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## Rail Capacity Improvement Study for Commuter Operations

### Background

The Federal Transit Administration notes that over the last decade, commuter rail systems have experienced increased ridership that closely matches the increases in gasoline prices. FTA also identified highway congestion and environmental concerns as other factors that have helped to boost ridership. As a result of these and other factors, some major commuter rail systems have reached or are approaching capacity. FTA has expressed concerns that commuter rail systems will not be capable of fully handling the resulting increase in ridership demand.

### Objectives

The objective of this study was to offer a combination of considerations and evaluation tools pertaining to relevant means of capacity improvements (technology, operations, route, and vehicle upgrades), conventional and emerging. Guidance regarding the economics is offered to help balance the mix to minimize the cost of achieving the level of capacity improvement required. To meet this objective, Transportation Technology Center, Inc. (TTCI) evaluated various aspects of the present capacity limitations versus ridership for a large commuter rail system in the United States to determine capacity constraints and to identify areas where improved capacity might be needed. TTCI identifies promising potential improvements and additions to infrastructure to increase capacity (emphasizing cost-effective technology solutions). The study also discusses the benefits, effectiveness, and life cycle costs of the various solutions. A sequence for implementation of the various recommended changes is suggested.

### Findings and Conclusions

*A combination of considerations, evaluation tools, and economic guidance is provided pertaining to relevant means of capacity improvements for commuter rail systems.*

This report describes principles and concepts related to capacity for commuter rail operations. Topics include track and station configuration, rolling stock, train operations, and signal issues. Transportation Technology Center, Inc. (TTCI) identifies promising potential improvements and additions to infrastructure to increase capacity (emphasizing cost-effective technology solutions). Discussion is provided on investment planning to increase commuter rail system capacity by making the various improvements noted. The study also discusses the benefits, effectiveness, and life cycle costs of the various solutions.

The following specific conclusions are noted:

1. Capacity issues for commuter rail lines can be very different depending on the type of operation, that is, single or multiple track, single or bidirectional operation.
2. Key factors affecting commuter rail capacity include time between trains, operating speeds between stations, acceleration and deceleration capabilities of trains, station dwell time, signal system, and rolling stock, both cars and locomotives.
3. Key factors affecting commuter rail trip time include length of route, number and distance between stations, and passenger perception of trip length and delay.
4. In commuter rail operations on corridors shared with freight operations, the freight operators must be kept whole in terms of their ability to provide service to their freight customers.
5. Scheduling for commuter rail operations needs to take into consideration the long braking distances and relatively long time between trains needed to operate safely.
6. In developing schedules for commuter rail operations, consideration should be given to allow operating windows for various freight and long-distance passenger operations, as well as track maintenance, temporary speed restrictions, equipment problems, and schedule recovery time.

## Benefits

Increasing commuter rail system capacity can be achieved by means of promising potential improvements and additions to infrastructure that emphasize cost-effective technology solutions.

### Project Information

#### FTA Report No. 0037

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