

# **BUILDING A CONSIST**

**LOCOMOTIVE MANAGEMENT**

**BY DAVE HUSMAN**

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# Yes, but.....

- Disclaimer
  - Locomotive management is policy
  - Varies by railroad
  - Varies by era
  - Varies by who is in charge
  - Can change overnight
  - Everybody is “right” – multiple correct answers

**I guarantee that you will be able to find exceptions to everything I say**

Opinions based on my experience: Asst Gen Foreman, Mgr Term Ops (Term Supt), Dir Loco Mgt, Dir Train Mgt (Chief Disp.)

# What we will discuss

- Managing the fleet
- How engines are selected for trains
- Timeline for power planning
- How the power flows through the service track
- Shopping engines
- Modeling

# Fleet Management

- Fleet Composition
  - What type of engines
    - Horsepower (tractive effort, speed, fuel economy)
    - Wheel arrangement (tractive effort, axle loading)
    - Extras (dynamic brakes, DPU, hump controls, cab signals/PTC, safety cabs, AC, hot plates, etc.)
  - Different fleets
    - Passenger (higher gear ratio, higher hp/axle, boilers, HEP)
    - Priority freight (higher hp/axle)
    - Drag freight (higher TE)
    - Local (4 axle) : very long life, low mileage, nearly immortal
    - Yard (hump controls, lower hp/axle, higher TE, calves, slugs): specific, limited use
    - Differentiation breaks down more in the post mega merger eras

# Fleet Management

- Allocation

- How many engines – sizing the fleet

- Number of trains, train speed and turn time

- Balancing (right number, right place, right day)

- Railroad operations aren't balanced, sometimes have to power for the returning train or next day

- Relocating power (excess power, power moves)

- Storing power

- Maintenance

- Manufacturer and model

- Periodic inspections (Federal and railroad)

- Failures (fix, replace or reduce)

- Upgrades (General or program)

# Fleet Management

Different engines, different purposes



GP38-2 local engine, SD9043AC intermodal engine and C44AC coal train engine



# Fleet Management

Engines may be used differently on different railroads



Former CNW SD38's working as N Platte Hump Engines



# Fleet Management

Different solutions to same problem



2 approaches to passenger engines, MP E-8 and RDG FP-7



# Who picks the engine

- System level decides on fleet
  - How many
  - What types
  - What service
- System allocates engines to regions or services
- Operating Dept manages use and allocation of engines
- Mechanical Dept. keeps them running and builds consists
- Dispatch office or central control manages fleets outside of yards

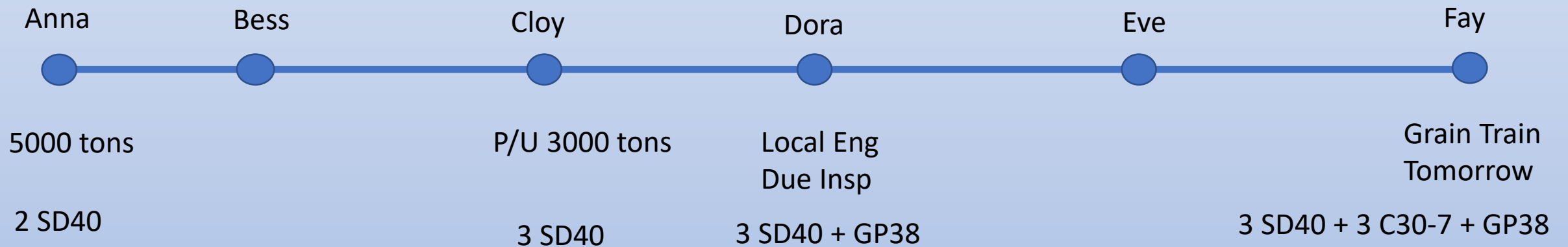


UP Operations Control (OpCon) 9<sup>th</sup> Floor, 14<sup>th</sup> & Dodge

# Who picks the engine

- Three levels to address

- What does the train need to leave the yard (yard)
- What does the train need to get over the road (dispatch)
- What does the system need (dispatch/system)



# Who picks the engine

- Operating dept sets the number and mix
- Mechanical forces pick specific units
  - Service track builds consists
  - Requirements, then convenience



MP local power set, 2 GP38-2's and GP18 at Houston, TX



# How many engines does the train need

- Steam vs. Diesel
  - Steam is a “step function”
    - Large increments of tonnage
    - 2-8-2 = 5,000 tons
    - Two 2-8-2 = 10,000 tons
  - Diesel is a sliding scale
    - Measure off as much as you need
    - GP38 = 2000 tons, SD40 = 3000 tons
      - 2 GP38 = 4000 tons
      - 1 GP38 + 1 SD40 = 5000 tons
      - 2 SD40 = 6000 tons
      - 3 GP38 = 6000 tons



UP coal train w/ SD9043AC & SP SD40T-2 at Mo Valley, IA



# How many engines does the train need

- Tonnage rating
  - Chart per subdiv or route
  - Tons per engine type or class
- Tonnage factor
  - Tonnage rating per engine type or class
  - Adjustment factor by subdiv or route

**THE TEXAS AND PACIFIC RAILWAY COMPANY**  
 OFFICE OF GENERAL MANAGER  
 Ft. Worth, Texas  
 Aug. 1, 1974  
**RED RIVER DIVISION**

FROM	TO	DIRECTION	RATING IN ACTUAL TONS								
			LOCOMOTIVE CLASS and HORSEPOWER								
			SW-8 900 HP	NW-2 1000 HP	SW 7, 9, 12 GP-12 1200 HP	GP-7, MP-15 GP-16 1600 HP	GP-9, 18 1800 HP	GP-28 GP-38 2000 HP	U-23-B 2250 HP	GP-35 2500 HP	U-30-C SD-40 3000 HP
TEXARKANA	SULPHUR	W	3400	3650	3800	4150	4430	4680	5030	4840	7020
SULPHUR	MARSHALL	W	1850	2000	2100	2200	2350	2490	2670	2580	3730
MARSHALL	SULPHUR	E	1850	2000	2100	2200	2350	2490	2670	2580	3730
SULPHUR	TEXARKANA	E	2500	2650	2800	3000	3200	3390	3640	3500	5080
MARSHALL	SHREVEPORT	E	2300	2500	2600	2800	2970	3140	3380	3250	4710
SHREVEPORT	SCOTTSVILLE	W	2300	2500	2600	2800	2970	3140	3380	3250	4710
SCOTTSVILLE	MARSHALL	W	2650	2850	2950	3200	3450	3620	3890	3750	5430
MARSHALL	LONGVIEW	W	2050	2250	2350	2500	2670	2830	3040	2930	4240
LONGVIEW	BIG SANDY	W	1900	2050	2150	2300	2450	2590	2780	2680	3880
BIG SANDY	T & P JUNCTION	W	1650	1800	1900	2000	2130	2260	2430	2340	3390
T & P JUNCTION	BROWDER	W	3400	3650	3800	4150	4430	4680	5030	4840	7020
BROWDER	LANCASTER YD.	W	1750	1900	2000	2100	2240	2370	2550	2460	3550
LANCASTER YD.	ARLINGTON	E	1650	1800	1900	2000	2130	2260	2430	2340	3390
ARLINGTON	T & P JUNCTION	E	2650	2850	2950	3200	3430	3620	3890	3750	5430
T & P JUNCTION	FORNEY	E	1650	1800	1900	2000	2130	2260	2430	2340	3390
FORNEY	MINEOLA	E	1850	2000	2100	2200	2350	2490	2670	2580	3730
MINEOLA	BIG SANDY	E	2050	2250	2350	2500	2670	2830	3040	2930	4240
BIG SANDY	LONGVIEW	E	2050	2250	2350	2500	2670	2830	3040	2930	4240
LONGVIEW	MARSHALL	E	2050	2250	2350	2500	2670	2830	3040	2930	4240
TEXARKANA	RED RIVER	W	2050	2250	2350	2500	2670	2830	3040	2930	4240
RED RIVER	BROOKSTON	W	2050	2250	2350	2500	2670	2830	3040	2930	4240
BROOKSTON	BONHAM	W	2000	2150	2250	2400	2560	2700	2900	2800	4050
BONHAM	FT. WORTH	W	2000	2150	2250	2400	2560	2700	2900	2800	4050

# How many engines does the train need

- Horsepower per trailing ton
  - Rating by type of train and region
  - Quick & Dirty : % max grade = Min hp/tt
- Tons Per Axle
  - TE rating of “axles” by engine type
    - SD40-2 = 6
    - C44AC = 10
  - Requirement by train type and region

Train	E of N Platte	W of N Platte
Bulk	.5 hp/tt	1 hp/tt
Manifest	1 hp/tt	1.5 hp/tt
Auto/Std IM	1.5 hp/tt	3 hp/tt
Premium IM	2.5 hp/tt	4 hp/tt

Train Type	E of N Platte	W of N Platte
Bulk	500	250
Manifest	250	125
Auto/Std IM	150	100
Premium IM	100	50

# Timeline for engines

- Annual -System level selects fleet
- Monthly/weekly - System level allocates power
- TD-1 to 7 days : Manage inbound power flows
  - Tactical : Inbound flows outbound flow for the day
- TD- 8 to 24 hrs : Engines are penciled in for outbound trains by service track, inbound engines have arrived
- TD- 6 to 8 hrs : Train size pretty well known, plan consist
- TD- 2 to 4 hrs: Train is “set”, outbound engine consist is built
- TD- 1 to 2 hrs: Consist to train by hostlers or outbound crew
- On time departure!



# Service track flow

- Service or “turn in yard”
- Service tracks
  - Defects, engineer reports
  - Inspections, due or past due (Blue card)
  - Fuel, water, sand, supplies, toilet dump
  - SD40 or later has about 1000 mile range
- Cut out inspections and bad orders
- Build outbound consists
  - Horsepower, attributes, inspections
  - Connect all the hoses and cables
  - Air test
  - Power test
- Outbound consist moved to ready tracks



West Service Track at UP Bailey Yard, N Platte, NE



# Shopping

- Minor repairs – minutes to hours
  - Done on service track
  - Brake shoes, air hoses, cables, light bulbs
- Light repairs – hours to a day
  - Monthly or quarterly inspections
  - Small repairs that don't need a crane or drop table
  - Wheel trueing

Shop tracks, MP Settegast Yard, Houston, TX





# Shopping

- Medium repairs – Days to a week
  - Annual and longer inspections
  - Heavy repairs that require a crane or trucks/traction motors removed
- Heavy repairs – Weeks to years
  - Rebuilds
  - Wrecks
  - Transfer table = weeks

MP Pike Ave Shops, N Little Rock, AR





# Shopping



Locomotive Shops, MP N Little Rock Yard



# Shopping



UP Jenks Shops  
N Little Rock, AR



# Modeling

- Fleet
  - Family appearance
  - Different types of service
- Allocations
  - Not as modelable on small scope
  - No engine = nothing happens, not fun
  - Assigning power to trains at the beginning of a session prototypical
- Tonnage ratings
  - Cars vs tons
  - Directional by locomotive class



Rescar CF-7's near BNSF Saginaw Yard, Ft Worth, TX

# Modeling

- Engines are water resistant
- Servicing
  - Not every diesel needs fuel every day
    - SW yard engine – refuel every 2-3 days
    - GP yard/local engine – refuel 2-4 days
    - Road engine – SD40 or better – 1000 mile range
- Inspections
  - Remove engine from use for the session
  - Swap out engines
  - Daily – by the crew wherever is it, has to be done by midnight, once per calendar day



KCS engine house, Heavener OK <sup>22</sup>

# Modeling

- Shopping
  - Putting engine into a shop takes it out of play for that session (or several sessions)
  - Transfer table – weeks or months
- Shop condition
  - Sets tone of condition of your railroad



Shop tracks, MP Settegast Yard, Houston, TX





# QUESTIONS?

For a downloadable pdf of this presentation go to:  
[www.wnbranch.com](http://www.wnbranch.com) in “How To” section