



**BUILDING AMERICA®**

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# TEGMA

How We Resource  
the Railroad for  
Reliability

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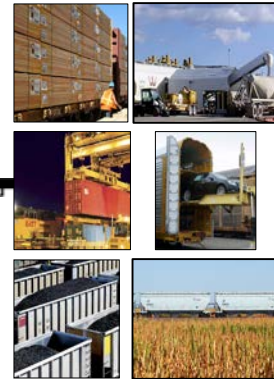
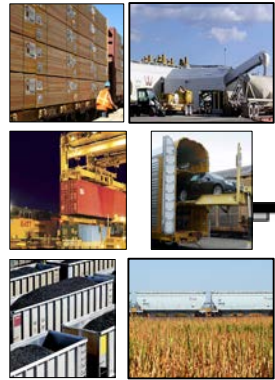
AVP Network & Capital  
Planning

# We are an Assembly Line

Pull and spot, classify, and transport cars



Products:  
Intermodal, Manifest, Bulk



(A) Customer / Serving Yard

(A) Customer / Serving Yard

(B) Terminal

(B) Terminal

(B) Terminal

(C) Line of road

(C) Line of road

# 5 Critical Resources Enable Production

Shared & Interconnected



Workforce

Main Lines



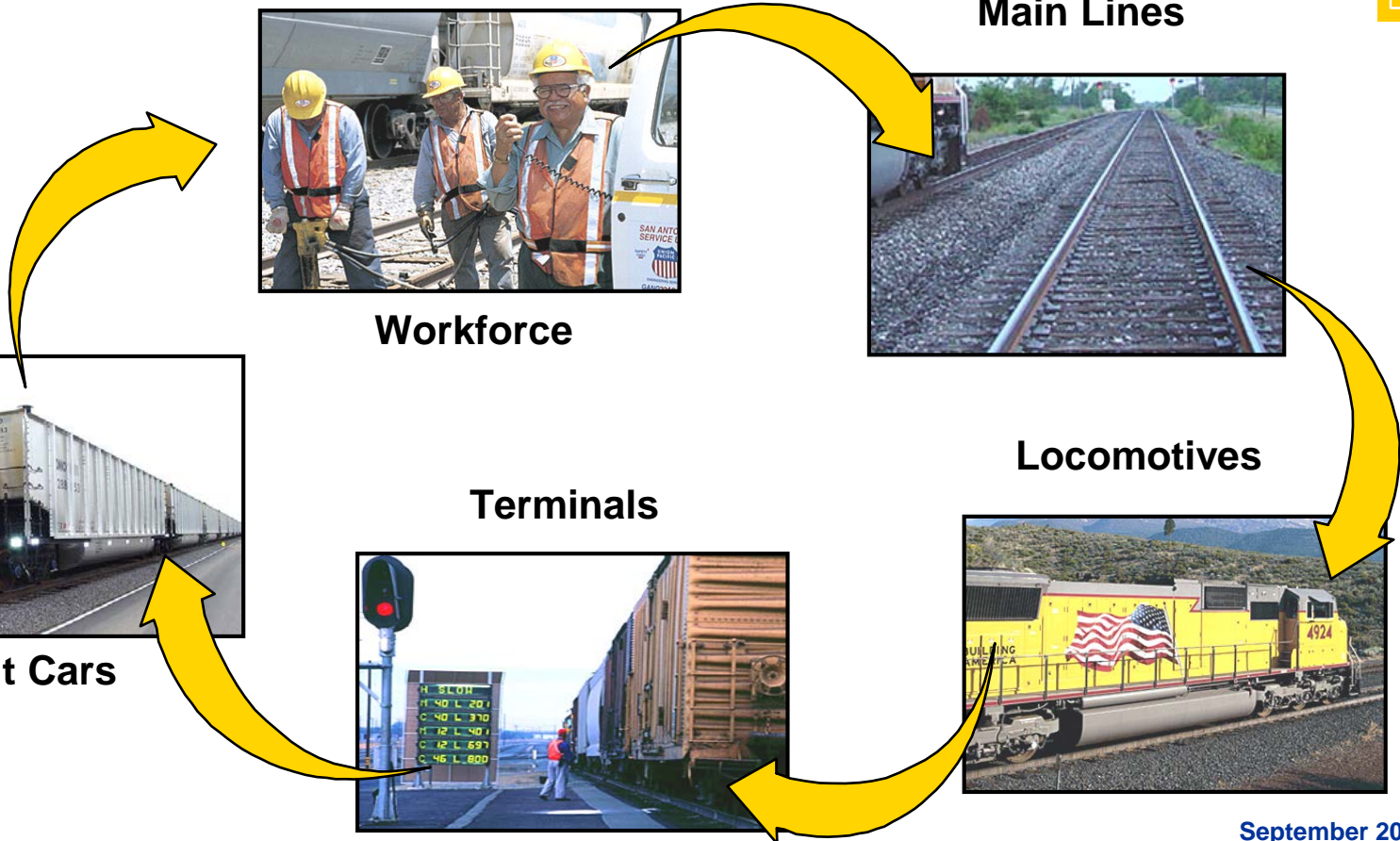
Locomotives



Terminals



Freight Cars



# 5 Critical Resources

*(Lead time for expansion shown in Italic)*



## Long lead time required to place resources



**Workforce**  
*6 – 9 months*



**Main Lines**  
*18 – 36 months*

**Locomotives**  
*12 months*



**Terminals**  
*18 – 36 months*



**Freight Cars**  
*12 months*

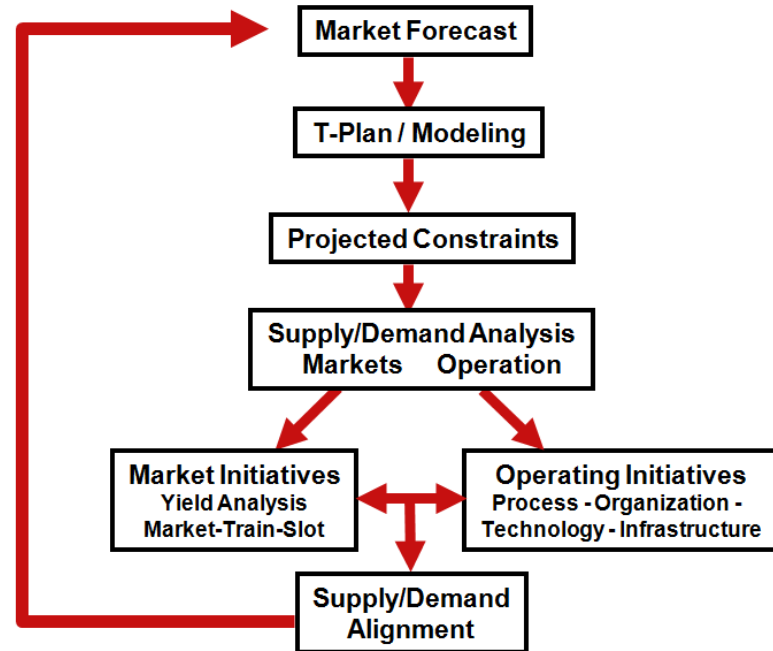


# Business Planning Process

Have the right resources, in the right place, at the right time

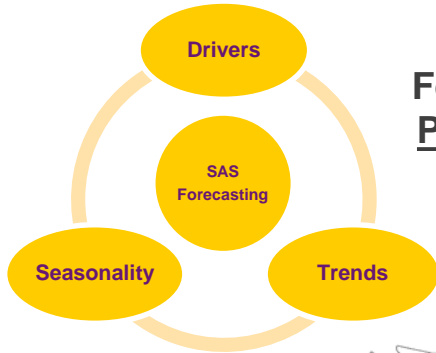
- Bi-annual process
- Cross departmental exercise
- Foundation for transportation and resource plans

## Business Planning Process



# Market Forecast

## How is the carload forecast developed?



### Forecast Process

- Statistically based modeling
- Economic indicators
- Supplemented by market intelligence
- Trends & seasonal patterns
- Annual process initiated in August

### Prophecy Regions



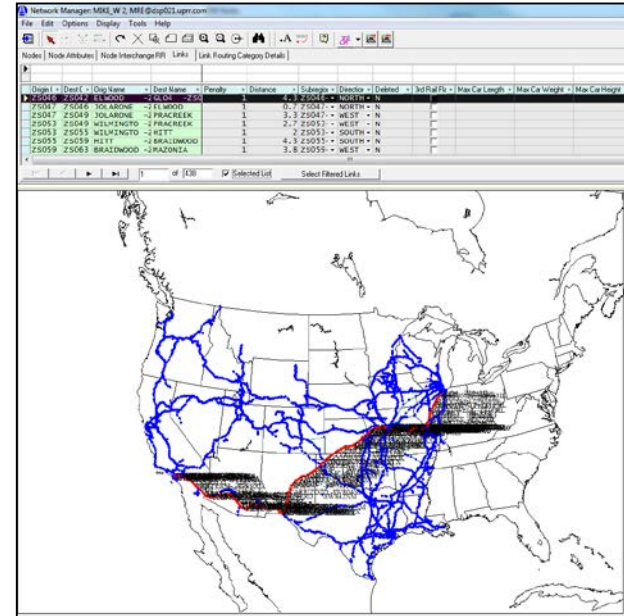
# T-Plan Modeling

## Converts cars to trains



- Utilizes Multirail software
- Flows market forecast across network
  - Places cars on trains
  - Incorporates empty cars flows
  - Line of road
  - Terminals
- Compares base period to forecast

### Multirail Screen Shot



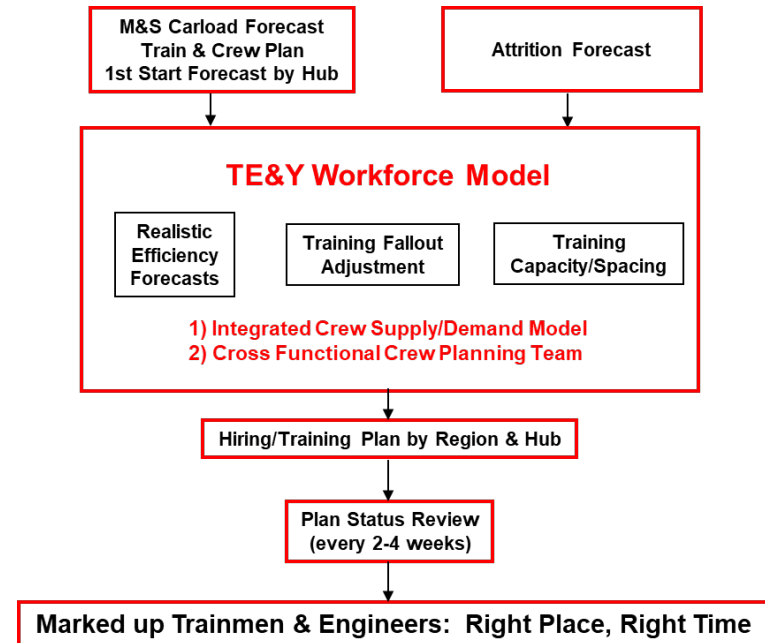
# Resources: Crews

## Right location, right craft, right time



- Support ~3,700 starts per day
- One start equals four TE&Y professionals
- Location specific, by labor agreement
- Seasonality swings demand by 1,000+ people over the course of the year

### Crew Planning Process





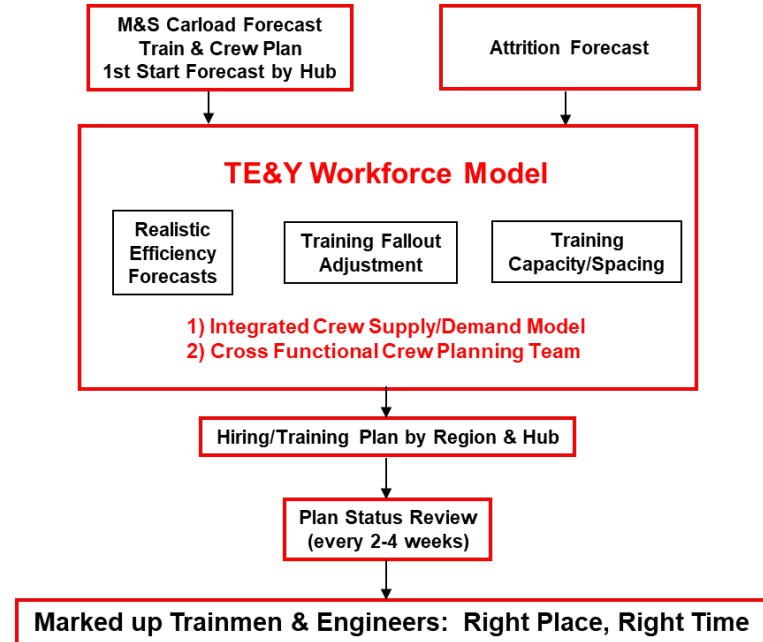


# Resources: Crews

Hiring plan developed via modeling, supported by process

- Key drivers:
  - 1<sup>st</sup> starts
  - Attrition
  - Efficiency
  - Training capability
- Hiring plan phased to meet demand, by hub
  - Seasonality
  - Track renewal
  - Training capability
- Accounts for surge capability
  - AWTs, cutback engineers, borrow out supply, and low miles

## Crew Planning Process



# Resources: Locomotives

## Share asset across the Network



- 7,300 active units
- 22 System locomotive shops
- ~4,500 mechanical locomotive employees

High Horse Power



Low Horse Power

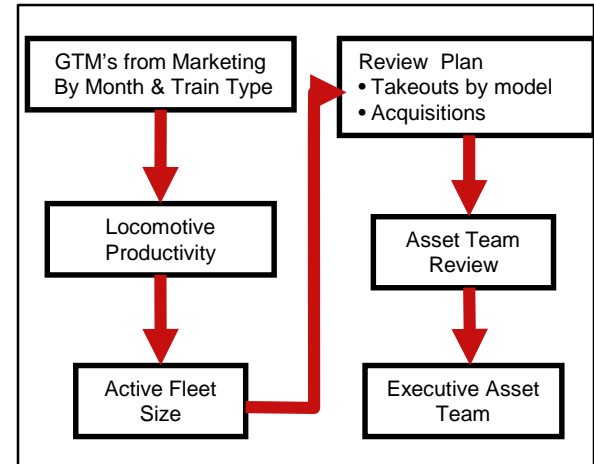


# Resources: Locomotives

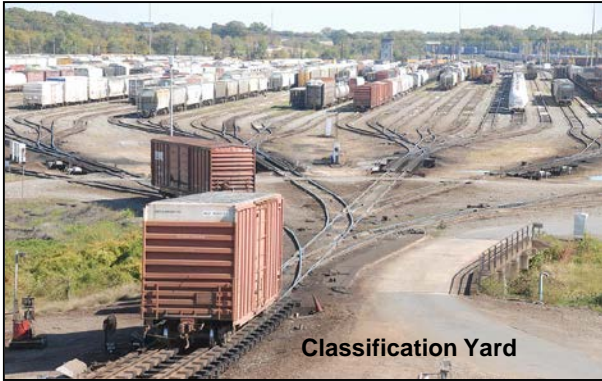


- Demand based on gross ton miles
- Mathematically derived
- Key drivers
  - Utilization (velocity / dwell)
  - Reliability
  - Business mix
  - Horsepower per Train: Grade, performance, tonnage
- Forecasts: Weekly, annual, long-term
- Accounts for surge capability

## Locomotive Planning Process

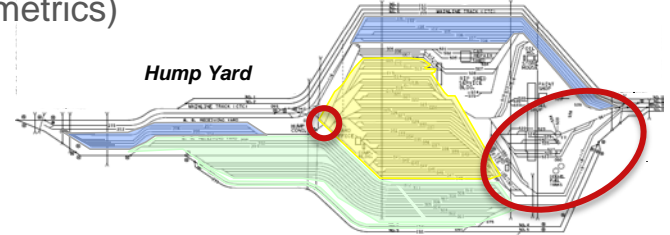


# Resources: Terminals



## Tools

- Analytical / Deterministic model (MIT base model)
- History (parametrics)

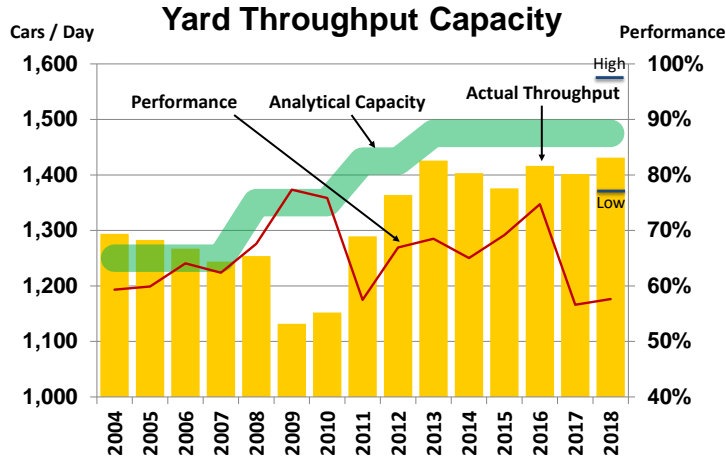
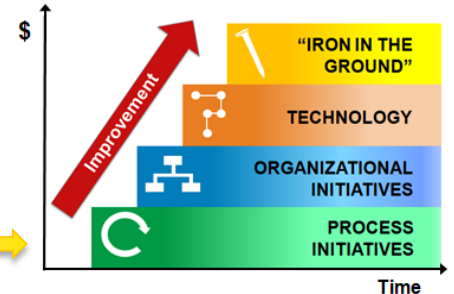


## Inputs

- Track-feet of major components
- Fluid utilization rate
- Processing rates
- Train Plan / Peaking
- Maintenance

## Informs

- Improvement initiatives
- Investments



# Resources: Line of Road



## Tools

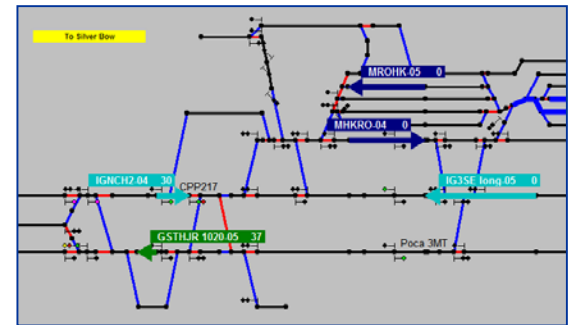
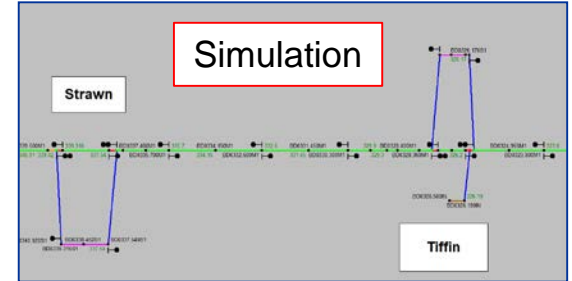
- Analytical / Deterministic model
- Simulation (RTC industry standard)

## Inputs

- Distance between sidings
- Speed, Product mix
- Peaking, Maintenance
- Recoverability
- Siding length

## Informs

- Maintenance scheduling
- Variability reduction initiatives
- Train and schedule design
- Investment project design and priority

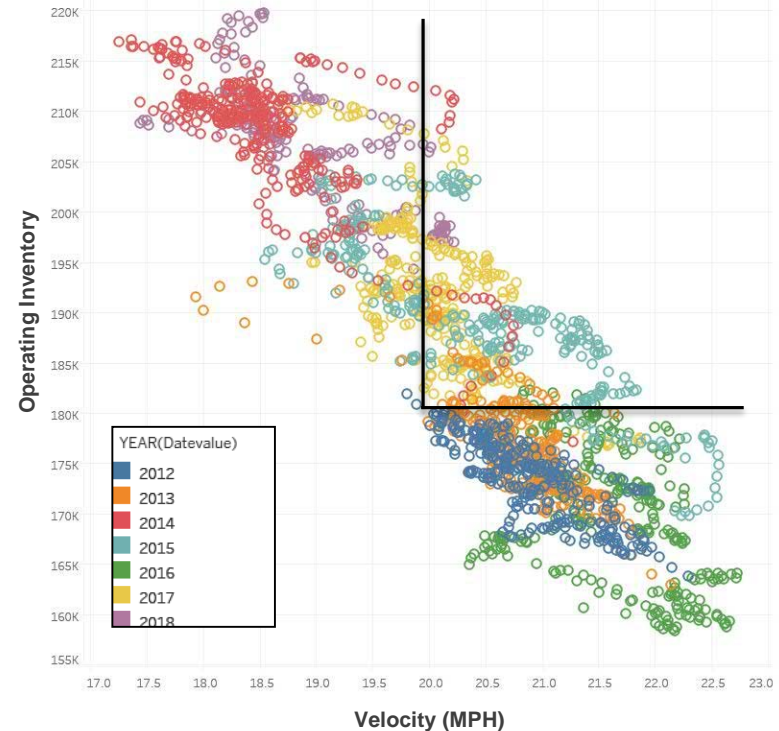


# Resources: Freight Cars / Inventory



- Fixed infrastructure network
- Performance is impacted by inventory
- Critical that we work together for the good of all

Velocity vs. Operating Inventory





# Resourcing the Railroad

Have the right resources, in the right place, at the right time

- Driven by market forecast
- Informs need for five critical resources
- Based on analytics, supported by process
- Cross departmental exercise
- Ongoing communication is critical

## Business Planning Process

