



# Highspeed Rail Challenges on The Northeast Corridor

Frank Vacca  
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HSR Practicum



# North American Differences to Consider

- NEC Operating Characteristics
- Regulatory Environment
- Axle Loads/Impact Loads
- Vehicle/Track Interaction Issues (VTI)

# Not Too Different

- Catenary
- Structures
  - Impact Leads
- Signals
  - Broken Rail Protection
  - Positive Train Control

# Northeast Corridor

- Mixed Traffic Use
  - Impact Loading
  - Maintenance Window Conflicts
- Corridor Configuration
  - Interlocking Spacing
  - Number of Wayside TO's
- Age of ROW and Assets
  - Curves/Grades
  - Sub-grade and Ballast Conditions

# Freight Trains



# Commuter Trains



# Commuter Trains HighSpeed & Regional



# Regulatory

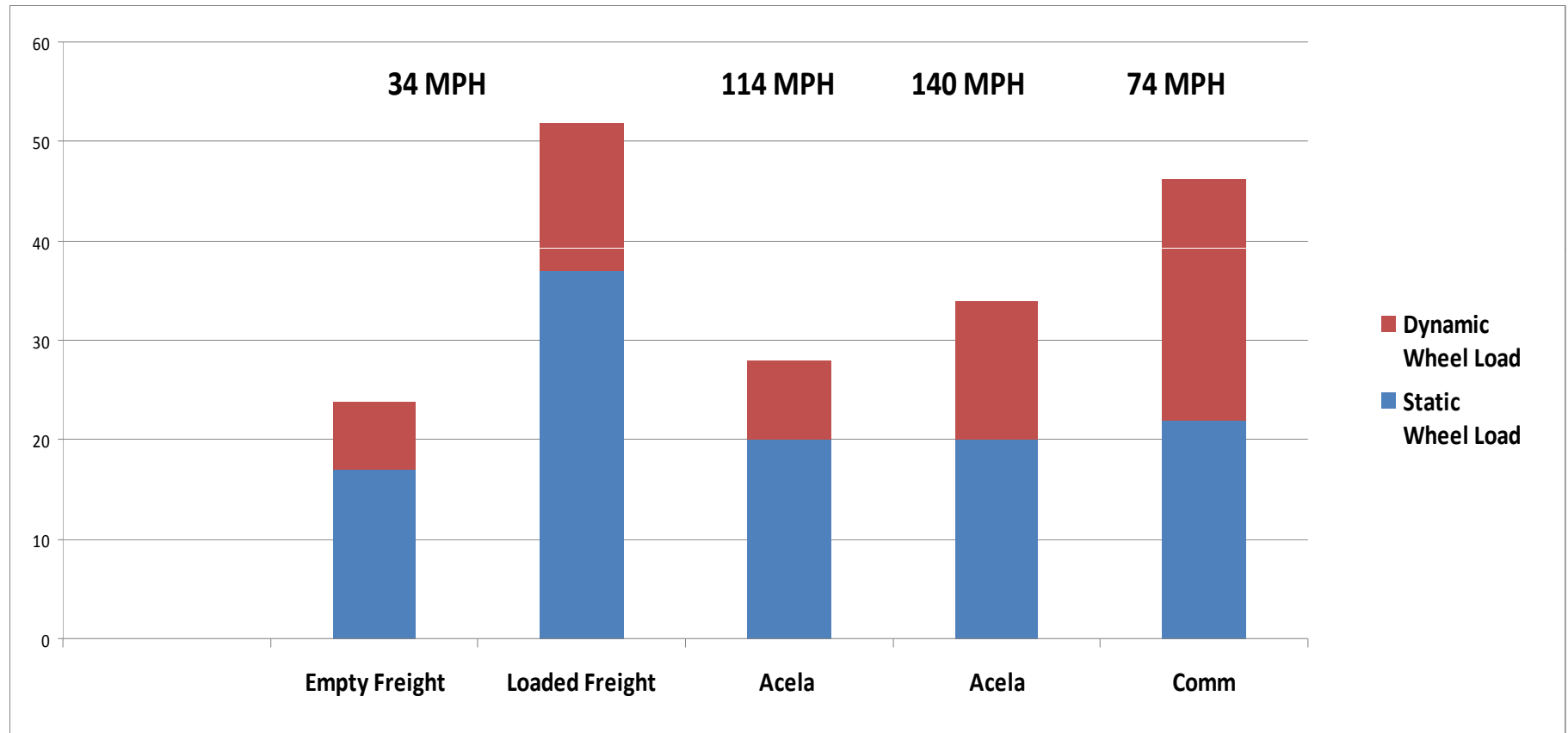
- Positive Train Control
- Roadway Worker Protection
- Track/Structures and Signal Standards
- Crash Worthiness
- Rule of Particular Applicability



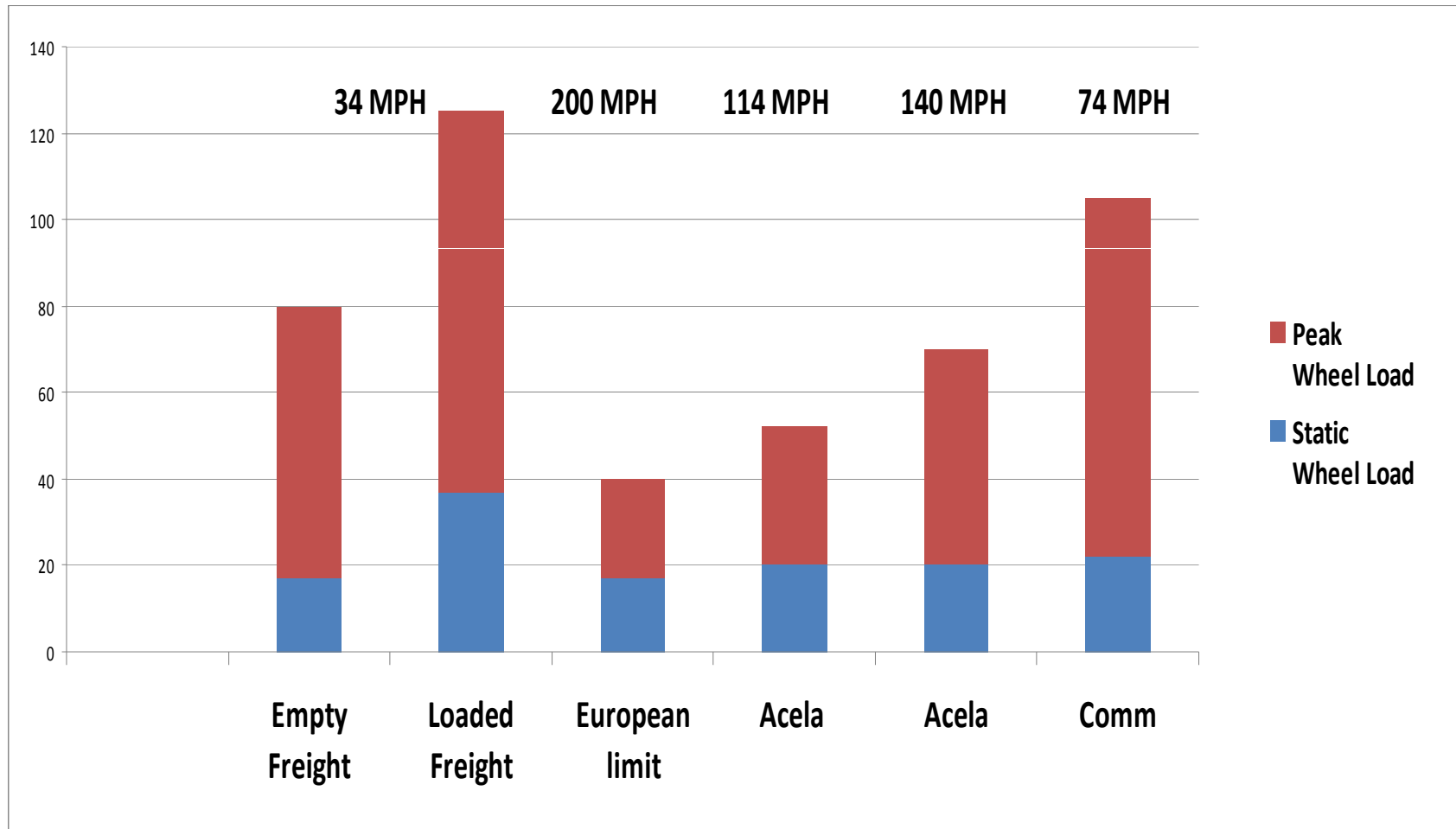
# Axle Loads

- NEC is a Mixed Traffic environment
- Amtrak uses six Wheel Impact Load Detector (WILD) sites to control axle loads and impacts
- 286,000 pound freight axle loads permitted
- The static load environment is much heavier than HSR abroad
- Higher speeds result in shock damage to IJs, joints and other special track work

# Average Vertical Loads NEC WILD Sites



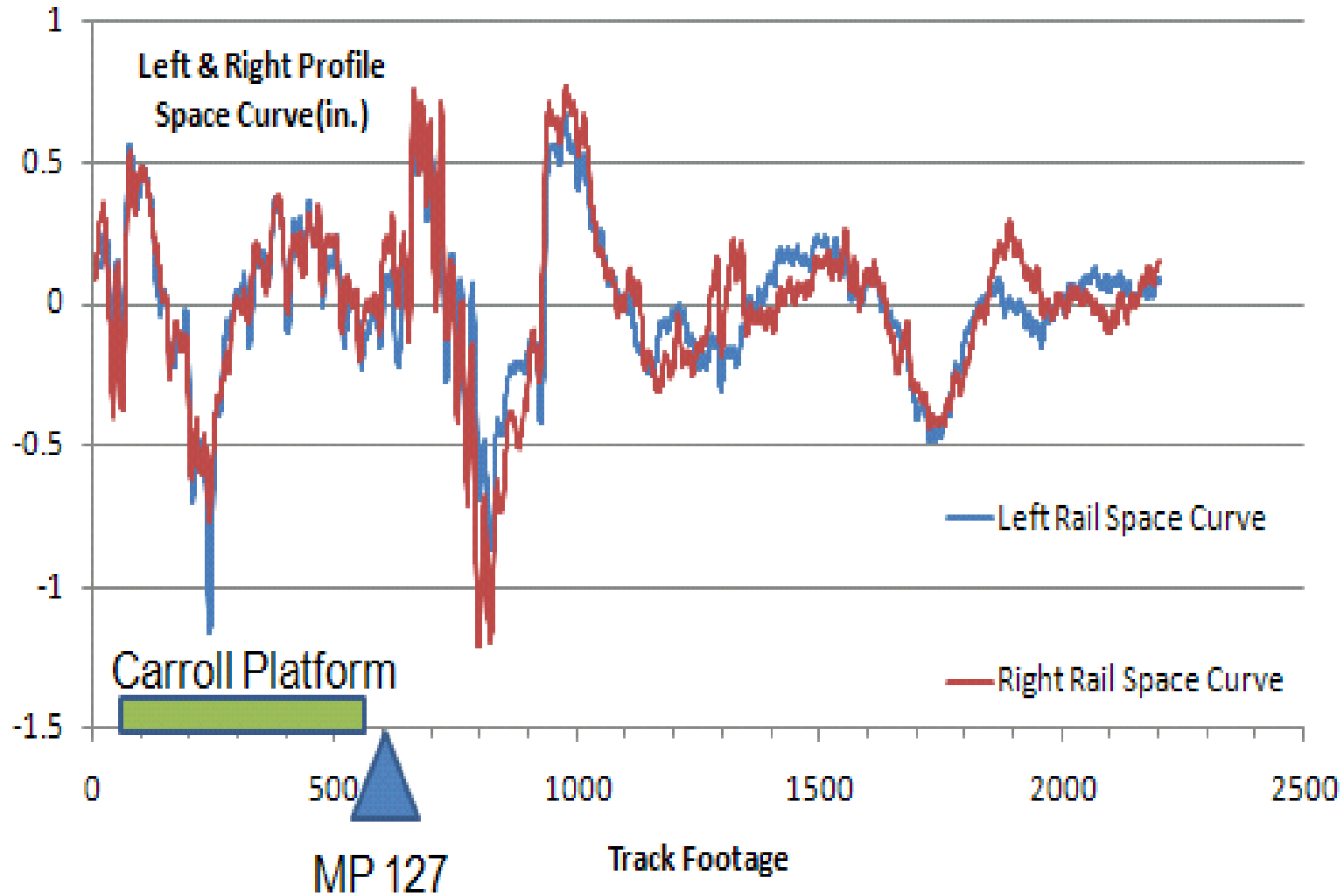
# Peak Vertical Loads NEC WILD Sites



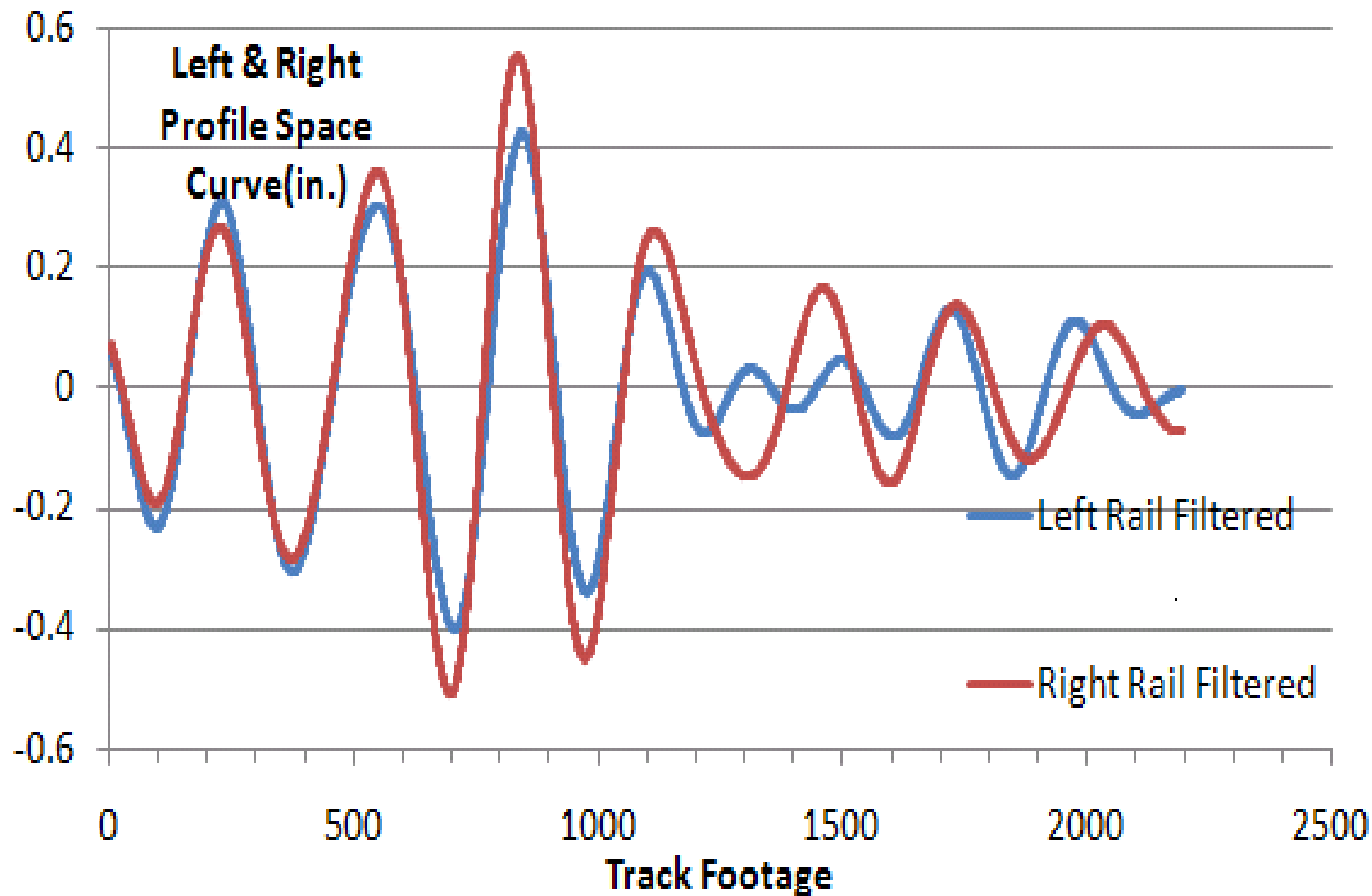
# VTI Issues

- How Rolling Stock Behaves on a Segment of Track
  - Ride Quality
  - Wheel & Rail Maintenance
  - Truck Hunting
- Defects
  - Combination of Profile and Alignment
  - Short & Long Warps

# Raw Geometry Car Data from VTI Problem Site



# Filtered Data from VTI Problem Site Harmonics



# North American Highspeed Rail

- Regulatory Environment = Adaptation
- Impact Loads = Greater Maintenance
- VTI Issues = Greater concern for mixed traffic/operating characteristics/passenger ride comfort
- NEC = Complexity in meeting everyone's expectations for rail

# Thank You