NCHRP REPORT 773
CAPACITY MODELING
GUIDEBOOK FOR SHARED-USE
PASSENGER AND FREIGHT RAIL
OPERATIONS

A project to develop guidebook for
DOT’s, Public Agencies and other
Shared Rail Corridor Stakeholders
Introductions

- Justin Fox
  - Senior Project Manager, CDM Smith
- David Simpson
  - Principal at David P. Simpson Consultants LLC
- Paula Hirsch
  - Senior Admin Assistant, CDM Smith
Project Background

- NCHRP Report 657 is the general guidebook for implementing passenger service on shared corridors.
- This guidebook “drills down” on the issue of service capacity assessment and modeling as these elements often comprise the biggest challenge to developing a long-term partnership.
Project Sponsor

- AASHTO’s Standing Committee on Rail Transportation (SCORT)
Study Team

- Justin Fox, CDM Smith
- David Simpson
- With assistance from
  - Alan Bing
  - Bruce Horowitz
  - Andy Cebula
  - Om Kanike
  - Paula Hirsch
Shared Corridor Context

› Public transportation agencies are increasingly considering rail service options to improve passenger mobility

› Agencies are engaging freight railroads given that new rail corridors are very costly and difficult to build

› Agency staff often lack knowledge of rail line capacity planning methods and issues
Project Goal

- Produce a guidebook for public sector agencies that will help them interact more effectively with freight railroads and other track owners in planning and managing line capacity for shared-use operations.
Project Work Program

- Three essential activities
  - Outreach to stakeholders
  - Description of capacity analysis tools and methodologies
  - Illustrative case studies
Outreach

- Stakeholder target groups
  - Freight railroads hosting passenger services
  - Public agency sponsors of passenger trains on freight railroads and Amtrak’s Northeast Corridor (NEC)
  - Amtrak
  - Federal Railroad Administration (FRA)
Principal Themes from Outreach

- Standards for transparency of modeling inputs and outputs vary widely.
- Long-term view of corridor needs is essential to ensure appropriate targeting of capital and to build confidence of all parties in the process.
- Robust analysis of service capacity needs and issues, including modeling, is essential to building a solid foundation for a corridor partnerships.
Capacity Analysis Methodologies

- **Manual methods**
  - String line analysis and grid time analysis

- **Operations simulation**
  - Rail Traffic Controller (RTC), RAILSIM, RAILS2000, NCFRP’s Web-based Freight-Passenger Rail Corridor Project Screening Tool, aka Shared-use Tool (SU Tool)

- **Other methods**
  - Manual, statistical, simulation, etc.
  - Proprietary, details less well known
Methodology Pros and Cons

- **Manual methods**
  - Pros: Easy to do, inexpensive, limited data requirements
  - Cons: Not applicable to complex rail environments

- **Simulation**
  - Pros: Robust, comprehensive analysis capability
  - Cons: Intensive data and resource requirements; potentially very expensive; getting freight railroad data may require confidentiality guarantees
String Lines

Also known as a time-distance diagram, a string line shows movements of trains over a track segment.
One-way grid time: Time required for train to exit eastern siding at Point B and enter western siding and stop at Point D (30 minutes)
Simulation Output: Speed Chart

At top: Maximum allowable speeds in grey; train progress in black
Methodology Applications

- Manual methods
  - Feasibility studies
  - Conceptual planning studies
  - Alternatives screening

- Operations simulation
  - Highly detailed operations analyses
  - Planning for detailed improvements to enhance line capacity over time
  - Reaching agreement between host railroad and public agency service sponsor on shared-use contract terms
Case Study: LOSSAN

- Conceptual planning study
- Methodology: Grid time analysis
- Objective: Link capital investments to train volumes over a 15-year period

LOSSAN study area in Southern California: Line thickness shows relative train volumes
Case Study: New Haven-Hartford-Springfield Line

- Detailed planning study
- Methodology: RTC operations simulation
- Objective: Identify capacity improvements to support new commuter trains, high speed rail trains, and increasing freight train volumes

Study area: Amtrak’s Springfield Line highlighted
Case Study: North Sound

- Conceptual planning study
- Methodology: Grid time analysis, RTC, and Shared-use Tool application
- Objective: Compare results of three analysis methodologies

Study Area: BNSF’s Scenic and Bellingham’s Subdivisions
Case Study: Chicago-St. Louis

- Detailed planning study
- Methodology: RTC operations simulation
- Objective: Deliver a long-term shared investment program for new intercity and increasing rail freight services

Route shown in two segments: Chicago to Bloomington, then Bloomington to St. Louis
Capacity Modeling – Partnership Principles

- Build trust between stakeholders: this is a long-term relationship, not a “purchase of space”
- Take the long view. What is the “vision of success” 20 years out, and is it consistent with your short term requests?
Capacity Modeling – Partnership Principles (cont)

- Acknowledge the large scale network impacts of local passenger operations: the most cost effective mitigations may be remote from the direct service area
  > May require agency to explain benefits of improvements made distant from a subject corridor

- Rigorous, detailed capacity assessment and modeling is a worthy investment, and delivers a framework to assess future changes in corridor needs
Link to Guidebook

- NCHRP Report 773
  - “Capacity Modeling Guidebook for Shared-Use Passenger and Freight Operations”
  - http://www.trb.org/Main/Blurbs/171662.aspx
Additional Opportunity

- Breaking down the barriers: the “virtual automobile”
- LA Workshop, 09/15
- https://vimeo.com/album/3754857