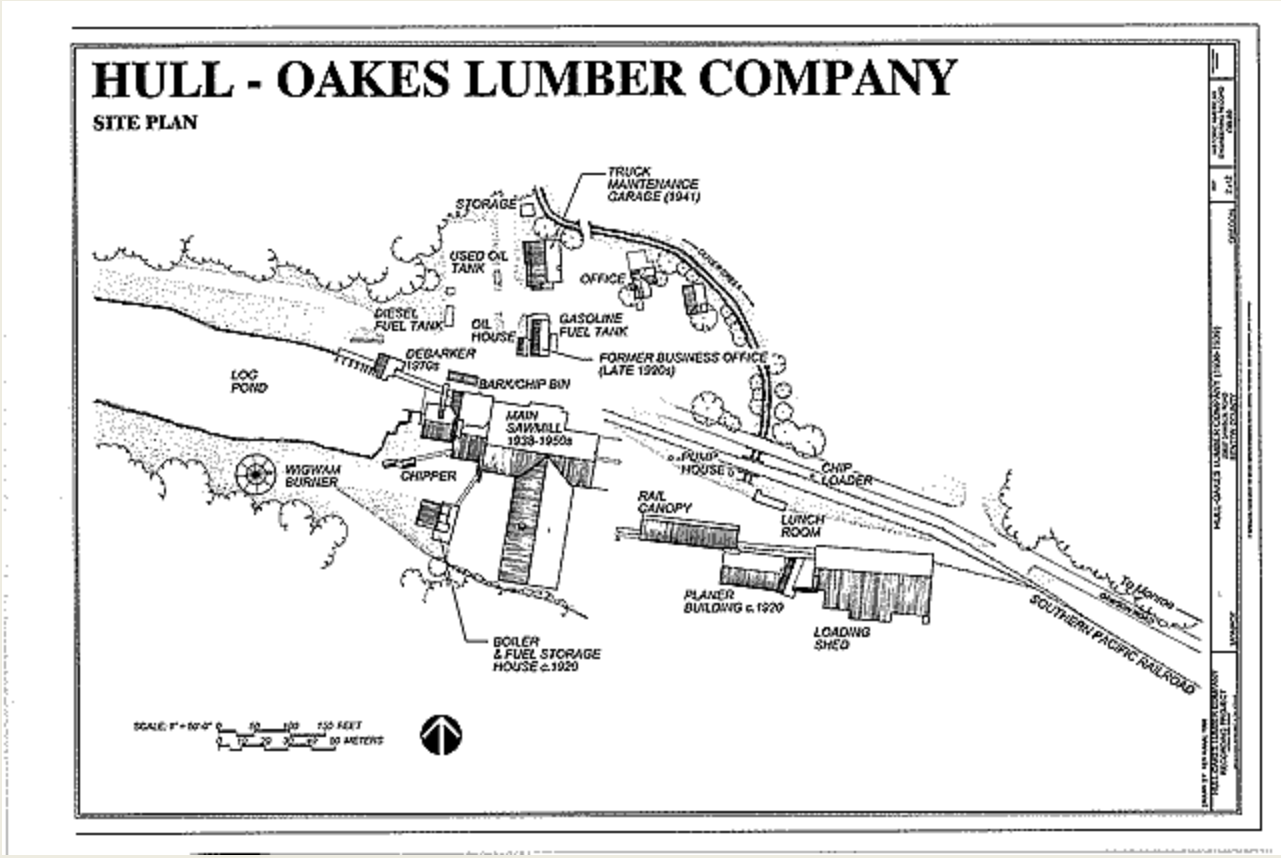
- BNSF Edmonds

Track Planning and Operations

- BNSF Edmonds

Hull Oakes Case Study

- Using the prototype to create a layout design element
- Building and operating in TRS



Hull Oakes

Prototype

Hull Oakes

N-scale Layout real example
Maybe you would like to make this but want to
test it out first before committing the time, effort and materials.

Hull Oakes

Build a sim layout and run it all you want

Hull Oakes

Trainz layout (time to build this was about 4 hours)

Prototype Study

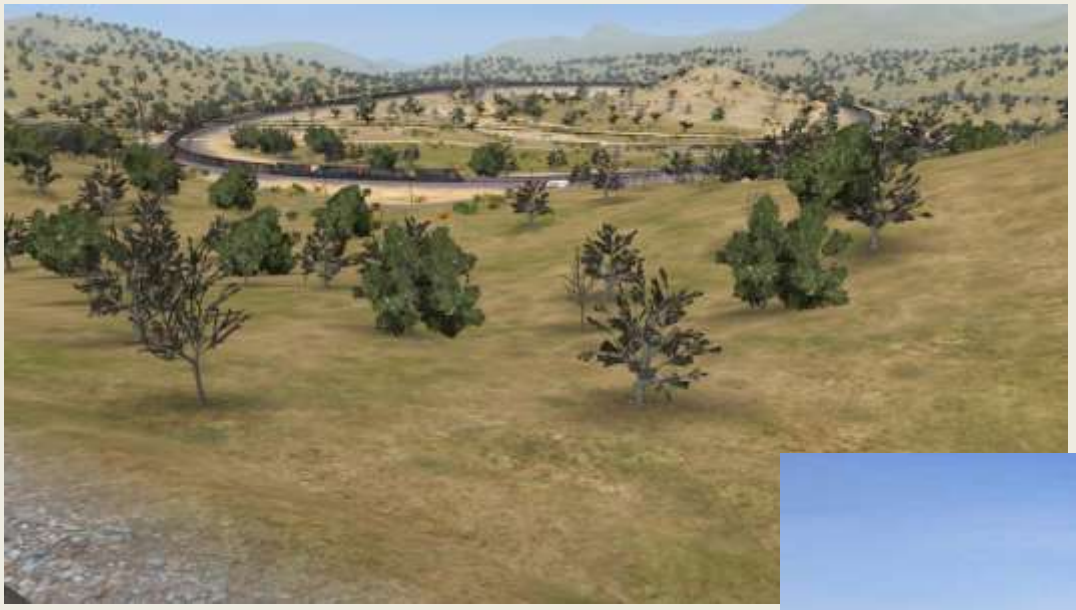
- Many routes are available that are near exact duplicates of the prototype in distance, trackage, scenery and topography making them a very valuable resource for layout and ops development
- Experience different physics characteristics of locomotives and train types, electric, diesel, steam, international, narrow gauge, etc.
- Time distances for layout time table application
- View and study signalling, speed limits, passing sidings, crossings, etc
- Practice and study realistic times for switching, brake checks and grade speeds (yes you can use dynamic brakes)
- The more you practice the better you will be prepared not only on your own layout but on OTHER people's layouts. Nobody wants to be "that guy".
- Practice, study, become a RR expert in several prototype areas without endless book study and internet surfing. Learn by doing or just do some railfanning.

Prototype – Tehachapi Loop

Trainz

Google

Prototype – Tehachapi Loop



Trainz

Proto

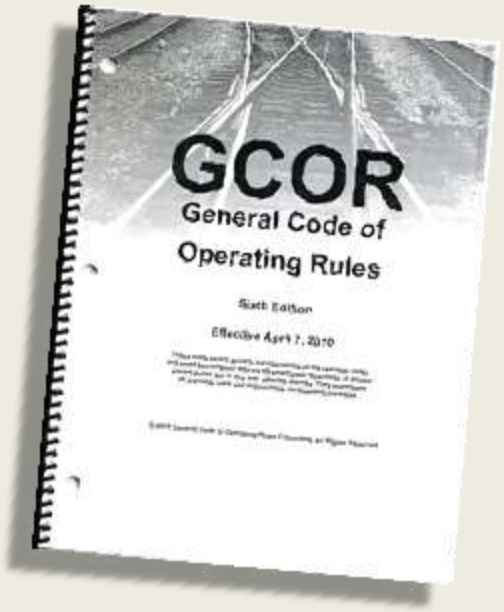
Prototype – Tehachapi Loop

Prototype – Stevens Pass

Prototype – BNSF Mukilteo

Virtual OPS for NMRA AP Steps

- Prepare a schematic drawing
- Develop a time table
- Develop an operating train chart
- Develop a system of operations
  - Car forwarding method
  - TTTO, TWC, CTC
  - JMRI integration

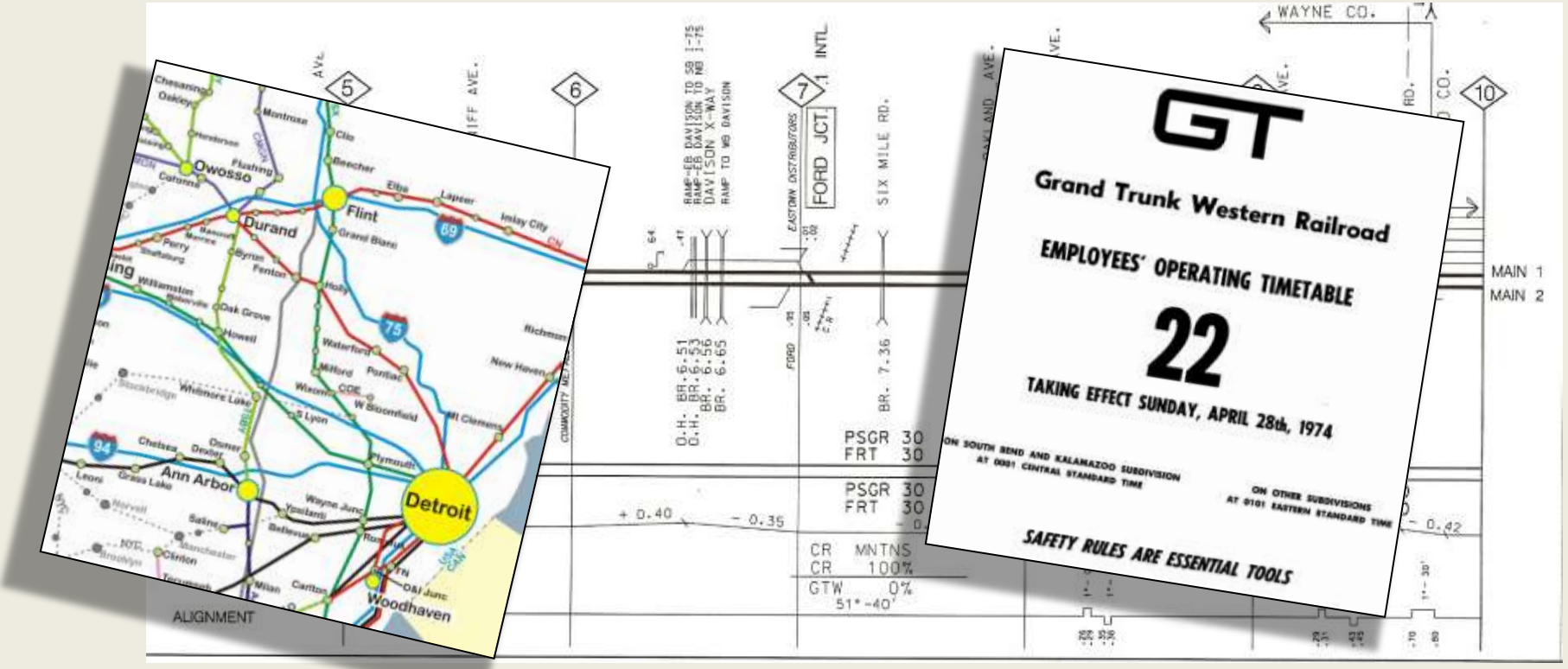


Virtual OPS for NMRA AP

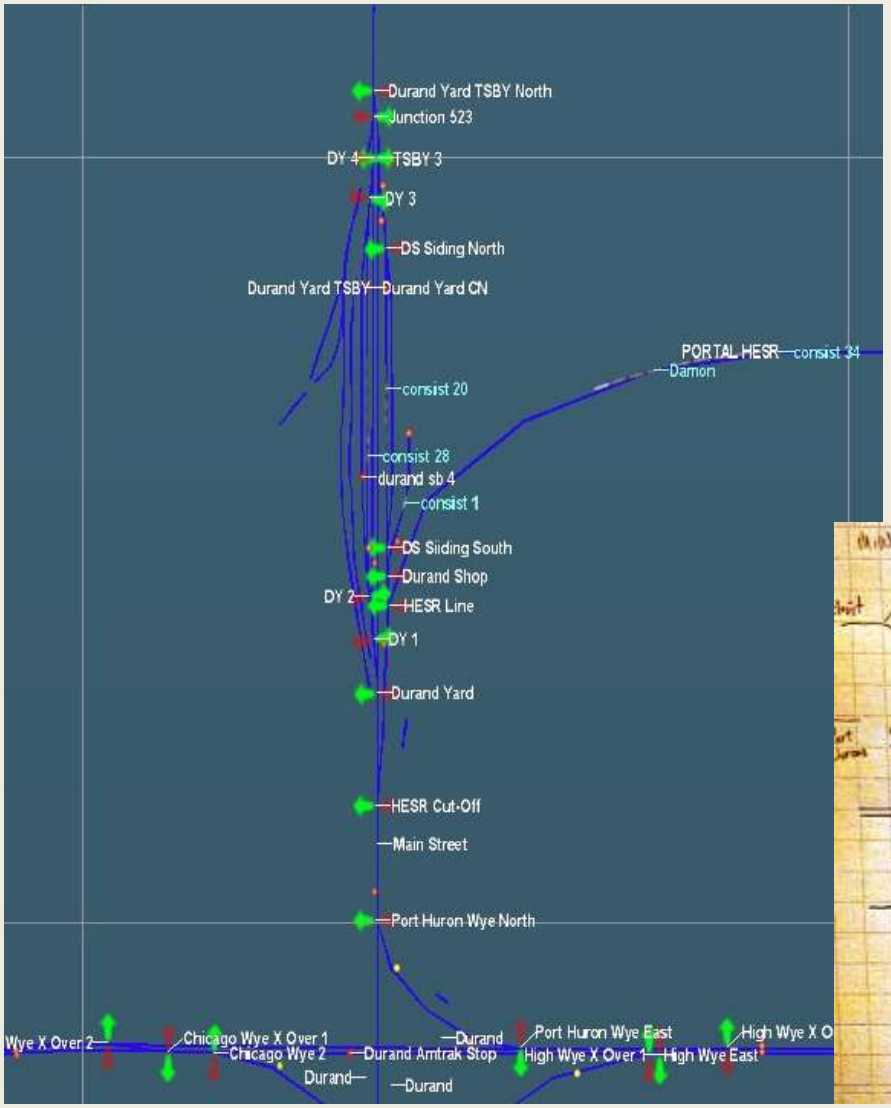
- For an NMRA Chief DS AP we actually have three options for the final requirements:
  - Your own operating layout
    - Requires years of prep
  - Somebody else's operating layout
    - Requires friends
  - Railroad Simulator Layout
    - Requires a computer which saves lots of time

GTW Holly Sub Project

- Prototype selection based on ready route availability within the retail TRS package and ample reference material on the internet.



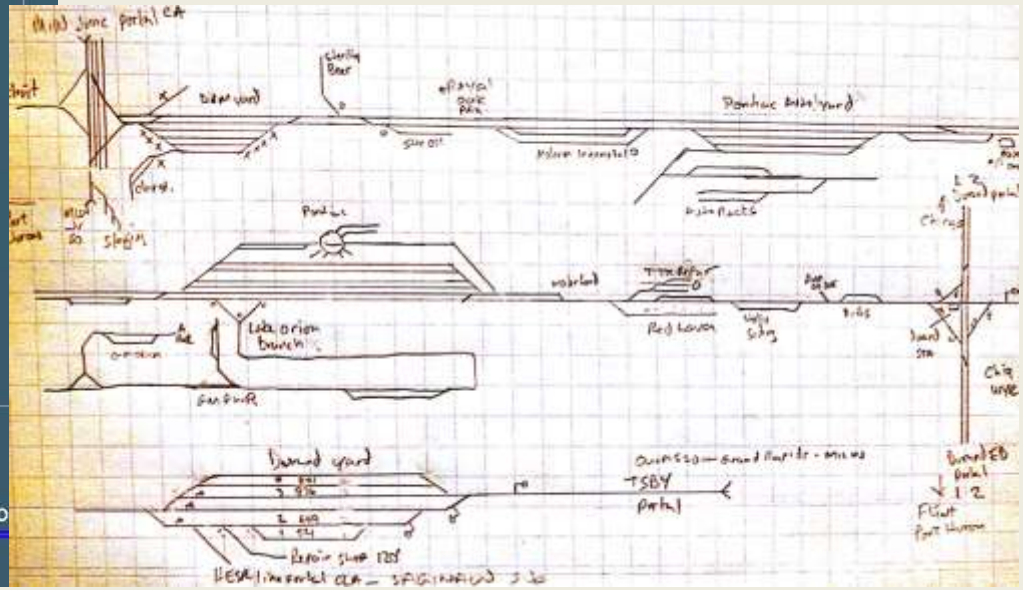
Developing the Schematic



TRS Route Modifications

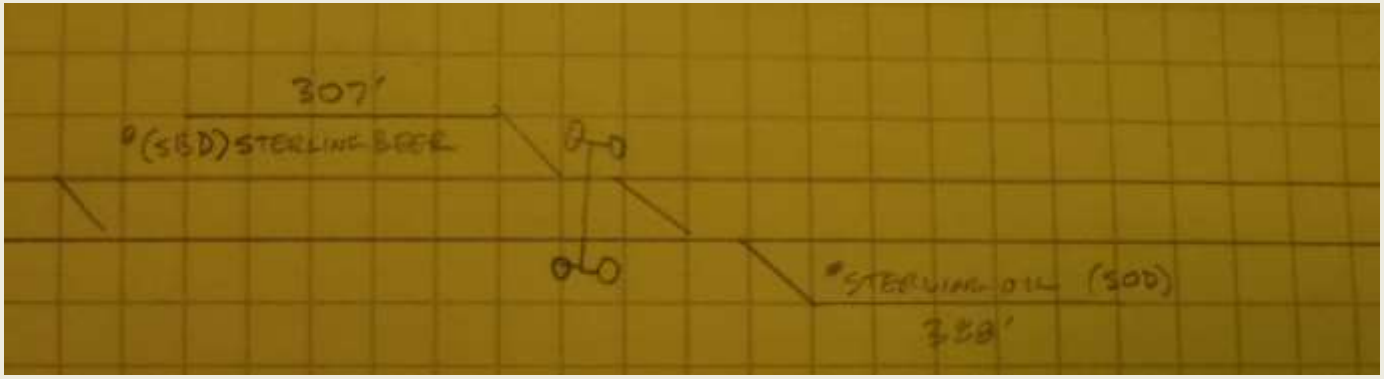
- Named additional locations as required.
- Added staging areas.

Then used TRS included map view to draw out rough schematic in pencil on graph paper



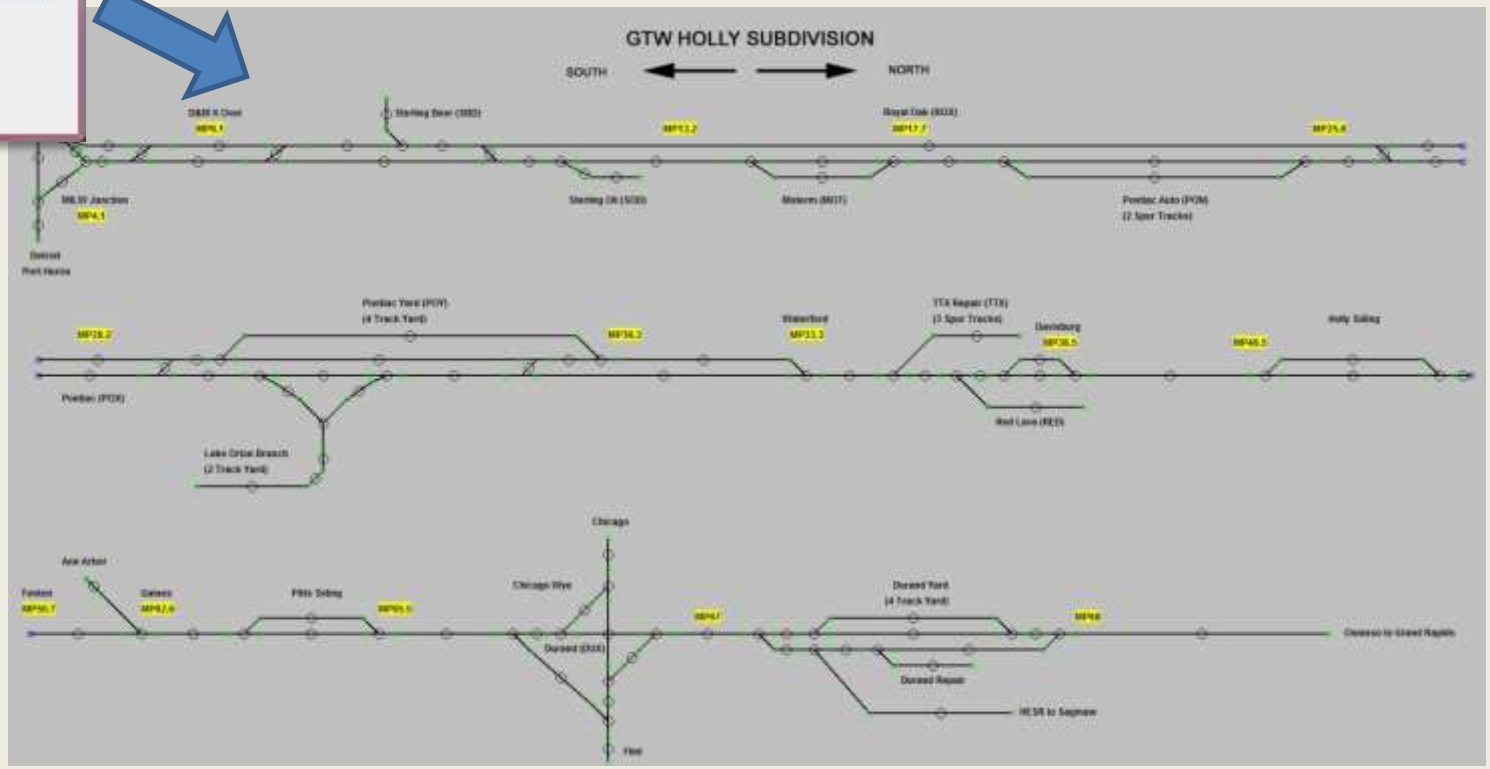
Developing the Schematic

Also during the pencil drawing stage, the TRS route spurs and yard trackage were measured using TRS layout building tools to gain reference information to be used on the final schematic for the DS and in JMRI to build locations accurately for car movements.



Developing the Schematic

For the final schematic, JMRI Panel Editor was used since it is fairly simple to use and was good practice for using some of JMRI's other features besides just programming decoders.

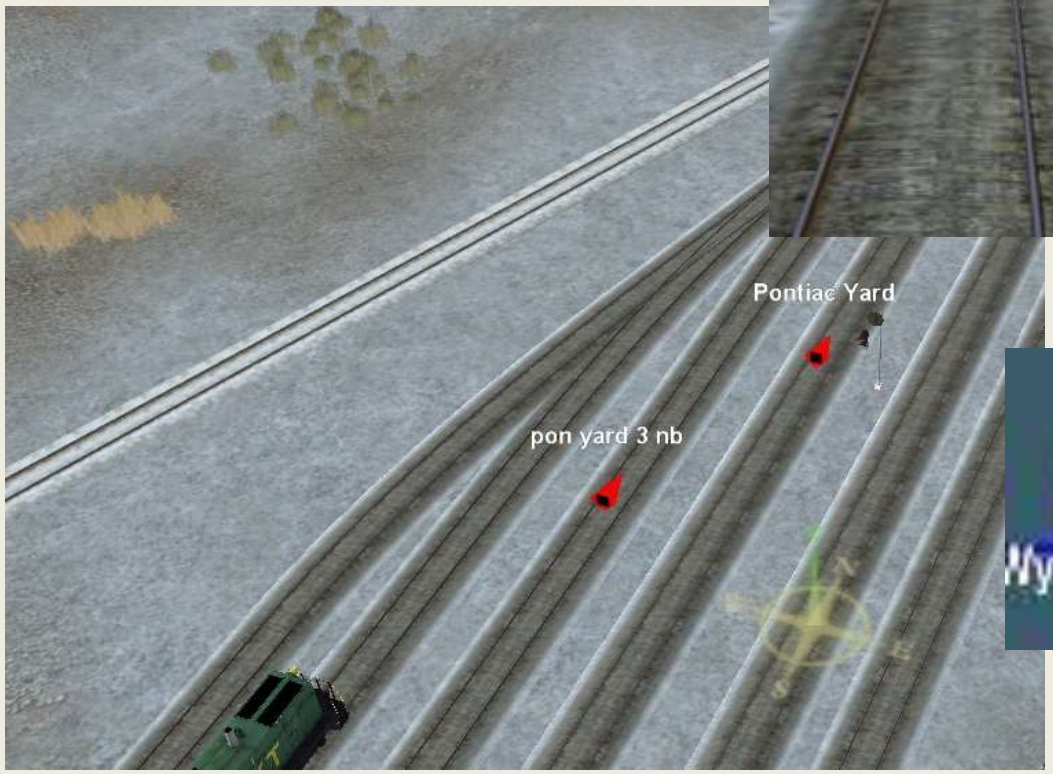


Building the Timetable

- Prototype timetables were used for passenger train movements.
- Speed limits were set according to Employee Time Tables within TRS using speed limit trackside objects to control AI train speed. This allowed passenger trains to run an automated schedule while testing freight train movements and determining transit times and train meet locations.
- A DS train movement sheet was created in MS Excel to provide a method to log and track all train movements.

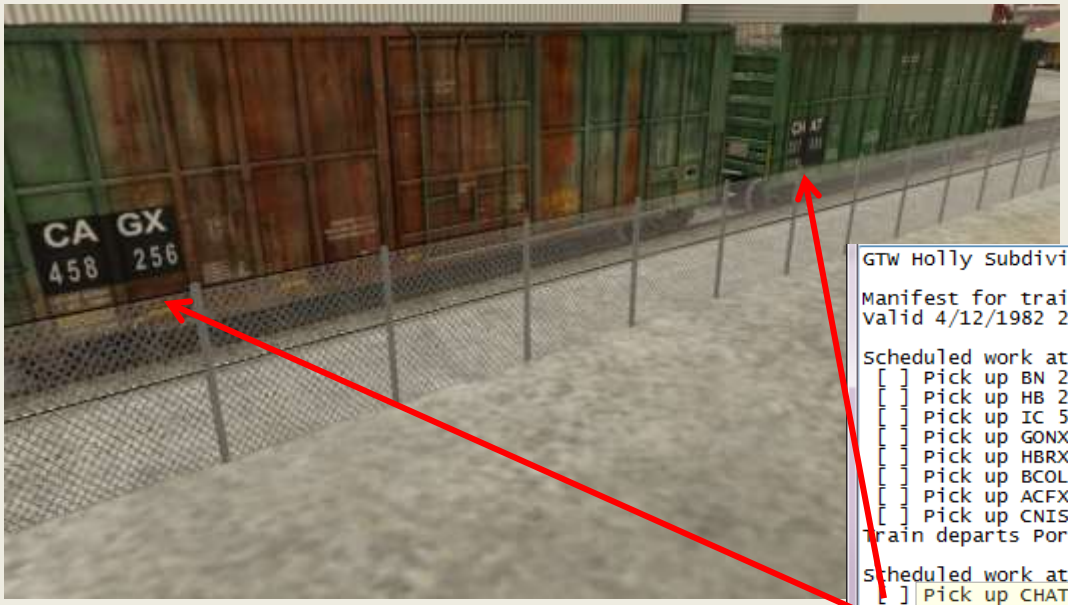
Building the Timetable

- Speed signs control AI speeds
- Track markers provide AI routing
- AI will control turnouts/signals as required



Building the Timetable

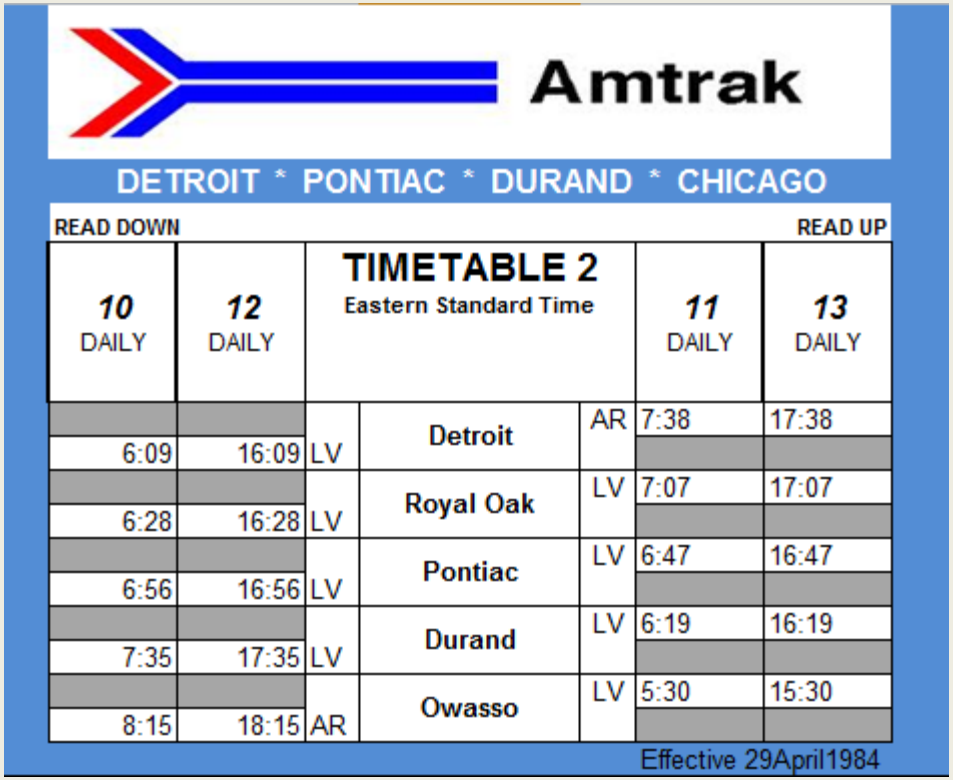
- Test scheduled trains were ran across the route using a 4:1 fast clock setting in TRS and times recorded for reference on the DS train movement sheet.
- Roster and locations were built in JMRI with routes created in JMRI with industry switching for the extras. This generated trains and car movements that were further used to create an accurate train movement time for each train.




```
GTW Holly Subdivision

Manifest for train (5828 MILW Local)
Valid 4/12/1982 22:45

Scheduled work at Port Huron, departure time 00:00
  [ ] Pick up BN 287262 XM 50' E from MILW1
  [ ] Pick up HB 287452 XM 50' L from MILW1
  [ ] Pick up IC 533038 XM 50' E from MILW1
  [ ] Pick up GONX 513149 GB 52' E from MILW1
  [ ] Pick up HBRX 998259 GB 52' E from MILW1
  [ ] Pick up BCOL 17150 FBH 52' E from MILW1
  [ ] Pick up ACFX 47409 HTR 60' E from MILW1
  [ ] Pick up CNIS 603545 FBH 52' E from MILW1
Train departs Port Huron Northbound with 8 cars, 450 feet, 295 tons

Scheduled work at Sterling Beer Dist, arrival time 00:15
  [ ] Pick up CHAT 287650 XM 50' E from SBD1
  [ ] Pick up CAGX 458256 XM 50' L from SBD1
  [ ] Set out BN 287262 XM 50' E to SBD1
  [ ] Set out HB 287452 XM 50' L to SBD1
  [ ] Set out IC 533038 XM 50' E to SBD1
Train departs Sterling Beer Dist Northbound with 7 cars, 396 feet, 266
tons

Scheduled work at Pontiac Yard, arrival time 00:55
```

Building the Timetable

- Since all trains other than passenger are extras, a legacy type TTTO timetable is not used but the reference times are all recorded for subsequent stringline trainchart build.
- A traditional passenger timetable is used and a small reference sheet was created in Excel to be posted as needed.



Amtrak

DETROIT * PONTIAC * DURAND * CHICAGO

READ DOWN — READ UP

TIMETABLE 2
Eastern Standard Time

10 DAILY	*12* DAILY				*11* DAILY	*13* DAILY
			Detroit	AR	7:38	17:38
6:09	16:09	LV				
			Royal Oak	LV	7:07	17:07
6:28	16:28	LV				
			Pontiac	LV	6:47	16:47
6:56	16:56	LV				
			Durand	LV	6:19	16:19
7:35	17:35	LV				
			Owasso	LV	5:30	15:30
8:15	18:15	AR				

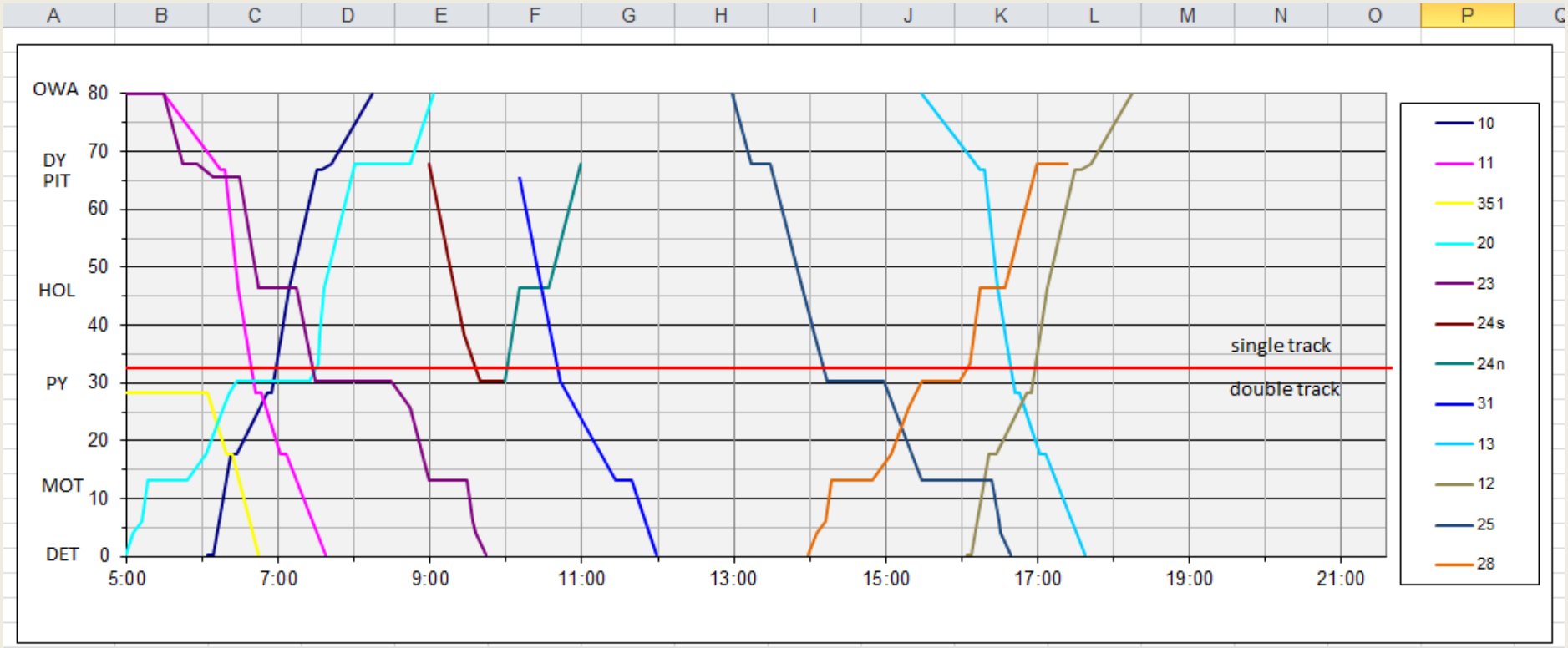
Effective 29April1984

Trainchart (Stringline) Build

- Using time tests as previously described, a stringline is easily generated.
- Excel again is used to generate the stringline with a time table and a line chart.
- Meets and times required for switching were calculated and recorded during time testing.

Station	Milepost	Trains											
		10	11	351	20	23	24s	24n	31	13	12	25	28
Detroit	0.3	6:05									16:05		
	0.3	6:09	7:38	6:45	5:00	9:45			12:00	17:38	16:09	16:40	14:00
Milw Jct	4.1												
	4.1				5:06	9:37						16:32	14:06
DM Xover	6.1												
	6.1				5:13	9:35						16:30	14:13
Moterm	13.2				5:18	9:30			11:40			16:25	14:18
	13.2				5:49	9:00			11:28			15:30	14:50
Royal Oak	17.7	6:23	7:07	6:25						17:07	16:23		
	17.7	6:28	7:03	6:20	6:04					17:03	16:28		15:05
Pon Auto	25.8												15:19
	25.8				6:18	8:45							
Pontiac	28.2	6:52	6:47	6:05						16:47	16:52		
	28.2	6:56	6:43	1:31	6:22					16:43	16:56		
Pon Yard	30.3				6:28	8:30	10:00					15:00	15:29
	30.3				7:25	7:30	9:40	10:00	10:44			14:15	16:00
Waterford	33.3												
	33.3				7:33								16:08
Davisburg	38.5												
	38.5				7:34		9:28						
Holly	46.5	7:09	6:29			7:15		10:12		16:29	17:09		16:16
	46.5				7:37	6:45		10:35				13:55	16:35
Pitt	65.5					6:30							
	65.5					6:10			10:12				
Durand	67	7:31	6:19							16:19	17:31		
	67	7:35	6:15							16:15	17:35		
Durand Yard	68	7:43			8:01	5:57					17:43	13:30	17:00
	68	7:43			8:45	5:45	9:00	11:00			17:43	13:15	17:25
Owasso	80					5:30						13:00	
staging	80	8:15	5:30		9:03	5:00				15:30	18:15		

Trainchart (Stringline) Build



Location keys added and red line indicates separation point between single and double track mainline. This Excel sheet format was obtained from the OPSIG Yahoo Group.

System of Operations

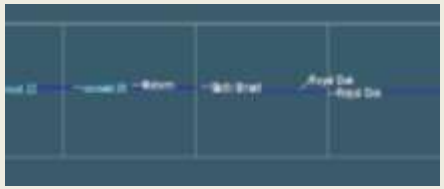

GRAND TRUNK WESTERN
TRACK WARRANT

- Track Warrant Control (TWC) was the selected method of operations since it followed the prototype. TW forms were created in Word and a TWC Log spreadsheet for the DS created in Excel.

1															WORK BETWEEN			NOT IN EFFECT TIL			AUTH	
2	No	Date	To	At	1	VOID	2	FROM	TO	TRACK	3	FROM	TO	TRACK	4	LOC1	LOC2	5	ARR	AT	6	EXPIRES	7
3	1		20	PH/DET			X	DET	MOT	MAIN 1					X	SBD	MOT				X	0605	X
4	2		23	OWA			X	OWA	DY						X	MP67	MP68				X	0600	
5	3		23	DY			X	DY	PIT														
6	4		20	MOT			X	MOT	PON	MAIN 1	X	PON	PY	MAIN 2				X	351	MOT			
7	5		23	PIT			X	PIT	HOL									X	11	PIT			
8	6		23	HOL			X	HOL	PY	MAIN 2								X	10	HOL			
9	7		20	PY			X	PY	DY						X	MP67	MP68	X	23	PY	X	0900	
10	8		23	PY			X	PY	SBD	MAIN2					X	MOT	SBD						
11	9		24	DY			X	DY	PY														
12	10		20	DY			X	DY	OWA														
13	11		23	SBD			X	SBD	DET														
14	12		24	PY			X	PY	HOL														
15	13		31	DUR			X	DUR	MP33.3		X	MP33.3	MOT	MAIN 1	X	MP.17.7	MP13.2						
16	14		24	HOL			X	HOL	DY									X	31	HOL			
17	15		31	MOT			X	MOT	DET	MAIN 1													
18	16		25	OWA			X	OWA	DY						X	MP67	MP68						

System of Operations

- All train movements and car forwarding uses the JMRI Operations module.
- All locations, rosters and train routes were generated using the TRS route and car inventory as the reference for building the JMRI ops portion.



Locations

Tools Operations Window Help

Id	Name	Track	Length	Used	Rolling Stock	Pick ups	Set outs	Action	Edit
21	Chicago	Staging	5100	84	1	1	0	Yardmaster	Edit
15	Durand Station		0	0	0	0	0	Yardmaster	Edit
16	Durand Yard	S Y	2807	1084	16	5	5	Yardmaster	Edit
19	HESR Saginaw	Staging	5000	452	8	3	2	Yardmaster	Edit
11	Lake Orion Branch	Yards	2268	279	3	3	2	Yardmaster	Edit
20	Moterm	Spurs	3293	84	1	1	1	Yardmaster	Edit
17	Owasso	Staging	5000	0	0	0	5	Yardmaster	Edit
8	Pontiac Auto	Spurs	660	186	2	2	0	Yardmaster	Edit
9	Pontiac Station		0	0	0	0	0	Yardmaster	Edit
10	Pontiac Station -1	Spurs	354	0	0	0	0	Yardmaster	Edit
12	Pontiac Yard	Yards	6308	456	8	8	19	Yardmaster	Edit
18	Port Huron	Staging	10000	790	14	8	6	Yardmaster	Edit
14	Red Lava	Spurs	421	222	4	4	1	Yardmaster	Edit
7	Royal Oak Station		0	0	0	0	0	Yardmaster	Edit
5	Sterling Beer Dist	Spurs	307	216	4	2	3	Yardmaster	Edit
6	Sterling Oil	Spurs	388	384	6	2	1	Yardmaster	Edit
13	TTX REPAIR	Spurs	360	259	4	1	2	Yardmaster	Edit

Sort By (•) Name ( ) Id Add

Trains

Tools Operations Window Help

Time	Build	Function	Name	Description	Route	Departs	Terminates	Current	Status	Action	Edit
00:00	✔	Prev...	5828 MILW Local		MILW Local	Port Huron (MILW1)	Owasso (TSBY2)	Port Huron	Built 14 cars	Move	Edit
00:00	✔	Prev...	Chicago Throug...	conatainers only	Chi Through Frieght	Chicago (CHI 1)	Port Huron (MILW1-...	Chicago	Built 2 cars	Move	Edit
00:00	✔	Prev...	HESR Turn		HESR	HESR Saginaw (H...	HESR Saginaw (H...	HESR Saginaw	Partial 5/7 cars	Move	Edit
00:00	✔	Prev...	Lake Orion Turn		Lake Orion Turn	Lake Orion Branch	Lake Orion Branch	Lake Orion Branch	Partial 5/7 cars	Move	Edit
00:00	✔	Prev...	PON switcher		PON Local	Pontiac Yard	Pontiac Yard	TTX REPAIR	In route 2 cars 149 f...	Move	Edit
00:30	✔	Prev...	2518 Durand L...		Durand Local	Owasso (TSBY1)	Port Huron (MILW2)	Durand Yard	In route 5 cars 358 f...	Move	Edit

System of Operations

- JMRI provides switchlists and job sheets for train movements.
- Further advanced operations modes can be tested with JMRI using loads and schedules and applying the physical tests to the TRS layout.

AM SWITCHLIST (Pontiac Yard) - Notepad

File Edit Format View Help

```
GTW Holly Subdivision

Switch List for Pontiac Yard
Valid 5/4/1982 14:37

Scheduled work for train (PON switcher)

Visit number 2 for train (PON switcher) expect to arrive in 00:55, arrives
Northbound
  [ ] Set out ATW 642095 GB 52' E to POY1
  [ ] Set out WRWK 728237 XM 50' E to POY1
  [ ] Set out TTGX 157670 FA 89' E to POY2
  [ ] Set out AMGX 2735 GB 52' E to POY3
  [ ] Set out BNSF 513121 GB 52' E to POY3

Visit number 3 for train (PON switcher) expect to arrive in 02:00,
terminates
Pontiac Yard
  [ ] Set out UP 701574 FA 89' E to POY2
  [ ] Set out SP 854251 FA 89' E to POY4
No car pick ups for train (PON switcher) at this location

Scheduled work for train (2518 Durand Local)
Departed Owasso, expect to arrive in 00:15, arrives Southbound
  [ ] Pick up HB 287937 XM 50' E from POY3
  [ ] Pick up PRR 513050 GB 52' E from POY3
  [ ] Set out CNA 712493 FA 89' E to POY2
  [ ] Set out UB 271962 XM 50' E to POY3
  [ ] Set out BNSF 850665 FA 89' E to POY4

Scheduled work for train (HESR Turn)
Departs HESR Saginaw at 00:00 expected arrival 00:15, arrives Northbound
  [ ] Pick up UCLX 20822 TM 60' E from POY2
```

Virtual RR OPS

- Simulators are tool to enhance model railroading
- Provide a means to study track plans
- Develop LDE scenes
- Develop and test operational scenarios
- Practice running/switching
- Educational and provides a realistic experience on prototype routes for railfans

Questions

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Virtual RR OPS

- Trainz Railroad Simulator (TRS)
  - www.trainzportal.com
  - Easier to manipulate, build routes
  - Lot of free content

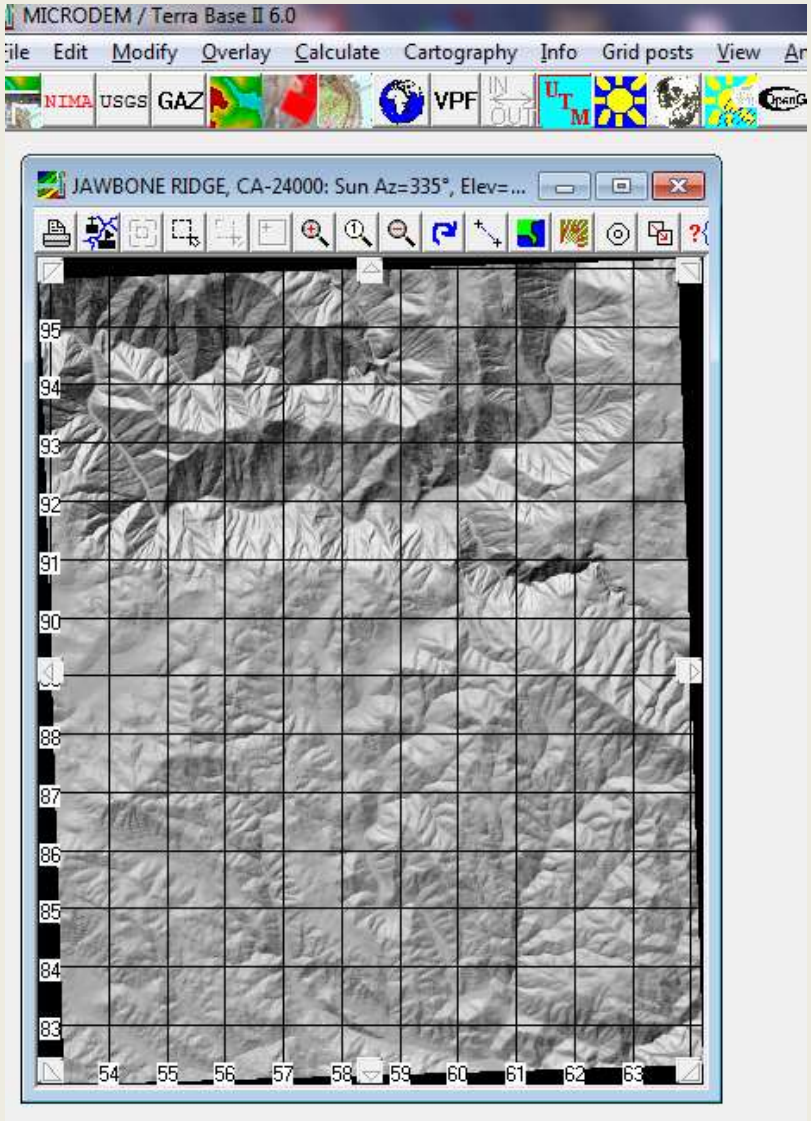
- Train Simulator (Railworks)
  - www.railsimulator.com
  - More complete prototype routes
  - High intensity graphics and shadowing effects

- Run8
  - www.run8studios.com
  - Real time multiplayer simulator with dispatching via internet
  - Limited content and routes

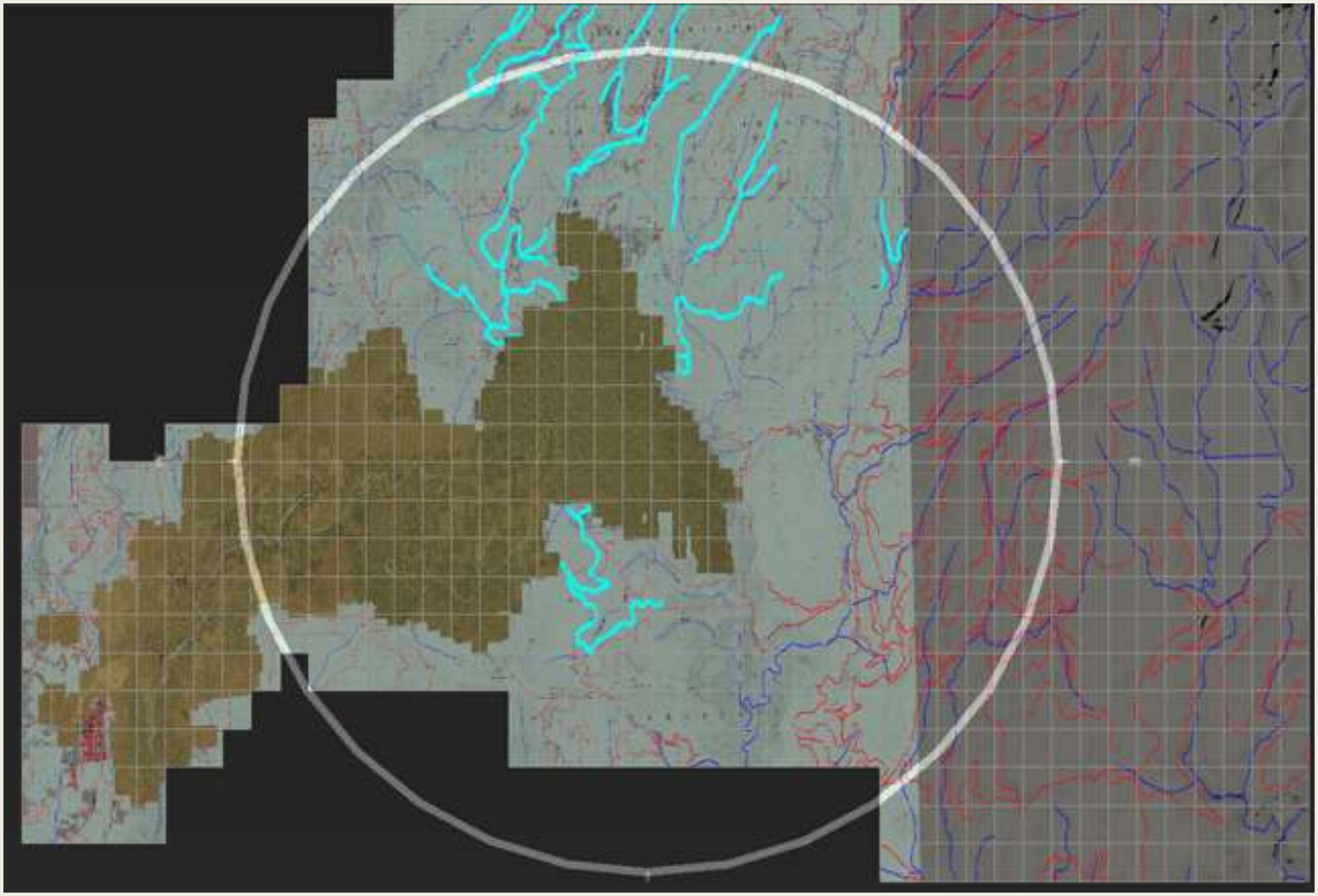
Bonus Material

Russian Narrow Gauge (600mm)

Digital Elevation Model – MicroDEM

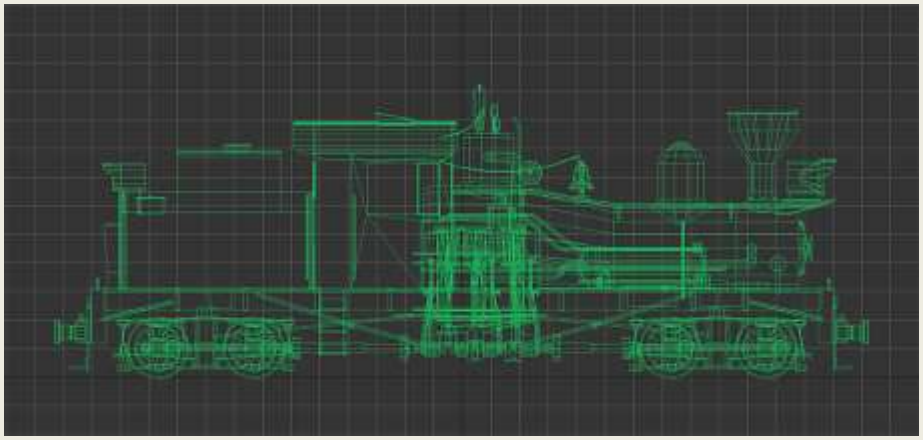


WSLC – DEM import



West Side Lumber Co.

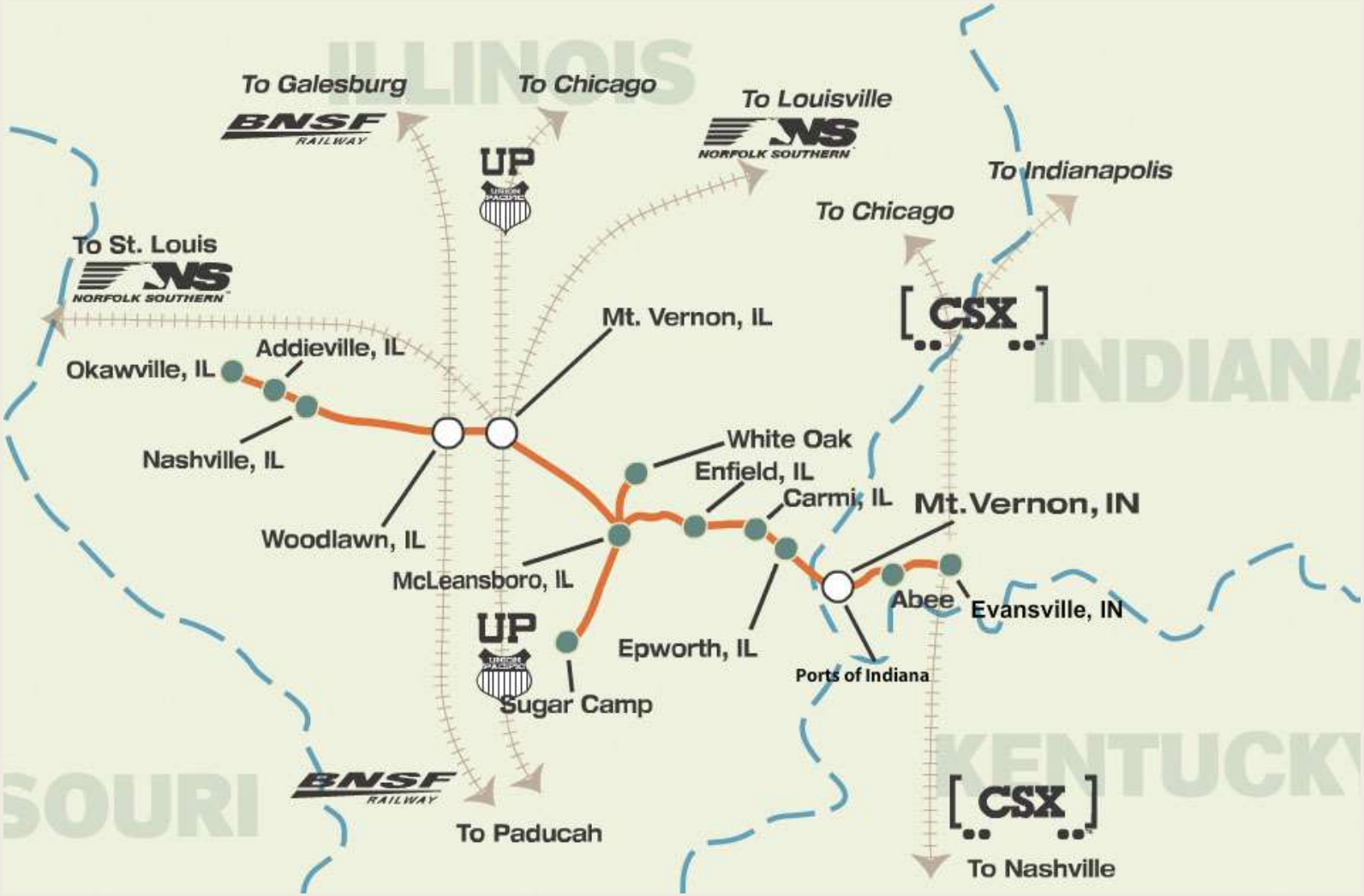
3D CG CAD Projects



MILW Avery - Drexel

MILW Avery - Drexel

Evansville Western



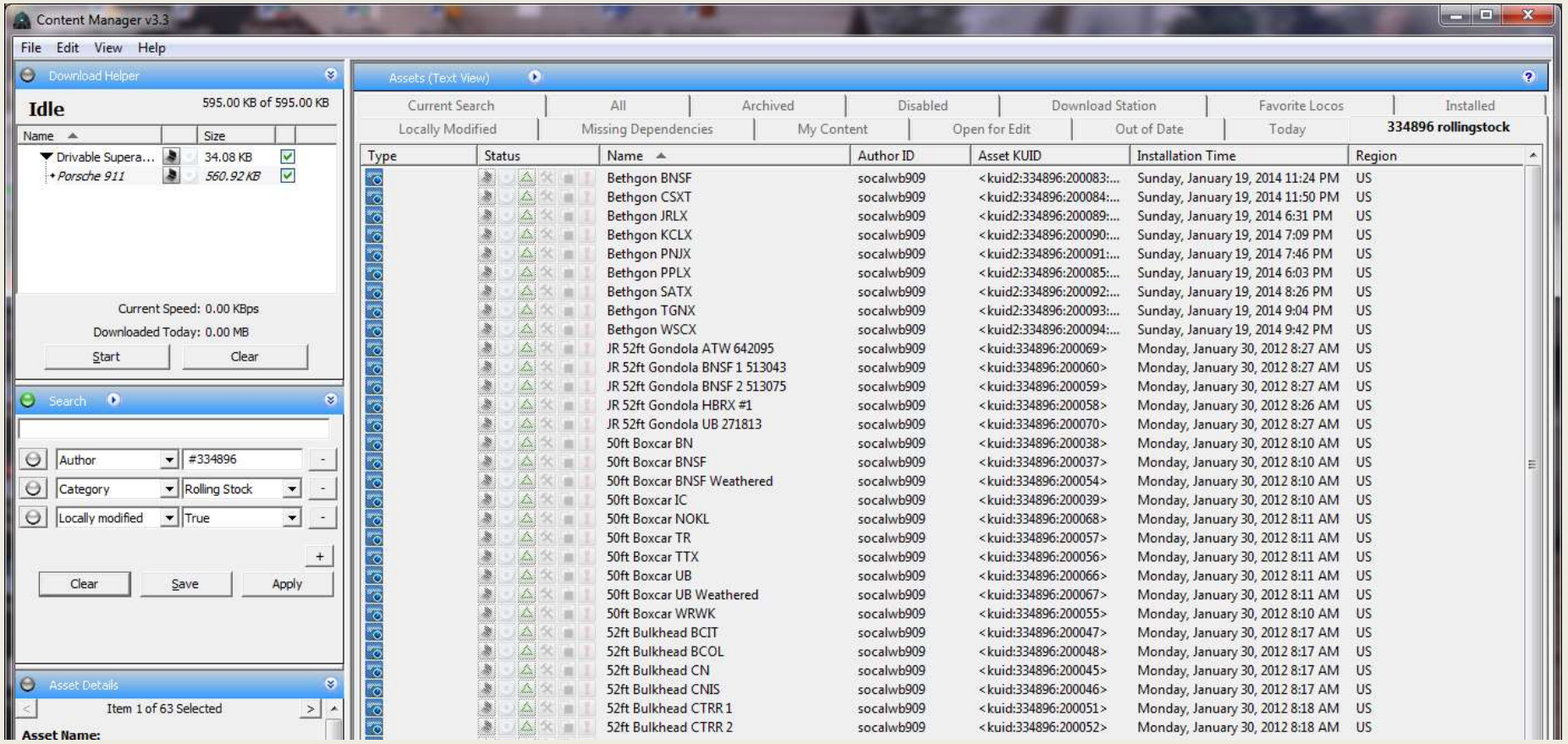
Evansville Western

EMD GP-38

Virtual OPS screens

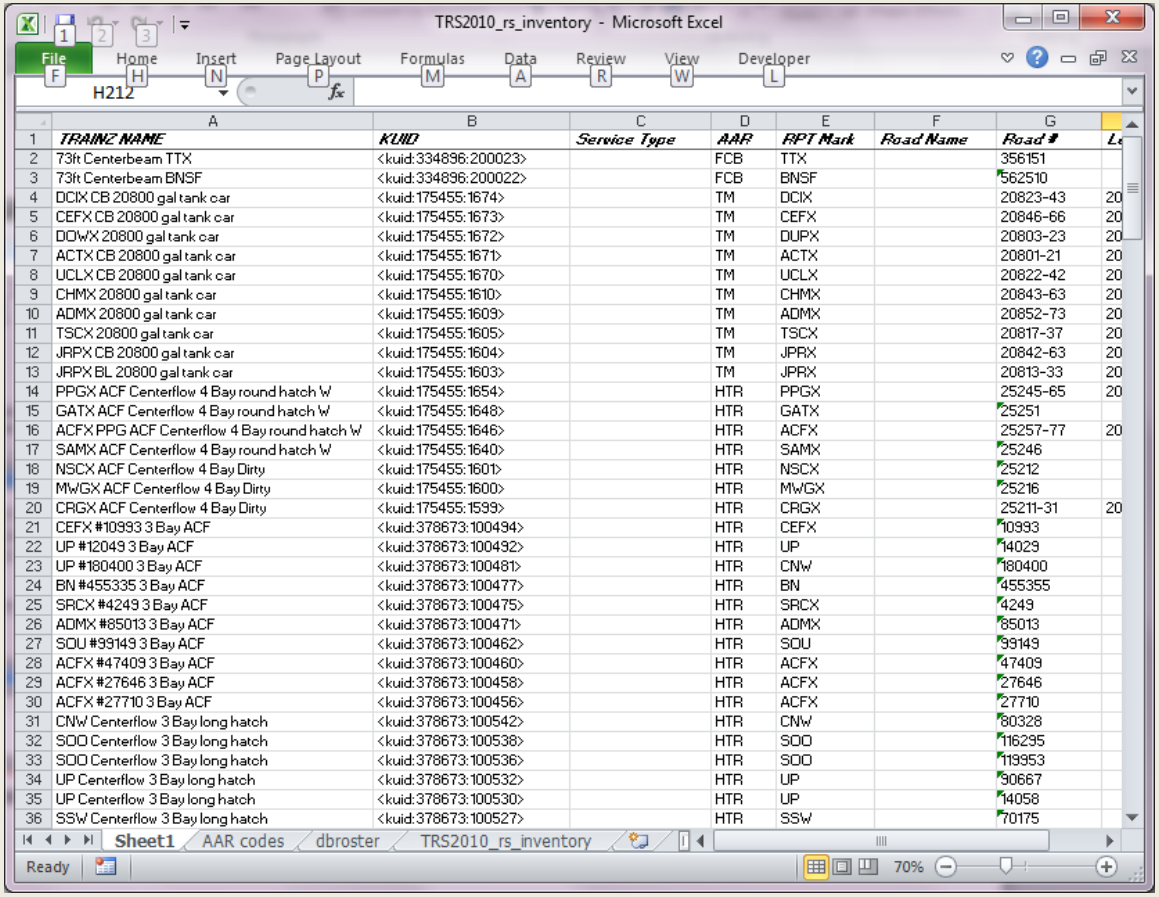
JMRI Roster build from Trainz Inventory

JMRI Roster build from Trainz Inventory



Trainz Content Manager Inventory screen with selected rolling stock items for export to text file.

JMRI Roster build from Trainz Inventory



	A	B	C	D	E	F	G
1	TRAINZ NAME	KUID	Service Type	AAR	RPT Mark	Road Name	Road #
2	73ft Centerbeam TTX	<kuid:334896:200023>		FCB	TTX		356151
3	73ft Centerbeam BNSF	<kuid:334896:200022>		FCB	BNSF		562510
4	DCIX CB 20800 gal tank car	<kuid:175455:1674>		TM	DCIX		20823-43
5	CEFX CB 20800 gal tank car	<kuid:175455:1673>		TM	CEFX		20846-66
6	DOWX 20800 gal tank car	<kuid:175455:1672>		TM	DUPX		20803-23
7	ACTX CB 20800 gal tank car	<kuid:175455:1671>		TM	ACTX		20801-21
8	UCLX CB 20800 gal tank car	<kuid:175455:1670>		TM	UCLX		20822-42
9	CHMX 20800 gal tank car	<kuid:175455:1610>		TM	CHMX		20843-63
10	ADMX 20800 gal tank car	<kuid:175455:1609>		TM	ADMX		20852-73
11	TSCX 20800 gal tank car	<kuid:175455:1605>		TM	TSCX		20817-37
12	JRPX CB 20800 gal tank car	<kuid:175455:1604>		TM	JPRX		20842-63
13	JRPX BL 20800 gal tank car	<kuid:175455:1603>		TM	JPRX		20813-33
14	PPGX ACF Centerflow 4 Bay round hatch W	<kuid:175455:1654>		HTR	PPGX		25245-65
15	GATX ACF Centerflow 4 Bay round hatch W	<kuid:175455:1648>		HTR	GATX		25251
16	ACFX PPG ACF Centerflow 4 Bay round hatch W	<kuid:175455:1646>		HTR	ACFX		25257-77
17	SAMX ACF Centerflow 4 Bay round hatch W	<kuid:175455:1640>		HTR	SAMX		25246
18	NSCX ACF Centerflow 4 Bay Dirty	<kuid:175455:1601>		HTR	NSCX		25212
19	MWGX ACF Centerflow 4 Bay Dirty	<kuid:175455:1600>		HTR	MWGX		25216
20	CRGX ACF Centerflow 4 Bay Dirty	<kuid:175455:1599>		HTR	CRGX		25211-31
21	CEFX #10993 3 Bay ACF	<kuid:378673:100494>		HTR	CEFX		10993
22	UP #12049 3 Bay ACF	<kuid:378673:100492>		HTR	UP		14029
23	UP #180400 3 Bay ACF	<kuid:378673:100481>		HTR	CNW		180400
24	BN #455335 3 Bay ACF	<kuid:378673:100477>		HTR	BN		455355
25	SRCX #4249 3 Bay ACF	<kuid:378673:100475>		HTR	SRCX		4249
26	ADMX #85013 3 Bay ACF	<kuid:378673:100471>		HTR	ADMX		85013
27	SOU #99149 3 Bay ACF	<kuid:378673:100462>		HTR	SOU		99149
28	ACFX #47409 3 Bay ACF	<kuid:378673:100460>		HTR	ACFX		47409
29	ACFX #27646 3 Bay ACF	<kuid:378673:100458>		HTR	ACFX		27646
30	ACFX #27710 3 Bay ACF	<kuid:378673:100456>		HTR	ACFX		27710
31	CNW Centerflow 3 Bay long hatch	<kuid:378673:100542>		HTR	CNW		80328
32	SOO Centerflow 3 Bay long hatch	<kuid:378673:100538>		HTR	SOO		116295
33	SOO Centerflow 3 Bay long hatch	<kuid:378673:100536>		HTR	SOO		119953
34	UP Centerflow 3 Bay long hatch	<kuid:378673:100532>		HTR	UP		90667
35	UP Centerflow 3 Bay long hatch	<kuid:378673:100530>		HTR	UP		14058
36	SSW Centerflow 3 Bay long hatch	<kuid:378673:100527>		HTR	SSW		70175

Importing space delimited text file into Excel. Columns will populate with Trainz default items. You may have to manually input some items depending on the import and where the space delimiting is formatted.

JMRI Roster build from Trainz Inventory

Menu Bar

Tools

- **Roster -->**
  - **Import from File**

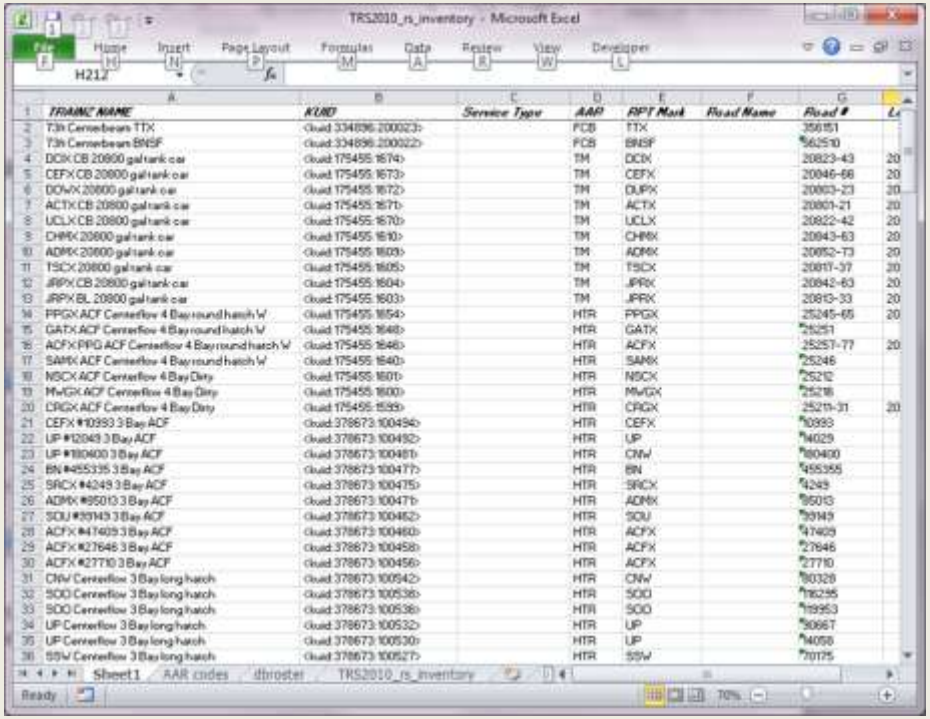
    Opens the **Open** dialog box, to import a roster of cars if you already have a list of cars in a database. The import function requires an ACSII text file, with one line for each car. The car import requires four attributes and the order is car number, road name, type, and length. An example of a correct format:

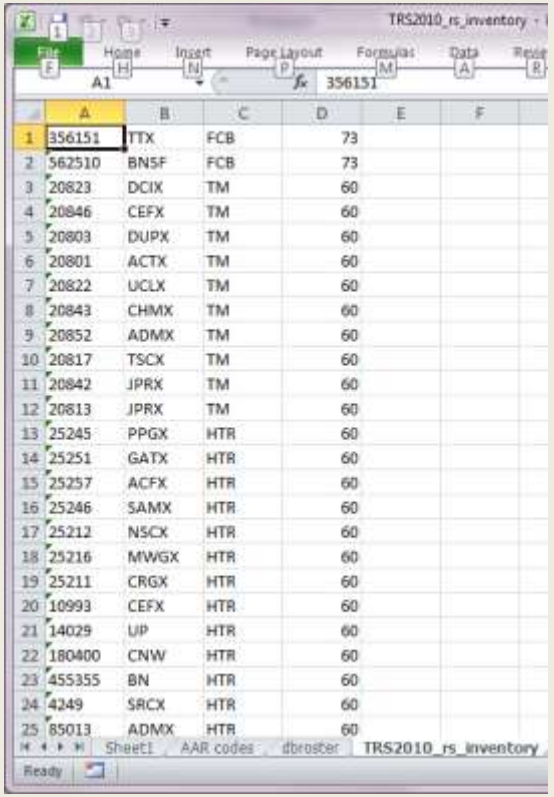
    336 GCR Flat 40
    655579 UP Boxcar 40

    Optionally you may include additional attributes in the following order: weight, color, owner name, date built, and location. Check the Windows help file for further information.

JMRI requires the above format in text for import.

JMRI Roster build from Trainz Inventory

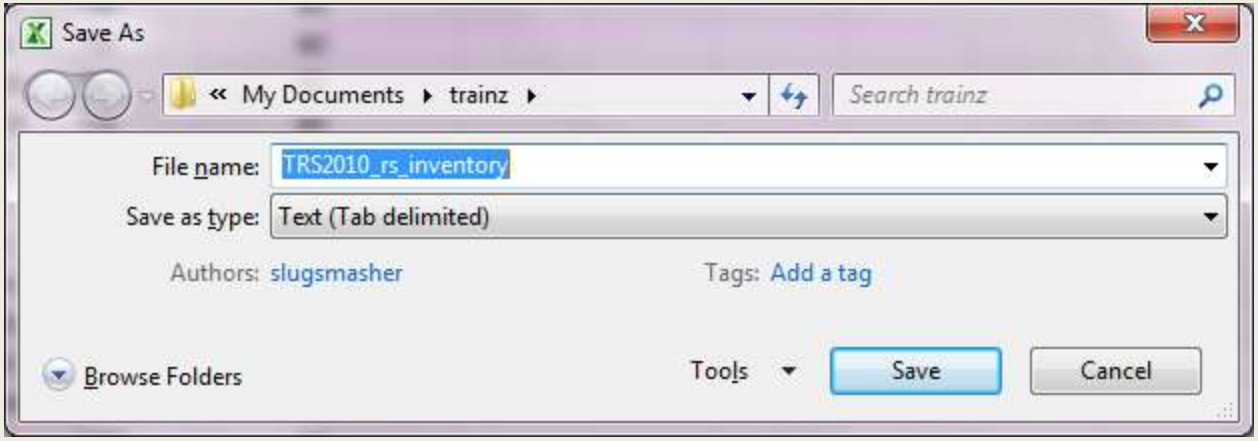




	A	B	C	D
1	356151	TTX	FCB	73
2	562510	BNSF	FCB	73
3	20823	DCIX	TM	60
4	20846	CEFX	TM	60
5	20803	DUPX	TM	60
6	20801	ACTX	TM	60
7	20822	UCLX	TM	60
8	20843	CHMX	TM	60
9	20852	ADMX	TM	60
10	20817	TSCX	TM	60
11	20842	JPRX	TM	60
12	20813	JPRX	TM	60
13	25245	PPGX	HTR	60
14	25251	GATX	HTR	60
15	25257	ACFX	HTR	60
16	25246	SAMX	HTR	60
17	25212	NSCX	HTR	60
18	25216	MWGX	HTR	60
19	25211	CRGX	HTR	60
20	10993	CEFX	HTR	60
21	14029	UP	HTR	60
22	180400	CNW	HTR	60
23	455355	BN	HTR	60
24	4249	SRCX	HTR	60
25	85013	ADMX	HTR	60

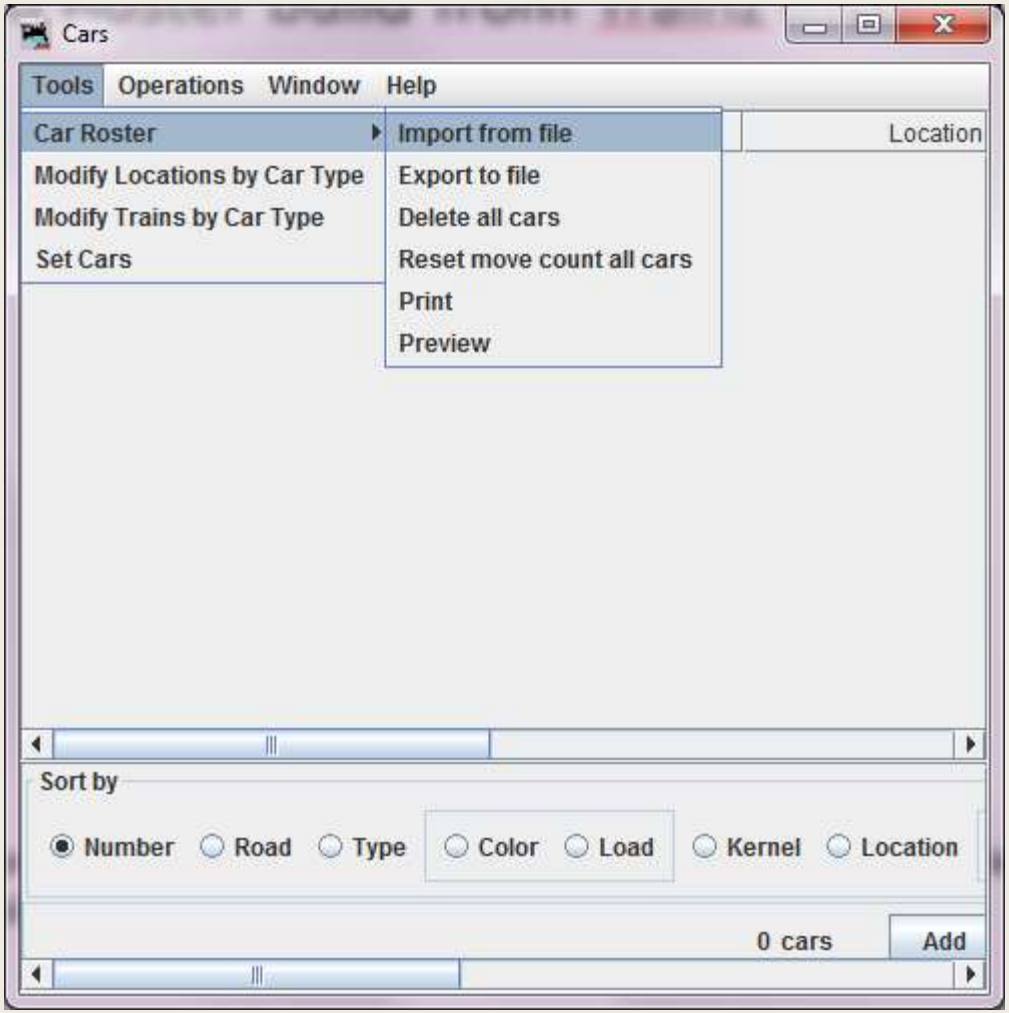
Once all the imported columns are built in Excel you can copy and paste required column data to a new worksheet in order to format for JMRI. The column format is “road number”, “road name”, “type”, “length”. Do not use column headers.

JMRI Roster build from Trainz Inventory



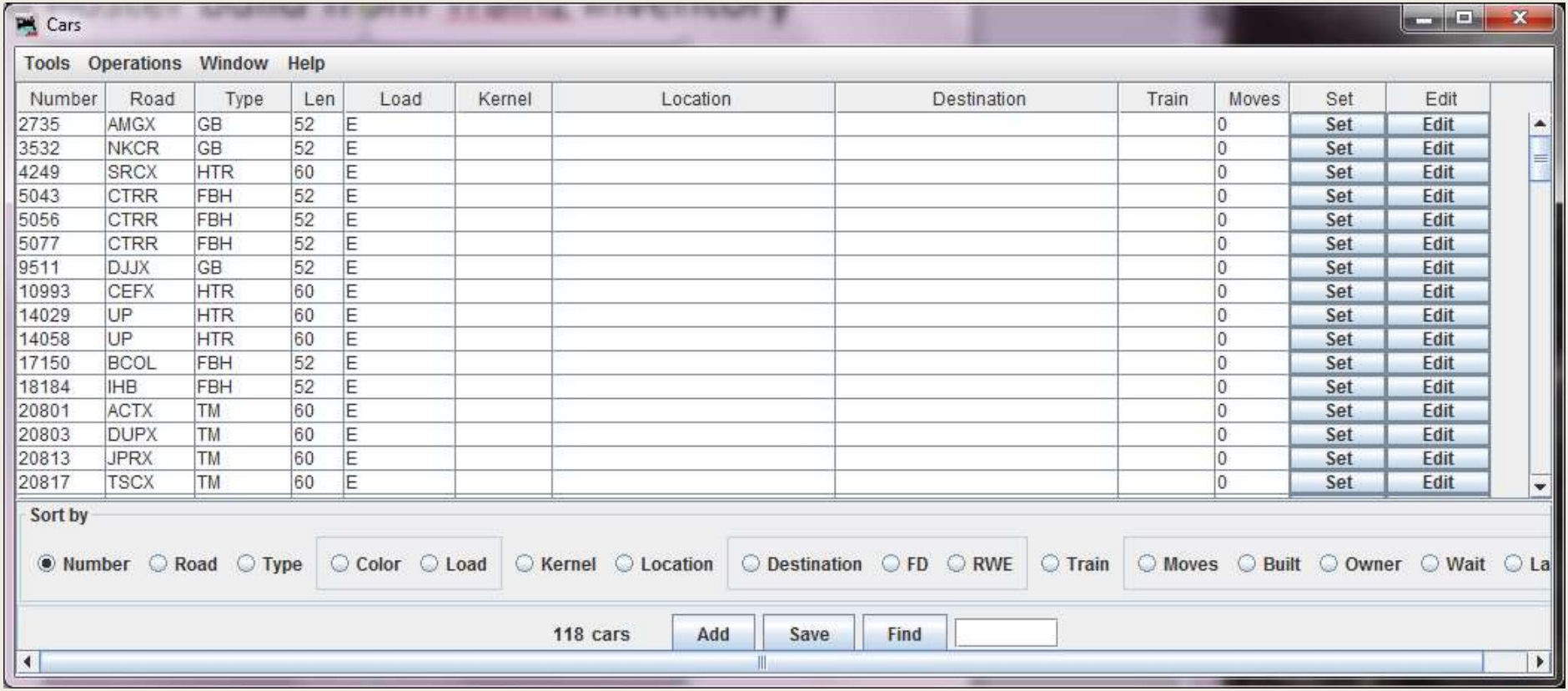
After formatting complete, select File and Save As type: Text (tab delimited). Excel will save only the worksheet you are on as a text file.

JMRI Roster build from Trainz Inventory



Now you may goto JMRI operations and the “Cars” selection to import your text file. This will populate the cars inventory in JMRI. Any new car types will also be added.

JMRI Roster build from Trainz Inventory



If successful, your JMRI roster will now contain all your rolling stock. You may from this point modify each car as necessary for JMRI specific features or simply start adding them to locations and trains.

Leisure Activity Changes

1960's Baby Boomers	2010's The Millennials
Sports	Smart Phone/Selfies
TV/Movies	Social Media/Facebook/Twitter/Blogs
Hobbies/Crafts	Video Games
Radio	WIFI/Internet/Starbucks
Cars	Computers/Tablets/Online reading
	HDMI TV
	Sports
	Cars
	Hobbies?

Too much media, not enough time

Technology is a major pathway to influence the next generation