

2016

FRA Rail Program Delivery

Meeting

Lessons Learned: Railroad Operations

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Types of Railroad Trains

Freight Trains

Passenger Trains

Freight Train Types

- ▶ **Local Freights** have the lowest priority, but consume massive amounts of time on the main line.
- ▶ **Tonnage Trains** can carry the most weight. Because of this, braking can be the most difficult of any train type.
- ▶ **Manifest Trains** are the most varied in cargo and weight, and therefore braking distance.
- ▶ **Intermodal Trains** carry lighter weight, high value cargo, and travel longest distances. They adhere to tight schedules.

Passenger Train Types

- ▶ **Commuter Trains'** average speed is low because they make frequent passenger station stops.
 - ▶ Local Commuter
 - ▶ Zone Express Commuter

- ▶ **Intercity Passenger Rail Trains** by definition connect two or more large metropolitan areas.
 - ▶ Long-Haul, Short-Haul
 - ▶ Higher-Speed, High-Speed

Train prioritization on the Railroad . . .

1. Intercity Passenger Rail
2. Commuter Rail Trains
3. Intermodal Hotshots
4. Manifest Trains
5. Tonnage Trains
6. Local Freight Trains

How are priorities set?

- ▶ Train time-sensitivity
- ▶ Length of Route
- ▶ Train speed
- ▶ Crew-time limits and distances to crew change
- ▶ Contracts with the RR for on-time performance

Freight Train Summary

Types	Train Length	Range in Miles	Ave. Speed MPH
Local Freight Trains	< 35 cars	0 – 60 -150	5 – 10
<i>Local Switchers</i>			
Tonnage Trains	100 – 120 cars	Up to 2000	20 – 30
<i>Bulk Commodity Freight</i>			
<i>Unit Trains</i>			
Manifest Trains	Can be very long	60 – 2000	30 – 40
<i>Mixed Freight Trains</i>			
Intermodal Hotshots	80 – 120 cars	700 - 3000	40 – 50

Passenger Rail Train Summary

Types		Train Length	Range in Miles	Ave. Speed MPH
Commuter Trains		4 – 12 cars	20 – 100	30 – 45
Intercity Passenger Trains				
	<i>Long-Haul</i>	10 – 16 cars	800 -2000	50 -60
	<i>Short-Haul</i>	5 – 8 cars	300 – 700	45 – 55
	<i>Higher-Speed</i>	5 – 10 cars	200 – 700	60 – 85
	<i>High-Speed</i>	10 – 12 cars	300 – 700	100 – 130

Managing Capacity

Trains – Expected speeds with different freight densities

Freight Trains on Corridor		Give priority in design of track and signals to:	Expected Average Speeds
40-60/day	Heavy	Freight	50 mph freight 60 mph passenger
10-20/day	Medium	Equally to Freight and Passenger	50 mph freight 60 mph passenger
1-4/day	Light	Passenger	30-40 mph freight 70 mph passenger

Braking Systems Summary Table

Freight Trains	
All freight trains	Conventional Air Brakes
Some, esp. Intermodal	Dynamic Brakes
Intermodal and some Tonnage	Electro-Pneumatic Brakes
Passenger Trains	
All passenger trains	Conventional Air Brakes
Some, esp. Amtrak	Blended (Conventional & Dynamic)

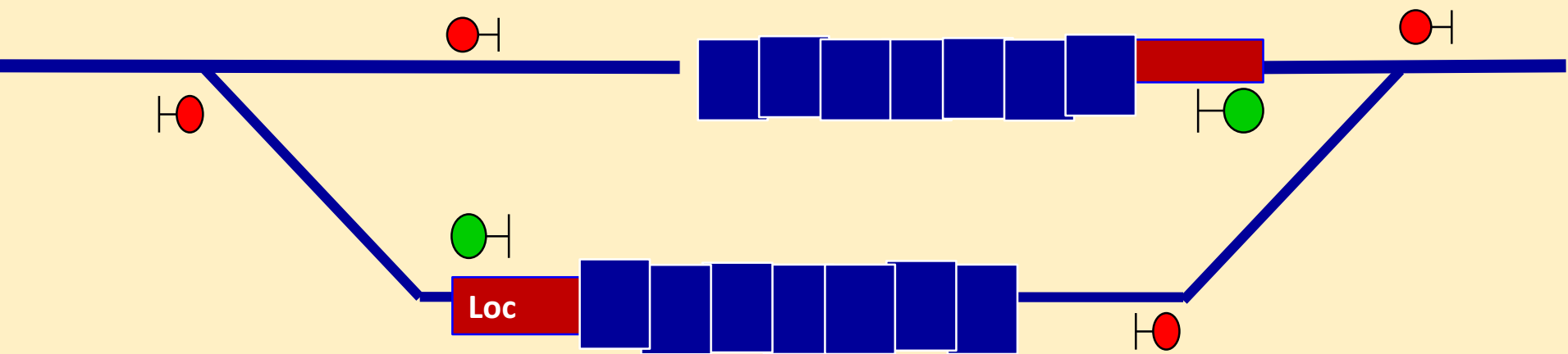
Railroad Operations

Operations on Single and Double Track Railroads

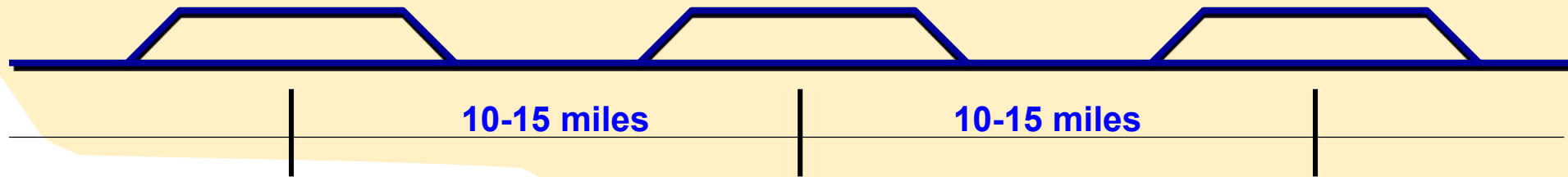
Single Track Railroads

- ▶ Of 100,000 route miles of Class 1 Railroads, 80-90% single track.
- ▶ All regionals and short lines are single track.
- ▶ Capacity:
 - ▶ 15 - 25 trains per day
 - ▶ 8 -12 in each direction

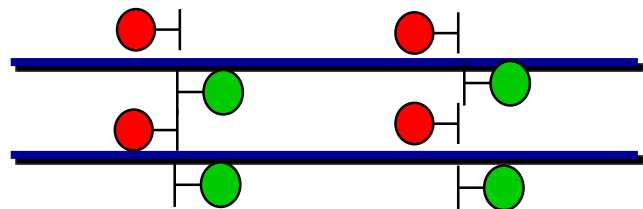
Single Track Capacity Builders



Signalized passing tracks for meets and overtakes



Double Track Capacity Builders

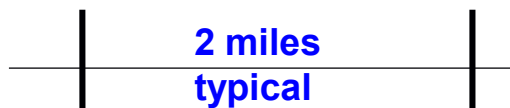


Bi-Directional Signals



10-12 miles

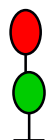
Universal Crossovers
w/ #20 - 24 Turnouts



2 miles typical

30-40 miles

30-40 miles

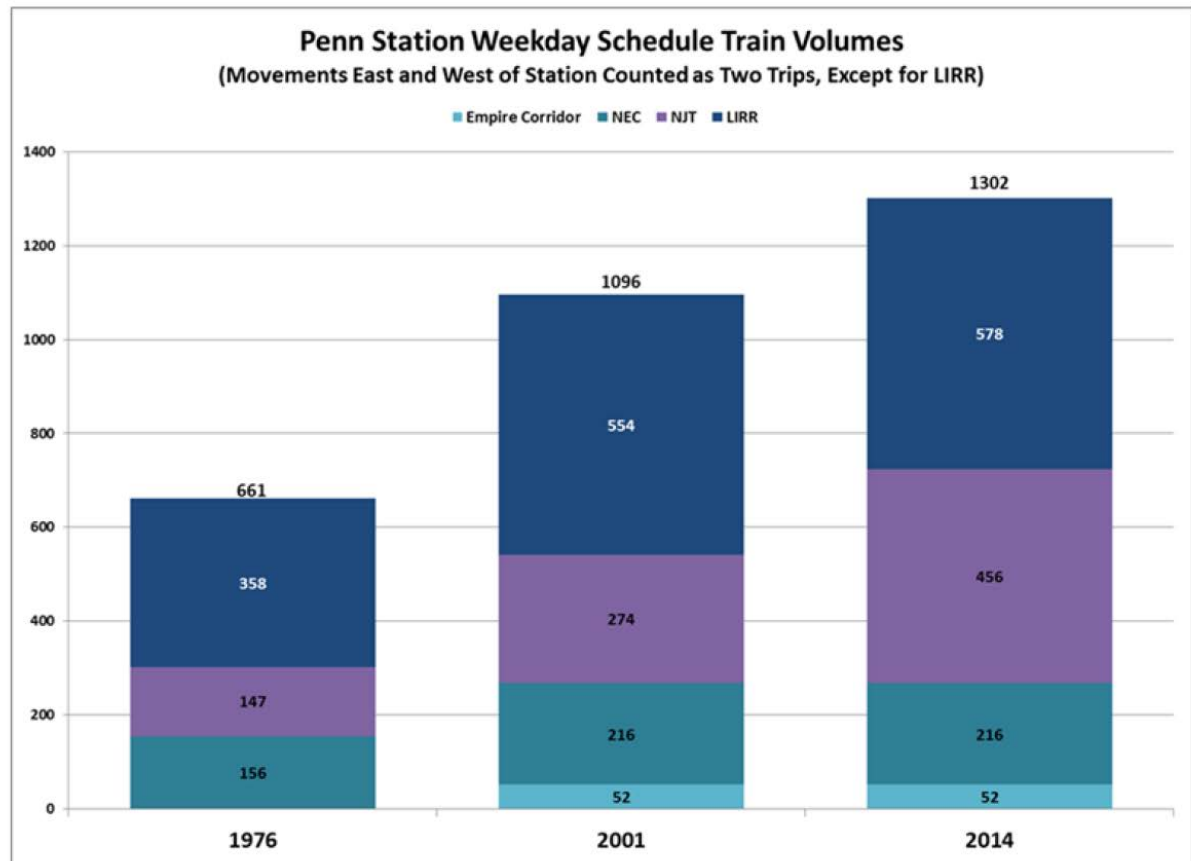


Signalized Passing Tracks
w/#20-24 Turnouts

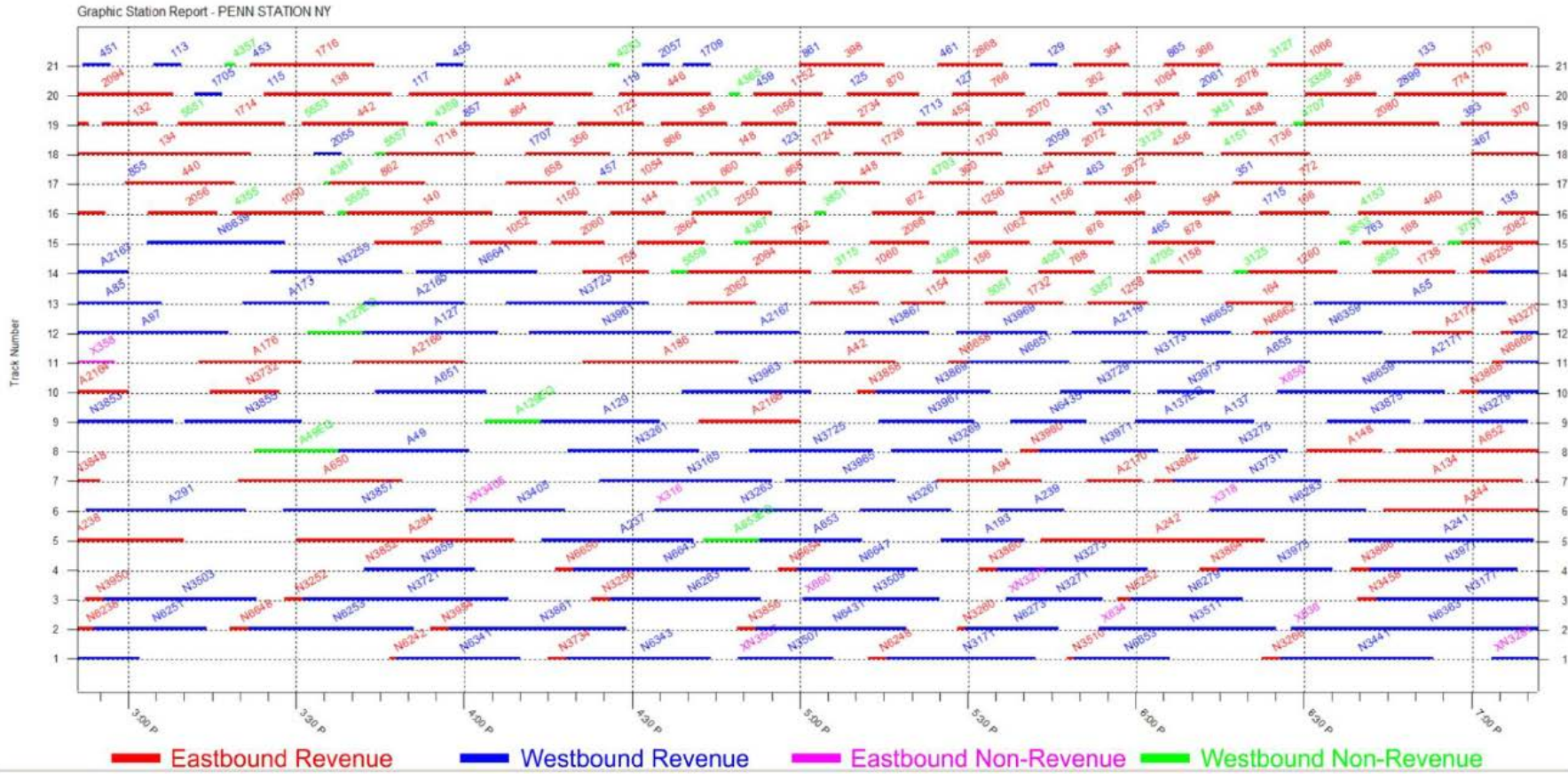
Volume & Density Effects - Growth

Penn Station

- ▶ 7 Tunnels
- ▶ 21 Station Tracks
- ▶ 1300 Train Movements
- ▶ 400,000 passengers
- ▶ 2 Minute Headways (Min.)



Volume & Density Effects – Evening Peak



Volume & Density Effects - Principles

Scheduling

- ▶ *Every Train Movement Scheduled*
 - ▶ *Revenue – all three operators*
 - ▶ *Non-Revenue over main tracks and yards*

Infrastructure

- ▶ *Designed for the operation (where feasible)*
- ▶ *Station – platforms, vertical access, communications*
- ▶ *Railroad – parallel routes, signal sectionalization*

Coordination Essential

- ▶ *Joint terminal operations*
- ▶ *Joint planning of schedules / initiatives*

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Thank you!

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