Capacity Improvement On the Shared-use Corridors by Applying Timetable Management Techniques

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Research Introduction

Research Background:

- Interest in "higher-speed" or "accelerated" passenger trains is increasing pressure to create shared-use (freight/passenger) corridors
- Most corridors are already close to capacity limits, making introduction / increase of passenger trains challenging
- The new corridors offer closer resemblance to European shared corridors with high utilization, but different train configuration and operation philosophy

Research Questions:

- How do European and U.S. methodologies and tools compare when analyzing shared-use capacity?
- How to improve capacity utilization with focus on operations, instead of infrastructure capital improvements?

Research Steps:

Step 1: Literature review and obtaining U.S. and European capacity tools and software (RTC, RailSys, Open Track ☑

Step 2: Comparing and analyzing different capacity tools on a theoretical corridor ☑

Step 3: Applying hybrid evaluation method (both European and U.S. approaches) on a real-life case study

Step 4: Developing an operational capacity improvement model for the U.S. shared corridors

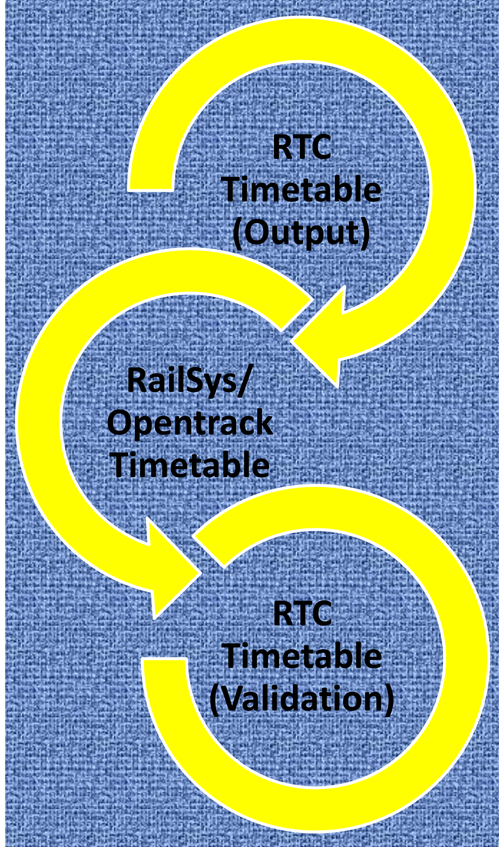
Capacity Tools and Hybrid Application Process

1- Rail Traffic Controller (RTC)

- Common tool in the U.S.
- U.S. default databases (Rolling stock, signaling)
- Automatic dispatch / resolve of the trains conflicts: "**meet-pass N-train logic"**

2- RailSys/ Opentrack

- Common tools in Europe
- **RailSys:** Timetable management features to resolve the trains conflicts
- **Railsys:** Timetable compression for optimization
- **Opentrack:** Simpler database development
- **Opentrack:** Automatic dispatch / resolve of the trains conflicts**: "routing options and train priorities"**



Database Conversion – RTC to RailSys/Open Track

Category	Conversion Criteria	Difficulty Level	Main Adjustments
Operation rules	Match	Easy	Unit conversion
Trains	Maintain running times	Complicated	Train consist, Power, Max speed, Train resistance
Signaling	Maintain routes and running times	Complicated	Signal features, Interlocking, Blocks
Infrastructure	Match	Easy	Unit conversion

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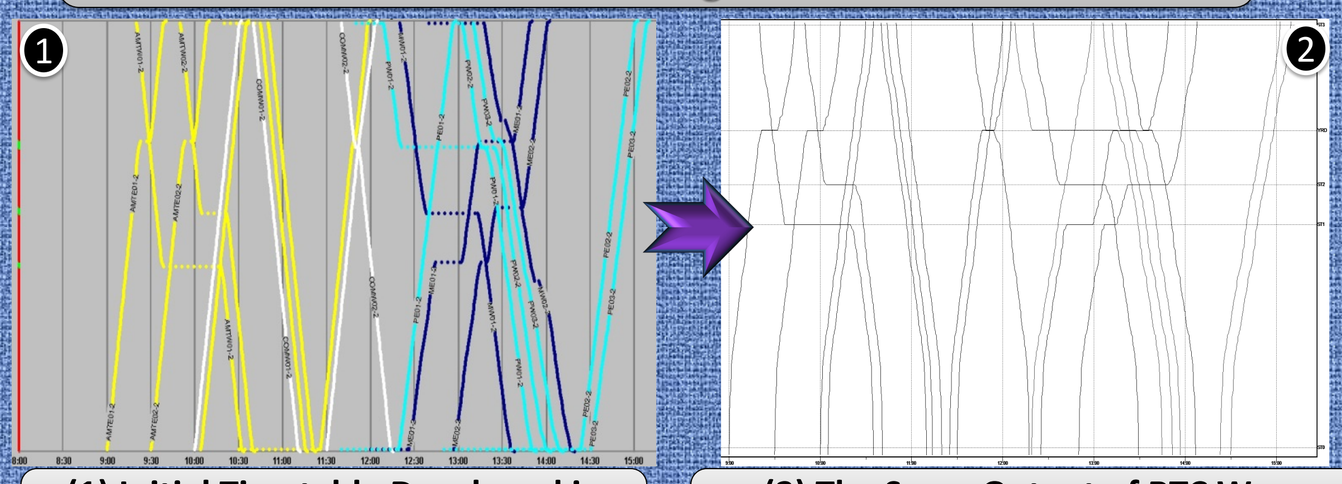
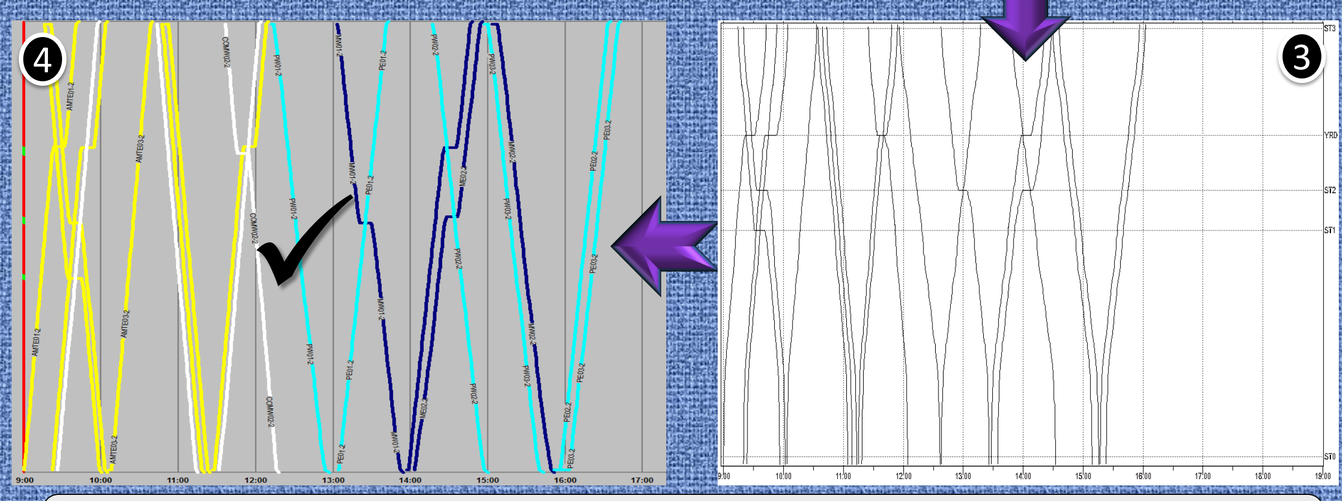
RTC & RailSys - Hybrid Approach Application for Improving the Utilization of a Single Track Corridor



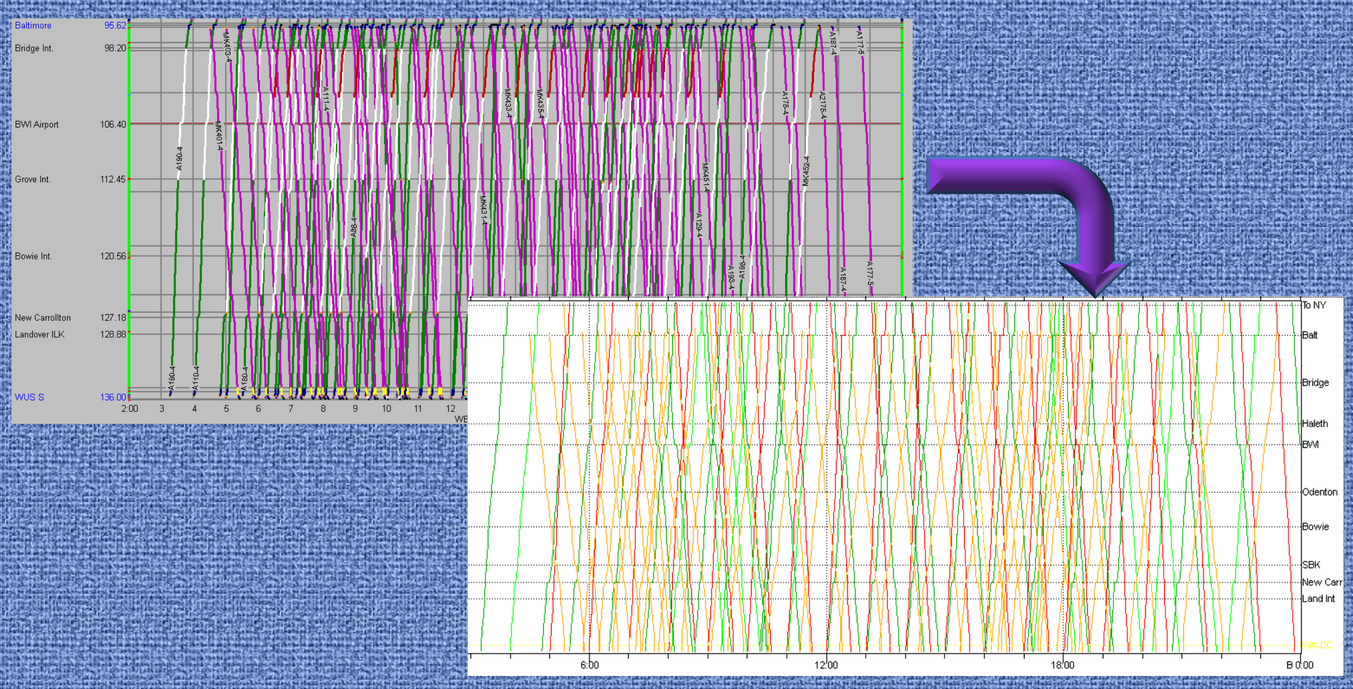
(1) Initial Timetable Developed in RTC

(2) The Same Output of RTC Was Replicated in Railsys

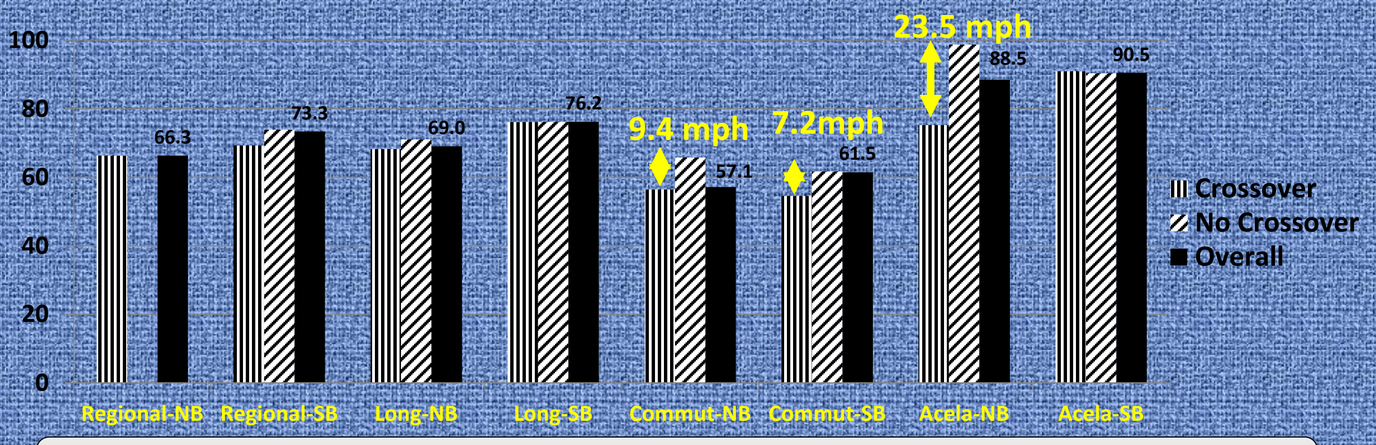


The Timetable (2) Improved through RailSys Timetable Compression Technique (3), The New Timetable Validation in RTC (4)

RTC & RailSys – Real Life Case Study; Impact of Using Crossovers along Baltimore-DC Corridor



The RTC's Timetable Replicated in RailSys and Used to Evaluate Impact of Crossover Use on the Trains Speed through Operational Management Features



Average Speed of Baltimore-DC Trains Based on Crossover Use

Next Step of Research

- Applying Opentrack simulation on the case studies
- Implementing the hybrid approach on a segment of Chicago-Detroit "Accelerated" corridor
- Developing a "Rescheduling/Rerouting Model of Timetable Improvement" for the U.S. shared-Use Corridors