



Transit



Safe Transit in Shared Use

Background

With the resurgence of public transit, interest has emerged in the use of corridors that are part of the general railroad system, which is primarily used for freight railroad operations and, to a lesser extent, by intercity and commuter railroad services. Many of these corridors are located in areas where light rail transit (LRT) is the preferred transit mode, due, in part, to the adaptability of LRT and the fact that it is physically capable of operating on the general railroad system in most respects. The most prominent exception is non-compliance with Federal Railroad Administration (FRA) vehicle safety requirements imposed on both freight and passenger railroad services. Light rail vehicles in use in the United States do not meet these standards, although vehicles recently put into service have characteristics that are near-compliant.

Where freight operations can be limited to times when LRT would not operate, such as late night, FRA has granted waivers to its rules. In this approach to temporal separation, FRA-compliant and non-compliant trains are kept absolutely separate by assignment of specific blocks of time to each mode, typically one non-compliant (traditionally LRT) block and one compliant (i.e., freight) block per 24-hour cycle. In some locations, this type of shared use of track by compliant and non-compliant trains is not satisfactory for the concerned service providers, as the frequency and flexibility of operations is constrained, curtailing the quality of service for each mode. This has prompted research and discussion regarding techniques for shared use of track.

This research focused on the NJ TRANSIT River LINE, a 34-mile-long LRT service between Trenton and Camden, New Jersey. The line operates in-street and over exclusive right-of-way (32 miles of the line are currently part of the general railroad system), most of which is shared with Conrail freight operations under a shared use waiver from FRA that initially specified the typical day/night separation of modes. However, at one location, even during the passenger hours of operation, the use of vital signal design known as Short Interval Temporal Separation (SITS) allowed freight trains to cross over passenger tracks. SITS permits short interval shifts between modes while maintaining absolute mode separation in a single interlocking.

A major adjustment to the River LINE waiver was obtained from FRA using Extended Temporal Separation (ETS), which was applied to two miles of the River LINE, enabling passenger and freight trains to share track, even during the day-time hours of passenger operation. ETS involves a method of employing vital signal logic to integrate actions of two or more consecutive railroad interlockings covering an extended section of railroad, so that separate passenger and freight routes may be called and locked.

Objectives

The primary study objective was to define an approach that could assist LRT project planners seeking an FRA waiver for shared use operation. In addition, the study was to apply the approach to a demonstration project and prove that the approach for shared track operations would provide an acceptable level of safety in comparison to the time-of-day approach to temporal separation previously used.

Findings and Conclusions

The research in this study, using the SITS/ETS technologies and operating practices in use on the NJ TRANSIT River LINE, developed a design for more advanced temporal separation to allow the operation of light rail vehicles and freight trains in closer proximity than currently exists. The SITS/ETS design for the River LINE enables the two modes to operate more frequently, within minutes of each other, spans approximately seven miles with multiple interlockings (a longer segment than in the previous application of SIT/ETS), and increases routing flexibility through the shared use territory. The template employs advanced, but nevertheless “conventional off-the-shelf” engineering technology that can be applied by railroads or transit agencies seeking to advance a shared use project. This template includes an option for using “railroad-based” rather than “transit-based” operating practices to enhance the compatibility of the LRT service with FRA-compliant railroad operations. The resulting mode is referred to as “interurban” rail. The research prepared a sample FRA waiver application and identified prospective rail services where the shared use template could be considered.

Benefits

With limited available rights-of-way for expansion of transit services, it is desirable to use existing corridors to cost-effectively advance projects involving non-compliant LRT and FRA-compliant freight and passenger operations. This research developed a template for temporal separation that consists of technology and operating practices that would safely separate the modes in compliance with FRA regulations. This advanced approach to temporal separation has the potential to enable the compliant and non-compliant modes to operate frequently and within minutes of each other, making efficient use of the right-of-way while optimally serving its markets.

Project Information

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